

DATA SYSTEMS • 11000 Wolfe Road, Cupertino, California 95014, Telephone 408-257-7000, TWX 910-338-0221

Dear User:

Attached is the newest update to your HP BASIC Program Library Handbooks. This single package contains both the HP BASIC Addenda and the Educational Users Group Addenda. The order number for this package is HP 36000-90673.

CONTENTS:

- HP BASIC Program Library Handbook
 - a) New Introduction
 - b) New Complete Indices
 - c) New and Modified Documentation, RUNs, and LISTings
 - d) Note: LETTER (HP 36124A has been replaced by a new program, PRINT (HP 36299A). LETTER should be removed from your Handbook.

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- Volume II Huntington Computer Project
 - a) New Introduction
 - b) New Complete Indices
 - c) New Documentation, RUNs, and LISTings
- Volume III Application Programs
 - a) New Introduction
 - b) New Complete Indices
 - c) New Documentation, RUNs, and LISTings
- Volume IV Stanford Graduate School of Business Handbook

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- a) New Introduction
- b) New Complete Indices

This material should be merged with your original Handbooks to comprise single volumes.

HP SOFTWARE CENTER Users' Library

36000-90673

HP Computer Museum www.hpmuseum.net

For research and education purposes only.

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HP BASIC PROGRAM LIBRARY HANDBOOK

The Hewlett-Packard Company makes no warranty, expressed or implied, and assumes no responsibility in connection with the operation of the contributed program material attached hereto.

HEWLETT-PACKARD, SOFTWARE CENTER, 11000 Wolfe Road, Cupertino, California 95014 Area Code 408 257-7000 TWX 910-338-0221

36000-90001	6/72	Handbook
36000-90002	10/72	Addenda
36000-90003	2/73	Addenda
36000-90673	6/73	Addenda

CLASSIFICATION CODE CATEGORY

(Not all categories have programs. Please refer to Classification Code Listing for available programs in HP BASIC)

DATA HANDLING

- EDITING
- INFORMATION STORAGE AND RETRIEVAL TABLE HANDLING CHARACTER/SYMBOL MANIPULATION CODE/RADIX CONVERSION

- CODE FRADIA CONVERSION DUPLICATION SORTING AND MERGING DATA HANDLING UTILITIES MEDIA CONVERSION FILE MANAGEMENT

- SPECIAL FORMAT DATA TRANSFER

TESTING, DEBUGGING AND PROGRAMMING AIDS

- TRACING

- INSTRUMENT TEST DISC/DRUM EQUIPMENT TEST MAGNETIC TAPE EQUIPMENT TEST GRAPHIC EQUIPMENT TEST MEMORY SEARCH AND DISPLAY

- DUMPING CORE STORAGE TEST
- CORE STORAGE TEST CENTRAL PROCESSING UNIT TEST BREAK POINTS DEBUGGING AIDS PROGRAMMING AIDS PAPER TAPE EQUIPMENT TEST PUNCH CARD EQUIPMENT TEST PRINTER EQUIPMENT TEST ACD = D (4 EQUIPMENT TEST 210

- 217
- A/D D/A EQUIPMENT TEST TELECOMMUNICATIONS EQUIPMENT TEST SPECIAL DEVICE EQUIPMENT TEST DATA ACQUISITION SYSTEMS TEST
- 219
- MATH AND NUMERICAL ANALYSIS
 - MATHEMATICS, GENERAL MATHEMATICS, GENERAL EXTENDED-PRECISION ARITHMETIC COMPLEX ARITHMETIC BCD/ASCII ARITHMETIC BOOLEAN ALGEBRA FUNCTIONS, COMPUTATION OF INTERPOLATION/EXTRAPOLATION CURVE FITTING NUMEBICAL INTECENTION

 - NUMERICAL INTEGRATION POLYNOMIALS AND POLYNOMIAL EQUATIONS MATRIX OPERATIONS

 - MATRIX OPERATIONS EIGENVALUES AND EIGENVECTORS SYSTEMS OF LINEAR EQUATIONS SYSTEMS OF NON-LINEAR EQUATIONS INTEGRAL TRANSFORMS NUMERICAL DIFFERENTIAL EQUATIONS PARTIAL DIFFERENTIAL EQUATIONS

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PROBABILITY AND STATISTICS

- UNIVARIATE AND MULTIVARIATE PARAMETRIC STATISTICS
- 40 4
- UNIVARIATE AND MULTIVARIATE PARAMETE TIME SERIES ANALYSIS DISCRIMINANT ANALYSIS REGRESSION ANALYSIS REGRESSION ANALYSIS PROBABILITY DISTRIBUTION SAMPLING NON-PARAMETRIC STATISTICS, STATISTICS, GENERAL CORRELATION ANALYSIS ANALYSIS SCALING GENERAL PROBABILITY

- 410
- 412
- GENERAL PROBABILITY

SCIENTIFIC AND ENGINEERING APPLICATIONS

- SOCIAL AND BEHAVIORAL SCIENCES
- GEOPHYSICS
- GEOLOGY OCEANOGRAPHY

- PHYSICS 507 MEDICAL SCIENCES CHEMISTRY BIOLOGY ASTRONOMY AND CELESTIAL NAVIGATION PETROLEUM ENGINEERING HYDRAULIC ENGINEERING ELECTRICAL ENGINEERING MECHANICAL ENGINEERING CIVIL ENGINEERING AERONAUTICAL ENGINEERING STRUCTURAL ENGINEERING SYSTEM THEORY BIOLOGY 514 517 MANAGEMENT SCIENCES AND OPERATIONS RESEARCH PERT CRITICAL PATH ANALYSIS OPTIMIZATION PROGRAMS LINEAR PROGRAMMING DISCRETE SYSTEMS SIMULATION CONTINUOUS SYSTEMS SIMULATION FORECASTING TECHNIQUES DYNAMIC PROGRAMMING 700 BUSINESS AND MANUFACTURING APPLICATIONS JOB REPORTING 9UALITY ASSURANCE PERFORMANCE ANALYSIS 9UALITY ASSURANCE TESTING NUMERICAL CONTROL BILL OF MATERIALS PAYROLL ACCOUNTING WORK-IN-PROCESS CONTROL INVENTORY ANALYSIS ACCOUNTS PAYABLE SALES FORECASTING ACCOUNTS RECEIVABLE FINANCIAL ANALYSIS INVESTMENT ANALYSIS BUGGETING PROGRAMS BUSINESS INFORMATION SYSTEMS BUSINESS SERVICES EDUCATIONAL ADMINISTRATION JOB REPORTING 706 708 710 711 716 717 720 EDUCATION MATHEMATICS (EDUCATION) PROGRAMMING AND COMPUTER SCIENCE (EDUCATION) ENGINEERING (EDUCATION) ECONOMICS (EDUCATION) SCIENCE (EDUCATION) SOCIAL SCIENCE (EDUCATION) HISTORY (EDUCATION) ENGLISH (EDUCATION) ENGLISH (EDUCATION) ENGLISH LANGUAGES (EDUCATION) 85Ø
 - FOREIGN LANGUAGES (EDUCATION) FOREIGN LANGUAGES (EDUCATION) BUSINESS (EDUCATION) VOCATIONAL (EDUCATION)

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UNCLASSIFIED

- DEMONSTRATIONS
- GAMES PLOTTING ROUTINES
- MICROCODE

INTRODUCTION

What is Hewlett-Packard?

From a two-man beginning some thirty years ago, Hewlett-Packard has developed into a major designer and manufacturer of electronics for measurement, analysis, and computation. HP customers in science, industry, medicine, and education know and appreciate Hewlett-Packard's reputation for technical excellence, quality, and reliability.

Over 100 world-wide offices sell and service the products of sixteen manufacturing facilities located in the United States, Europe, and the Far East. Specialized customer support (such as training, systems analysis and equipment rental) is available at domestic regional Data Centers in New Jersey, Georgia, Illinois, and California and international data centers in Italy, England, Germany, France, Canada, and Australia.

What is the HP BASIC Library?

One important facet of customer support is the collection and distribution of contributed software, from and for HP computer users. The HP BASIC Library contains contributed programs covering a variety of subjects, all written in the HP BASIC language. You can use these programs directly or as a starting point for developing your own special-purpose software. Many of the programs run on a "single terminal" BASIC system; however, some use sophisticated features available only to time-share system users.

How is the HP BASIC Library Organized?

Hewlett-Packard has categorized all programs within the following major areas of user interest:

- 1 DATA HANDLING
- 2 TESTING, DEBUGGING AND PROGRAM-MING AIDS
- 3 MATH AND NUMERICAL ANALYSIS
- 4 PROBABILITY AND STATISTICS
- 5 SCIENTIFIC AND ENGINEERING APPLICATIONS
- 6 MANAGEMENT SCIENCES AND OPERATIONS RESEARCH
- 7 BUSINESS AND MANUFACTURING APPLICATIONS
- 8 EDUCATION
- 9 -- UNCLASSIFIED

The four indices appearing at the beginning of the Handbook contain all BASIC programs available through the HP BASIC Program Library. Four separate handbooks are now available. The indices indicate in which of the four volumes the programs appear.

- T = HP BASIC E = EDUCATION H = HUNTINGTON
- S = STANFORD

The programs which appear in this Handbook are designated in the indices by a "T" indicating general programs in HP BASIC.

Program indices are by:

- Classification Code (In the Handbooks, programs are sequenced by classification code)
- Cross-reference Index
- Program Name (In alphabetical order)
- Order Number

Who Prepares These Programs?

Hewlett-Packard supported programs written in HP BASIC are now listed in the Educational Users Group Handbook, Volume III, Applications Programs, and the HP BASIC Handbook or general programs. They are distinguished by a stripe. Contributed programs in HP BASIC which have been submitted by users of HP computer systems throughout the world are listed in the HP BASIC Handbook, The Educational Users Group Handbooks, including the Stanford Graduate School of Business Handbook. The Educational Handbooks contain programs which are oriented for instructional purposes.

Contributions to our library are from many disciplines and various applications. HP personnel at the Software Center run and check the documentation for each program, but because it is impractical to test these programs under all possible conditions, Hewlett-Packard cannot assume responsibility for errors. Therefore, please report any errors you might find to the Software Center for forwarding to the program contributors.

How Can I Make Use of These Programs?

This handbook contains operating instructions, a sample RUN and Listings for each program. If the time-share system your terminal accesses has these programs in its system library, you merely GET the program preceding the name by a "\$." Otherwise, you may enter the

program from your terminal by duplicating the information in the listing.

The system on which the program was tested by Software Center personnel is listed under "Systems Specifications" in the Handbooks, and it is indicated in the Indices as the leading alpha of the classification code. Its versatility to RUN on other time-sharing systems can be determined from its program features. The following chart was designed to be used in conjunction with the program listings from the BASIC Handbooks.

Program Features	2000A	20008	2000C	2000E	2000C High-Speed 2000F
Maximum Program Size	5100 Words	5100 Words	10000 Words	4180 Words	10000 Words
Maximum Number				1	
of Files	8	8	16	4	16
Maximum Number of Records/File	128	128	32767	48	32767
Maximum Number or Words/Record	64	64	756	128	256
Programmable					
Functions					
TIME		x	×	×	×
ENTER		×	×		×
COMMON	-	×	×	×	×
CHAIN		Chain-''Name''	Chein-\$Name, Statement No.	Chain-SName	Chain-SName, Statement No.
		×	×	×	×
PRINT USING			×		×
BRK					×
ASSIGN			×		×
RÉSTARTABLE RND			x	×	×
SPACE			x	CARGOLI THE	×
LINE			×	-	×

How Can I Order These Programs?

Contact your local HP sales office to order any of the material from the library, (except HP subscriptions).

To order magnetic tapes of all contributed BASIC software, contact your local HP sales office and ask for:

HP Part No. 02000-90029 2000C Mag Tape \$25.00 HP Part No. 02000-90060 2000C'/F Mag Tape 25.00 HP Part No. 02000-90059 2000E Disc Cartridge 150.00* * Price includes disc. If you return your user cartridge with your order, the price is \$25.

Individual Programs On Paper Tape and Handbooks

Programs include punched paper tape and documented user procedures. Price, \$10 per program or otherwise noted on program documentaion to cover the cost of reproduction and handling. Licensed HP-supported programs are available only with the purchase of an HP time-share system.

Note: The June 1973 Addenda to the HP BASIC Library Handbooks is a single package, including both the HP BASIC Handbook Addenda and the Educational Users Group Addenda. The order number assigned to this addenda (HP 36000-90673) reflects the issue date in the last 3 digits.

To order individual Handbooks from your local sales office, use the following:

		Part	
Title	Date	Order No.	Price
HP BASIC Program Library			
Handbook	June '72	36000-90001	\$10
HP BASIC Program Library			
Handbook Addenda	Oct. '72	36000-90002	\$3
HP BASIC Program Library			
Handbook Addenda	Feb. '73	36000-90003	\$3
Educational Users Group			
Program Library-Vol. II			
Huntington Computer Project	Feb. '72	5951-3041	\$5
Educational Users Group			
Program Library-Vol. III			
Application Programs	Feb. '72	5951-3042	\$5
Educational Users Group			
Program Library-Vol. IV			
Stanford Graduata School of			
Business Handbook	Oct. '72	36500-90001	\$5
Business Handbook	Oct. 72	36500-90001	\$ D
Educational Users Group			
Program Library—Addenda	June '72	36400-90002	\$3
Educational User Group			
Program Library-Addenda	Oct. '72	36400-90003	\$ 3
Educational Users Group			
Program Library-Addenda	Feb. '73	36400-90004	\$3
HP BASIC & Educational Users			
Group Program Library Addenda	June '73	36000-90673	\$6

Note: Educational Users Group Program Library Volume I, Guide to Educational Support (HP 5951-3040) is obsolete and has been discontinued.

OTHER LIBRARY PUBLICATIONS

The following is a list of documentation not included in the Library Handbooks. They should be ordered to fully document the programs referenced.

Title	Date	Order No.	Price
FINDIT Users Manual	Feb. '73	36250A, Option D00	\$5
TIDE Text Editor	Oct. '71	36200 Option D00	\$5
CTC1 Documentation	Feb. '73	36210B	\$5
CTC2 Documentation	Feb. '73	36211B	\$5
CTC3 Documentation	June '73	36212B	\$5
CTC4 Documentation	June '73	362138	\$5
CTC5 Documentation	Feb. '73	36214B	\$5
CTC6 Documentation	June '73	36638A	\$5

How to Update These Volumes?

This handbook was produced, three-hole punched, and stapled so that users can unbind them and keep them in a loose-leaf notebook. A 2" capacity binder is available from Hewlett-Packard. Order HP Part No. 9282-0069 (to match your other HP System manuals.)

Updates will be issued once every four months. The updates will contain revisions and additional programs. The updates should be merged with the original to produce single volumes.

HP BASIC SUBSCRIPTION SERVICES

(available only to users in the North American countries)

PAPER TAPE SUBSCRIPTIONS

To subscribe, mail Hewlett-Packard a check for \$250 (plus applicable state and local taxes). When we receive a paper tape subscription, we send the subscriber a booklet containing 50 coupons. Discounted punched paper tapes may then be procured via coupon or coupons as follows: (Check the documentation—if no price appears, the program is \$10.)

NORMAL PROGRAM PRICE COUPONS REQUIRED

\$10 to \$40	1
50 to 90	2
100 to 140	3
150 to 190	4
200 to 240	5

MAGNETIC TAPE SUBSCRIPTIONS

A "two-year" magnetic tape subscription service of contributed BASIC programs is available to 2000C System owners for \$100 (plus applicable state and local taxes). When we receive a magnetic tape subscription, we send the subscriber a current magnetic tape plus a coupon book for five additional magnetic tapes (released periodically). The coupon book consists of five selfaddressed prepaid mailing cards. The subscriber simply mails a card each time a new addendum is released. Each new index announces a new addendum.

HP BASIC HANDBOOK SUBSCRIPTIONS

A "two-year" handbook subscription service for a choice of any three of the handbooks is available to HP users for \$25 (plus applicable state and local taxes). When we receive a handbook subscription, we send the subscriber the current set of the three volumes he has requested, plus a coupon book to handle future addenda when they are announced in the Index. The user will receive addenda released between June 1972 and June 1974.

To order any of the above subscriptions, make your check payable to Hewlett-Packard Company and mail to:

Hewlett-Packard Company Software Distribution 11000 Wolfe Road Cupertino, California 95014

When Will New Programs be Added?

New programs are continually added to the library. A new "INDEX TO HP BASIC PROGRAM LIBRARY" is published every February, June, and October. The Index announces the release of new addenda, lists all the programs to date in the BASIC Library (by cross reference words); and flags new, revised, and HPsupported programs. Using the Index (5952-4639) you can learn about new additions, contribute your own programs and report any software bugs. Copies of the Index are complimentary and may be obtained from your local HP Sales and Service office.

How Do I Interpret the Listings?

The ASCII characters "Control N" and "Control O" when used in a PRINT statement, generate linefeed and carriage return on the TTY terminal during a RUN. During a LIST these characters are not printed by a TTY. On HP 2778 and the HP 2610 line printer listing, these characters are printed as "N" and "O" respectively. Listings in some Handbooks were prepared on these line printers.

What Related Information is Available?

There are a number of manuals and documents relating to HP 2000 series Time-Sharing Systems that may be of value to users of the Handbook. These include:

Language Manuals:

2000C: A GUIDE TO TIME-SHARED BASIC (02000-90016) – June, 1972 A GUIDE TO HP EDUCATIONAL BASIC (02116-91773) – September, 1971 HP BASIC (02116-9077) – April, 1970 2000A: A GUIDE TO TIME-SHARED BASIC (02000-90002) – August, 1970 2000F: A GUIDE TO TIME-SHARED BASIC (02000-90044) – August, 1972

Operating System Manuals:

2000C: TIME-SHARED BASIC OPERATOR'S GUIDE (02000-900017) – June, 1972 2000B TO 2000C CONVERSION PROGRAM GUIDE (02000-90031) – April, 1971 2000F: TIME-SHARED BASIC SYSTEM OPERATOR'S GUIDE (02000-90045) – August, 1972 2000A: TIME-SHARED BASIC SYSTEM OPERATOR'S GUIDE (02000-90001) – September, 1970 2000A TO 2000B CONVERSION GUIDE (02000-90011) – August, 1970

Educational Applications Manuals:

2000C/2000F SYSTEM OPERATOR INSTRUCTIONS FOR EDUCATIONAL APPLICATION (02000-90046) - December, 1972 2000C/2000F INSTRUCTIONAL MANAGEMENT FACILITY AND INSTRUCTIONAL DIALOGUE FACILITY-PROCTORS MANUAL (02000-90047) - December, 1972 2000C/2000F MATHEMATICS DRILL AND PRACTICE PROGRAM-PROCTORS MANUAL (02000-90051) - December, 1972 2000C/2000F INSTRUCTIONAL DIALOGUE FACILITY-AUTHORS MANUAL (02000-90055) - January, 1973 2000C/2000F MATHEMATICS DRILL AND PRACTICE PROGRAM-TEACHERS HANDBOOK (02000-90052) - December, 1972 COPYFL (02000-90032) - September, 1971 EDCALC (02000-90033) - September, 1971 INITIALIZATION (02000-90034) - September, 1971 INTEGER TO STRING (02000-90035) - September, 1971 DATE AND TIME (02000-90036) - September, 1971 2000C/2000F INTRODUCTION TO MATHEMATICS DRILL AND PRACTICE (02000-90050) - August, 1972 2000C/2000F MATHEMATICS DRILL AND PRACTICE CURRICULUM GUIDE (02000-90053) - August, 1972 COURSE DEVELOPERS' MANUAL FOR IDF-1 AND IMF-1 (02000-90061) - February, 1973

UPSHIFT (02000-90037) — September, 1971 CHARACTER REMOVAL (02000-90038) — September, 1971 KEY WORD SEARCH (02000-90039) — September, 1971 DOWNSHIFT (02000-90040) — September, 1971 STRING MATCH WITH "DON'T CARES" (02000-90041) — September, 1971 STRING TO NUMBER (02000-90042) — September, 1971 STUDENT RESPONSE ANALYSIS (02000-90043) — September, 1971

The preceding publications are available at nominal cost through your local HP sales office.

In addition, both 35mm slides and video tape instructional courses on programming in the BASIC language have been prepared. Again, contact the nearest HP sales office for more information.

The HP Program Catalog lists abstracts for over 700 programs written in FORTRAN, ALGOL, and HP Assembly Language suitable for various configurations of non BASIC language Systems. This catalog is available at no charge from your local HP sales and support office. 5950-9226

An active educational group for BASIC language computer users also invites inquiries. For more information on this activity, contact the Executive Secretary; Educational Users' Group, Hewlett-Packard Company; 11000 Wolfe Road, Cupertino, California 95014.

CLASSIFICATION CODE LISTING

LEGEND Volumes: T = HP BASIC, E = Education, H = Huntington, S = Stanford System Specifications: A = 2000A, B = 2000B, C = 2000C, F = 2000F, S = Single Terminal

<u> </u>	1/1/ 03 / 0 / 1 // a
T (A101) 36003A MACRO : A TEXT AND FILE PROCESSING SYSTEM	S (C405) 36551A GWAULL : SUBJECTIVE PROBABILITY - RANDOM VALUES
T (C101) 36200B TIDE : TEXT EDITOR FOR THE 2000C	T (A406) 36041A - BINOPO : PROBABILITY DISTRIBUTION COMPARISONS
T (A101) 36204A TIOEX : SYMBOLIC FILE EDITOR	S (C406) 36549A GTASPD : SUBJECTIVE PROBABILITY DISTRIBUTION
T (A102) 36004A SLSMN : SALES MANAGER'S INFORMATION RETRIEVAL	T (A407) 36042A CHISQ : COMPUTES PROBABILITY OF CHI-SQUARE VALUES
SYSTEM	T (A407) 36043L CHISOS : CHI-SQUARE STATISTICS FOR M®N CONTINGENCY
T (A102) 36231A ADDRES : AODRESS LABELS	TARLES
•T (C102) 36250B FINDIT : INFORMATION RETRIEVAL SYSTEM	T (A407) 36052A STAT2 : MANN-WHITNEY 2 SAMPLE RANK TEST
	T (ALAT) DIALDA CTATO A COLADMAN DANK CODDELATION COEFFICIENTS
*T (F102) 36284A MESSAG : INTERTERMINAL COMMUNICATOR T (A104) 36095B FORMAT : ALLONS SPECIAL FORMATIING OF DATA PRINTOUT T (8104) 36117A OATES : COMPUTES DATE FROM SYSTEM CLOCK T (8104) 36125B HELLO : TYPES DATE, TIME, AND PORT NUMBER ON TEPMINAL	T (A408) 36001A LOGRAM : LOG-ON TAPE ANALYZER T (A408) 36045A GEOMEN : STATISTICS OF GEOMETRIC DISTRIBUTION T (A408) 360556 HISTOG : A HISTOGRAM FOPMED FROM A SET OF NUMBERS
T (A104) 36176A STGINT : STRING-INTEGER CONVERSIONS	T (A40B) 36120A FC : ANALYSIS OF LOG TAPE
T (C104) 36220A CHARS : ASCII CHARACTER SET	T (A40B) 36136A SCORES : COMPUTES MEAN+ STANDARD DEVIATION AND
T (C104) 36256B ASCII : CREATES AN ASCII FILE CONTAINING ALL 256	STANDARD SCORES FOR TEST SCORES
ASCII CHAHACTERS	T (A408) 36137A KH20 : ITEM ANALYSIS ANO KUOER-RICHARDSON
T (C104) 36257A -ASCII : ASCII CODE GENERATOR	Formula 20 Reliability
T (A104) 36258A KEYSIG : GIVES MAJOR SCALES	T (A408) 361918 FRG : FREQUENCY BETWEEN BOUNDRIES
T (A104) 36259A MUSIC5 : FINDS DOMINANT SEVENTHS	S (C408) 36541A GRANK : PANKING STATISTICS
 T (F104) 36296A ALFTOV : ALPHA TO VARIARLE CONVERSION T (F104) 36297A TIMER : TIME OF THE DAY T (F104) 36297A TIMER : TIME OF THE DAY 	T (A410) 360398 ANVARI : ANALYSIS OF VARIANCE FOR A RANDOMIZED ONE- WAY DESIGN T (A410) 360408 ANVAM2 : ANALYSIS OF VARIANCE (LATIN SQUARE DESIGN)
*T (F104) 36298A DATER : DATE AND DAY OF THE WEEK T (C104) 36548A GTAPID : PAPER TAPE TITLEH T (C107) 36122A : SORT : FILE SERIAL STRING SORT	T (A410) 36172A ANVAR3 : ANALYSIS OF VARIANCE FOR A TWO VARIABLES OF CLASSIFICATION DESIGN
T (C107) 36145A STGSRT : SORTS STRINGS FROM FILES T (A107) 36206A FILSOR : FILE POINTER SORT/POINTER SORT	T (A410) 36173A ANVAR4 : TWO-WAY ANALYSIS OF VARIANCE FOR A TWO- WAY EXPERIMENT *T (F410) 36271A ANOVA3 : THREE FACTORIAL ANALYSIS OF VARIANCE
T (A107) 36296A POISOR : FILE POINTER SORT/POINTER SORT T (C107) 36232A . IRV : FILE SORT ROUTINE *T (A107) 36292A ALPHA : ALPHANUMERIC SORT	*T (A410) 36294A ANCOV : ANALYSIS OF COVARIANCE S (C410) 36501A GANOVA : ANALYSIS OF VARIANCE (2-WAY)
T (A108) 36197A JULIAN : JULIAN CALENDAR FOR THE CURRENT YEAR	•T (F410) 36607A STAT19 : KRUSKAL-WALLIS ONE WAY ANALYSIS OF
T (A108) 36218A HPMLUT : LIST/DUMP HP ASSEMBLER FILES	VARIANCE
T (A108) 36218A HPMLIT : LIST/DUMP HP ASSEMBLER FILES	T (S509) 36130A SUNSET : SUNRISE-SUNSET PREDICTOR
T (A108) 36222A TALK : TIME SHARING SYSTEM COMMUNICATION	T (A511) 36061A LOVALV : COMPUTES LIGUID CONTROL VALVE COEFFICIENTS
*T (F108) 36248A NEWIDS : CREATES NEW USER NUMBERS	T (A513) 36056A ANALAD : CIRCUIT ANALYSIS
T (CIOR) 36272A FILIS : FILE LISTING PROGRAM/INSTRUCTIONS T (CIOR) 36272A FILIS : FILE LISTING PROGRAM/INSTRUCTIONS T (CIOR) 36279A JULI : ONE PAGE JULIAN CALENDAR	T (A513) 36057A ACNODE : AC CIRCUIT ANALYSIS PROGRAM T (A513) 36060A LPFLTR : DESIGNS LOW-PASS FILTERS
*1 (F108) 36288A CALNDR : PRINTS A CALENDAR	I (ADI)/ 30004A MIASER + MIAER SPORIDOS RESPONSE FROORMM
T (A110) 36006A FILMAN : FILE MANAGER T (A110) 36007A FILIN : KEYBOARD FILE LOADING PROGRAM T (A110) 36008C FILDUM : PAPER TAPE FILE DUMP	 T (F513) 36293A ACTFIL : ACTIVE FILTER DESIGN T (A514) 36056A HTXFR : TWO DIMENSIONAL HEAT TRANSFER T (F514) 36635A METRIC : CONVERTS ENGLISH TO METRIC T (A515) 36109A BERDES : RECOMMENDS CORRECT STELL BEAM USE
(Allo) 36000C FILOSO : LOSS A FILE FROM THE TELETYPE	T (A516) 36059A DEBYE : COMPUTES DEBYE OR EINSTEIN FUNCTION
T (A110) 36011A FILREA : REENTERS THE DATA TAPE DUMPEO BY FILOUM	T (A519) 36063A TMFCEV : TIME FUNCTION EVALUATOR
T (A110) 360128 FLCOPY : COPIES ONE FILE INTO ANOTHER	T (A603) 361710 CPATH : CRITICAL PATH EVALUATION
T (B110) 36221A XTRACT : FILE UTILITY PROGRAM	S (C603) 36504A GCPATH : CRITICAL PATH ANALYSIS
T (B110) 36221A TAPDUM : FILE UTILITY PROGRAM	S (C603) 36505A GCPMI : CRITICAL PATH ANALYSIS
≪T (F110) 36247A FILRPT : REPORTS FILE CONTENTS AND STRUCTURE	S (C604) 36529A GNETFL : NETWORK FLOW
T (C205) 36185A TERTES : TELETYPE-CRT DIAGNOSTIC	T (A605) 360688 LINPRO : LINEAR PROGRAMMING MODEL
T (A211) 36116A BASTES : BASIC TEST PROGRAM	T (A605) 36230A TRANSP : TRANSPORTATION PROBLEM
T (C211) 36143C XHEF : BASIC LANGUAGE PROGRAM CROSS-REFERENCE	S (C605) 36512A GINTLP : LINEAR PROGRAMMING-VARIABLES RESTRICTED
Generator	TO VALUES OF ONE ON ZERO
*T (F212) 36287A DATA : DUMPS FILE TO DATA STATEMENTS	S (C605) 36516A GLP : LINEAR PROGRAMMING
T (A217) 36013A TESTTY : TESTS THE OPERATION OF A REMOTE TELETYPE	S (C605) 36517A GLPSA1 : LINEAR PROGRAMMING TWO-PHASE SIMPLEX
T (A301) 36034A SPHERE : SOLVES SPHERICAL TRIANGLES	METHOD
T (A301) 360358 EUCLID : COMPUTES LARGEST COMMON FACTOR OF TWO	T (A606) 36065C DECSN : TOP MANAGEMENT DECISION GAME
INTEGERS	S (C606) 36550A GVOTE : COMMITTEE CHOICE ANALYSIS
T (A301) 36036A SGRS : AN INTEGER AS THE SUM OF FOUR SQUARES	S (C607) 36552A GSSS : SMALL SYSTEMS SIMULATOR
T (A301) 36037A FACTOR : FINDS PRIME FACTORS OF POSITIVE INTEGERS	T (A609) 36069A LNTRND : LINEAR TREND FORECASTING
T (8301) 36131A CALCOM : CALCULATOR PROGRAM WITH OPTIONAL PLOTTER	T (A610) 36067A DYNPRO : DYNAMIC PROGRAMMING MODEL
DUTPUT (PART 1 OF 2)	*T (A706) 362139 CTC4 : CTC PAYROLL PROGRAMS
T (B301) 36131A CALPLT : CALCULATOR PROGRAM WITH OPTIONAL PLOTTER	T (A708) 36177A REP : DATA CENTER INVENTORY REPORT GENERATOR
OUTPUT (PART 2 OF 2)	T (A708) 36177A IN : DATA CENTER INVENTORY REPORT GENERATOR
T (A301) 36168A CALC2 : THREE REGISTER CALCULATOR PROGRAM	T (A708) 36210B CTC1 : CTC MANUFACTURING PARTS CONTROL
T (A302) 36015A CALC : EXTENDED PRECISION CALCULATOR	T (A708) 36211B CTC2 : CTC INVENTORY CONTROL FOR FINISHED
*T (A302) 360168 LEGNUM : LARGE NUMBER ADDITION & MULTIPLICATION	PRODUCTS
T (A302) 36144A EXTPRE : 40-DIGIT PRECISION MATHEMATICS	•T (F709) 3663BA CTC6 : CTC ACCOUNTS PAYABLE
T (A303) 36017A FNCTS : COMPUTES TRIG FUNCTIONS FOR COMPLEX	T (A710) 36095A SALES : SALES COMMISSION REPORT
ARGUMENTS	T (A711) 36214B CTC5 : CTC ACCOUNTS RECEIVABLE
T (A303) 36018A SQR(Z) : COMPUTES SQUARE ROOT OF A COMPLEX NUMBER	T (A712) 36074A ANNUIT : ANNUITY ANALYSIS
T (A303) 36118A CXANTH : VECTOR ARITHMETIC	T (A712) 36075A BALSHT : PROFORMA INCOME STATEMENT AND BALANCE
T (A303) 36119A CXEXP : VECTOR EXPONENTIATION	Sheet
T (A306) 36019A BESSEL : CALCULATES BESSEL FUNCTION OF FIRST KIND	T (A712) 36082A DEPCOM : DEPRECIATION METHOD COMPARISON
T (A306) 36019A BESSEL : CALCULATES BESSEL FUNCTION OF FINST KIND	T (A712) 36082A DEPCOM : DEPRECIATION METHOD COMPARISON
T (S309) 3618BA POLY : POLYNOMIAL APPROXIMATION	T (A712) 36083A EGUITY : COST OF EGUITY CAPITAL
T (A309) 36246A POLFTE : FITS LEAST-SQUARES POLYNOMIALS	T (A712) 36089B INSTMT : INCOME STATEMENT
T (A310) 36021A INTGRT : COMPUTES NUMERIC INTEGRAL OF A FUNCTION	T (A712) 36090A LENDER : SIMPLE LOAN ANALYSIS
*T (A310) 36022B ROMINT : INTEGRATES A FUNCTION (ROMBERG METHOD)	T (A712) 36091A LESSEE : LEASE ANALYSIS AS DETERMINED BY THE LESSEE
T (A311) 36024A ROOTER : FINDS THE ROOTS OF POLYNOMIALS	T (A712) 36093A MKRUY : MAKE-BUY DECISION ANALYSIS
T (A312) 36025A CDETER : COMPUTES VALUE OF COMPLEX DETERMINANT	T (A712) 360948 MORGAG : MORTGAGE ANALYSIS
T (B312) 36263A DETER4 : DETERMINANTS, CHARACTERISTIC POLYNOMIALS	T (A712) 361428 CSHFL : CASH FLOW ANALYSIS
AND INVERSES OF MATRICES	T (C712) 36194A LEASIN : LEASE INCOME
T (A314) 36026A SIMEON : SOLVES SIMULTANEOUS LINEAR EQUATIONS	T (C712) 36226A LOAN : LOAN AMORTIZATION
T (A314) 36027A CROUTI : SOLVES SIMULTANEOUS LINEAR EQUATIONS	S (C712) 36510A GFNRAT : FINANCIAL RATIOS
T (A314) 36196A SOLVIT : SIMULTANEOUS LINEAR EQUATIONS USING	S (C712) 36513A GIRRPV : INVESTMENT RETURN (CASH FLOW)
GAUSSIAN REDUCTION	S (C712) 36543A GRISKA : RISK ANALYSIS IN CAPITAL INVESTMENT
S (C314) 36547A GSIMEQ : SIMULTANEOUS LINEAR EQUATIONS	T (A713) 36076B BNDPRC : BOND PRICE ANALYSIS
T (A316) 36028A CIRFFT : COMPLEX TO REAL FAST FOURIER TRANSFORM	T (A713) 36077A BNDSWH : BOND SWITCH ANALYSIS
T (A3I6) 36030A GFFT : GENERAL FAST FOURIER TRANSFORM	T (A713) 36078B BNDYLD : BOND YIELD ANALYSIS T (A713) 36079A BNKRSV : BANK RESERVE CALCULATIONS
T (A317) 36031A DERIV : DERIVATIVE OF A FUNCTION AT A POINT	T (A713) 36080A CAPINV: CAPITAL INVESTMENT ANALYSIS
T (A318) 36032A DE-IOR : IST ORDER DIFFERENTIAL EQUATION	T (A713) 36084A EXDRSK: EXTENDED RISK ANALYSIS
T (A318) 36033A DE-2OR : 2ND ORDER DIFFERENTIAL EQUATION	T (A713) 36085A EXSMOO : EXPONENTIAL SMOOTHING ON PRICE DATA
T (A401) 36170A T-TEST : TEST OF HYPOTHESES USING STUDENTS T	T (A713) 36092A MARKOW : SECURITIES PORTFOLIO USING MARKOWITZ MODEL T (A713) 36096A STKINC : STOCK MERGER INCENTIVE PROGRAM
T (A404) 360238 POLFIT : FITS LEAST-SQUARES POLYNOMIALS	T (A713) 36098A STKRTN : STOCK RETURNS REPORT
T (A404) 36038C CURFIT : PERFORMS LEAST-SQUARES FIT	T (A713) 36099A STKSMO : EXPONENTIAL SMOOTHING AS A STOCK GUIDE
T (A404) 36056P PERFORMS VEGASSING ATION	T (A713) 36100A STKVAL : STOCK VALUE & EVALUATION REPORT
T (A404) 360548 REGCOR : REGRESSION/CORRELATION	T (A713) 36100A STKVAL : STOCK VALUE & EVALUATION REPORT
T (A404) 36178A MULREG : MULTIPLE REGRESSION/CORRELATION	T (A713) 36101A TRUINT : TRUE ANNUAL INTEREST RATE ANALYSIS
T (A404) 36186A MULTX : LEAST-SQUARES FIT, MULTIPLE Y'S PER X	T (C713) 36179A DROIPB : DISCOUNTED RETURN ON INVESTMENT AND
S (C404) 36542A GROPLI : SIMPLE REGRESSION AND PLOT	PAYBACK
T (A405) 360500 RANOEV : GENERATES RANDOM DEVIATES-SUBRDUTINE	S (C7I3) 36503A GCHLIN : RATING INVESTMENT FUNDS
T (4405) 36203A RANDOM : RANDOM NUMBER GENERATOR	S (C713) 36507A GDAPI : ABNORMAL PERFORMANCE INDEX
T (5405) 36264A RNDORD : PLACING INTEGERS IN RANDOM ORDER	S (C713) 36508A GDPA : EFFICIENT 'CORNER' PORTFOLIOS

	(C713)	36514A		:	WARRANT PRICE CALCULATION
5 5	(C713) (C713)	36515A 36530A	GKCOST GNMRVB	÷	PRICE/EARNINGS RATIO CALCULATION SECURITIES PORTFOLIO ANALYSIS AND
s	(C713)	36530A	GMRGB	:	DETERMINATION SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION
s	(C713)	36545A	GSTKVL	:	STOCK VALUATION
S S	(C713) (C713)	36553A 36554A	GTHOR GVPDQT	:	SECURITIES EPS GROWTH PLOTTING DATA
S	(C713)	36554A	VPDQ	:	PLOTTING DATA
S T	(C713) (A714)	36557A 36086A	VRRC GNPSUM	÷	INVESTMENT STRATEGY ANALYSIS GROSS NATIONAL PRODUCT SUMMARY
т	(A714)	360874	INACNT	÷	NATIONAL INCOME & PRODUCT ACCOUNTS
T T	(A714)	360884	IN/OUT	÷	INPUT/OUTPUT ANALYSIS ON ECONOMIC FLOWS DEPARTMENTAL MANAGER'S BUDGETING PROGRAM
Ť	(A716) (A716)	36073A 36111A	BUDGET EXPEND	:	BUDGET EXPENDITURES VS. TARGETS MONITOR
T	(A717)	361138	RECRUT	:	RECRUTING INFORMATION SYSTEM
οT T	(A717) (C718)	362128 361648	CTC3 [ATA.]	;	CTC PROJECTION PROGRAMS CALCULATE AIR FREIGHT RATES
Ţ	(C718)	36174A	TRCK . 1	:	CALCULATE TRUCK FREIGHT RATES
T T	(C718) (A720)	36241A 36072A	IATA.C SALSIM	;	CALCULATES BREAKPOINT OF IATA CONTAINERS SALARY SCHEDULE COST SIMULATOR
Ε	(C720)	36202A	ATTEND	:	ABSENTEE LISTING
°Т Н	(F720) (S720)	36282A 36340A	COLREG AVERG1		COLLEGE REGISTRATION DEMO AVERAGES AND CURVES GRADES
н	(5720)	36341A	FREQ	:	HAR GRAPHS OF GRADES
н	(5720)	363424	GRADE		TEST GRADE FOR NUMBER OF QUESTIONS MISSED
н	(S720) (S720)	36343A 36344A	ITEM1 STAT	:	NUMBER FREQUENCIES STATISTICAL ANALYSIS OF LAB DATA
T	(C720)	36518A	GMARKS		
	(C720)	36518A	GMEDIT		GSB GRADING PROGRAM
		242428	EAEC .		CAL ENECHTINE PACKAGE
		2#2428 242448 208246 242439	EACC SUGAIN MATHIN		INSTRUCTIONNE DIALOGUE FACTLITY CAI EXECUTIVE PACKAGE CAI SUPPOUTIVES CAI MATH PACKAGE IZBODE VERSION CAI MATH PACKAGE IZBODE VERSION
	100011	2424 39	MATHC		CAT WATH PACKASE 17090C VERSIONI
Ε	(8801)	36128A	TENS	:	DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS
£	(8801)	361294	DRILL	:	BASIC ARITHMETIC DRILL
£	(8801) (A801)	36130A 36133A	TWQUES WKSHT	:	MATHEMATICAL GAME OF TWENTY QUESTIONS GENERATES MATH WORKSHEETS
ε	(A801)	36159A	DIFFEQ	:	CAI IN SOLUTION OF LINEAR FIRST-ORDER
ε	(A801)	36182A	SAT	:	DIFFERENTIAL EQUATIONS TRIGONOMETRIC SOLUTIONS OF TRIANGLES
Ë	(A801)	36205A		:	COMPUTER ASSISTED ARITHMETIC DRILL
E	(A801) (A801)	36205A 36205A	CADA1M CADA1P	:	COMPUTER ASSISTED ARITHMETIC DRILL COMPUTER ASSISTED ARITHMETIC DRILL
E	(A801)	36227A	FACTRL	:	FACTORIALS TO 1000 PLACES
E	(C801) (C801)	36237A 36238A	TRIFAC SIPRAC	:	FACTORING QUADRATIC TRINOMIALS PRACTICE WITH SIGNED NUMHERS
Ε	(C801)	362394	POLSUE	:	POLYNOMIAL SURTRACTION
Ē	(C801) (8801)	36240A 36251A	AISUAR LOGIC	:	SQUARING BINOMIALS LOGIC EXAMINATION PROGRAMS
ε	(C801)	36253A	EXTEND		INFINITE PRECISION MATH UTILITY PROGRAM
ε	(8801)	36262A	CXSYSS	:	SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS
E	(A801)	36265A	GAME	:	CLASSIC MATRIX OF GAME THEORY
E *E	(C801) (C801)	36277A 36278A	DIMIS Syssol	:	X-Y AXIS SEGMENT PROGRAM SOLVING SYSTEMS OF LINEAK EQUATIONS
H	(\$801)	36333A	CRVLEN	:	COMPUTES LENGTH OF ANY CURVE
н	(S801) (S801)	36336A 36337A	RATIO	;	SOLVES PROPORTIONS UNION AND INTERSECTION OF SETS
н	(5801)	36338A	SURFAC		AREA OF SURFACE OF REVOLUTION
н Е	(5801) (5801)	36339A 36360A	VOLSOL BAGELS	;	VOLUME OF SOLID OF REVOLUTION THREE-DIGIT NUMBER GUESSING
٩Ε	(F801)	36602A	TRUTH	:	TRUTH TABLES FOR BOOLEAN EXPRESSIONS
ен ++	(A801) (A801)	36620A 36622A	CVAREA LIMSIN	;	AREA UNDER CURVE LIMIT OF (SIN X)/X
۹H	(A801)	36623A	PI	:	CALCULATES PI
н• Н*	(A801) (A801)	36625A 36626A	ROOTS2 SLOPE	:	QUADRATIC EQUATION SOLVER FINDS DERIVATIVES
۴H	(A801)	36627A	SORT	:	FINDS SQUARE ROOT
*н Е	(A801) (A810)	36628A 36014A	STATAL	÷	ARITHMETIC MEAN TIES MATH CALCULATOR PACKAGE
Ē	(A810)		TUTOR	:	TUTOR SERIES BASIC LANGUAGE PROGRAMMING
ε	(A810)	362084	STOPH	:	COURSE+ TUTO1 - TUT25 MATH CALCULATOR PACKAGE
Ε	(C810)	362194	BRAIN	4	BRAIN SIMULATOR PROGRAM
	(C810) (S810)		EXPRES	:	EXPRESSION SOLVING PROGRAM FUNCTION PLOTTER
	(\$810)		QUADT		NATURE OF GRAPH OF A 2ND ORDER EQUATION
ε	(4820)	36148A	EXPNT	:	IN TWO VARIABLES CAI IN SIMPLE EXPONENTIAL FUNCTIONS OF
c	(4020)	261604			TIME
Ε	(A820) (A820)		NET-3	:	SOLVES COMPLEX SIMULTANEOUS EQUATIONS COMPLEX NUMBER OPERATIONS
E		361524	AC-1		COMPUTER AIDED PRACTICE IN EE AC ANALYSIS
E	(A820)	36153A 36154A			CAI IN ALGEBRA OF COMPLEX NUMBERS ANALYSIS OF A BALANCED POLYPHASE
ε	(4820)	36155A	POLAR		INDUCTION MOTOR PLOTS SINGLE VARIABLE IN POLAR FORM
E		36156A	DVDRS	:	CAI IN VOLTAGE AND CURRENT DIVIDERS
Ē		36157A 36158A	UNITS RNET		CAI IN INTERPRETATION OF EE UNITS NETWORK SIMULTANEOUS EQUATIONS
£		36166A			MATRIX DETERMINANT USING GAUSSIAN
ε	(4820)	36167A	JACOBI	:	ELIMINATION EIGENVALUES AND EIGENVECTORS OF A REAL
					SYMMETRIC MATRIX
S S	(C830)	36519A 36519A	GMCR02	:	FISCAL POLICY GAME FISCAL POLICY GAME
		36521A 36521A	GMCR06	;	ECONOMIC POLICY GAME ECONOMIC POLICY GAME
*н	(A830)	36632A	CIRFLW	:	CIRCULAR FLOW MODEL
£		36121A 36134A	ORBIT H-LIFE	;	INTEGRATES EQUATIONS OF MOTION HALF LIFE SIMULATION
Ē		36184A	SPCTRA	:	OPTICAL ABSORPTION SPECTRA SIMULATION, 2-
E	(8833)	36260A	IONIC	:	SPECIES EQUILIBRIUM MIXTURES DRILL ON FORMULAS AND CHARGES OF IONS

E (#833) 326244 ISONEP : DELL ON NAMING ALXANES (
<pre>c (#933) 32664 [UNIC] : DOILL ON FORMULAS OF IONIC COMPOUNDS (#933) 33064 [UNIC] : DOILL ON FORMULAS OF IONICAL CHEMENTS (#933) 33064 [UNIC] : DOILL ON FORMULAS OF IONICAL CHEMENTS (#933) 33064 [UNIC] : MATURAL SUECTION FARMINES (#933) 33114 [UNIC] : MATURAL SUECTION FARMINES (#933) 33134 [UNIC] : MATURAL SUECTION FARMINES (#933) 3314 [UNIC] : MATURAL SUECTION FARMINES (#933) 3324 [UNIC] : MATURAL SUECTION FARMINES (#933) 33</pre>	E	(8833)	36261A	ISOMER	:	DRILL ON NAMING ALKANES
•** (Feb3) 362054 COMPACT 1 SEED-COMPACTION COMPANIESTOR TEST •** (Fe33) 363040 PROS SEED-COMPACTION COMPACTION SERVICEST •** (Fe33) 363040 PROS SEED-COMPACTION EARCENTISTICS •** (Fe33) 363040 PROS SEED-COMPACTION EARCENTISTICS •** (Fe33) 363040 PROS FEAD-COMPACTION EARCENTISTICS •*** (Fe33) 363040 PROS FEAD-COMPACTION EARCENTIST •**** (Fe33) 363040 FEAD-COMPACTION EARCENTIST FEAD-COMPACTION EARCENTIST •************************************				101101	:	DRILL ON FORMULAS OF IONIC COMPOUNDS
H 16333 33304 FOOL FORTIGE CHARACTERISTICS H 16333 33304 FOOL FANTURA SECTION FARTURA SECTION FARTURA H 16333 33044 FOOLS FORTIGE FARTURA H 16333 33044 FOOLS FORTIGE FARTURA H 16333 33044 FOOLS FORTIGE FARTURA H 16333 33044 FOOLS FOOLS FOOLS H 16333 33044 FOOLS FOOLS FOOLS H 16333 33044 FOOLS FOOLS FOOLS H 16333 33140 POOLS FOOLS FOOLS H 16333 33140 POOL						ORILL ON SYMBOLS FOR CHEMICAL ELEMENTS
H 65333 36304A EVOLU F. NATURAL SECTION EXPERIMENT F 65333 36304A MATAGE F. RATTATIC FEACTION FAILS F 55333 36304A POCAT F. RATTATIC FEACTION FAILS F 55333 36304A DECATI F. RATTATIC FEACTION FAILS F 55333 36304A DECATI F. RATTATIC FEACTION F 55333 36304A FEACTIC FEACTION F 55333 36314A PECATIC COMPOSITION F 55333 36314A PECATIC FIELD PICTURE F 55333 S6314A PELLE SEATIC FIELD PICTURE F 55333						
<pre>H (933) 6303A N2YMC : FXYMATIC PEACTION PARTS H (933) 6304A NYYW : FXYME FEACTION HATE H (933) 6304A FULL : FOULDING CONTINUES EXPERIENT H (933) 6304A FULL : FOULDING CONTINUES EXPERIENT H (933) 6304A FULL : FOULLINGIUM SYSTEMS H (933) 6314A A FULL : FOULLINGIUM SYSTEMS H (933) 6314A FULL : FULL FULL FULL FULL FULL FULL H (933) 7052A CLOODS : CLOOD FOULLING SYSTEMS H (933) 7052A CLOODS : CLOUD FOULLING COULLING H (933) 7052A CLOODS : CLOUD FOULLING COULLING H (933) 7052A CLOODS : CLOUD FOULLING COULLING H (933) 7052A CLOODS : CLOUD FOULLING COULT H (933) 7052A CLOODS : CLOUD FOULLING COULT H (933) 7051A FULL : FULL FULL FULL FULL FULL H (933) 7051A FULL : FULL FOULLING COULT H (933) 7051A FULL : FULL STELES H (9443) 7051A FULL : FULL FULL FULL FULL H (943) 7051A FULL : FOULLING SOUNDER SOULT H (943) 7051A FULL : FULL STELES H (9443) 7051A FULL : FULL FULL STEMPTH H (943) 7051A FULL : FULL STELES SOULCE (FILL H (943) 7051A FULL : FOULLING SOULCE STEMPTH H (943) 7051A FULL : FULL STEMPTH FULL FULL FOULLING H (943) 7051A FULL : FOULLING SOULLIS SOULCE HING CONTROL H (943) 7054A FULL : FULL</pre>	н	(\$833)	36301A	EVOLU		
<pre>H (6933) 53054A PV:VE : EX2'ME REACTION MATE 'S (6933) 53054A PCCAT : MULCAENDECAT (6933) 53054A CCCAT : MULCAENDECAT (6933) 5304A CCCAT : MULCAENDECAT (6933) 5304A FOULL2 : ECULLIPPILID SYSTEMS (6933) 5304A FOULL2 : ECULLIPPILID SYSTEMS (6933) 5304A FOULL2 : ECULLIPPILID FOUNDECAT (6933) 5304A FOULL2 : ECULLIPPILID FOUNDECAT (6933) 5314A PCCAE (6933) 5314A (7947) = PRECENT COMPOSITION (79533) 5314A PCCAE (79533) 5314A (7947) = PRECENT COMPOSITION (79533) 5314A (7947) = PRECENT COMPOSITION (79533) 5314A (7947) = PRECENT COMPOSITION (79533) 5314A (7947) = PRECENT (79533) 5314 (7947) = PRECENT (7953) 5314 (7947) = PRECENT (7953) 5314 (7947) = PRECENT (7947) = PRECE</pre>						
<pre>H (5833) 6306A DECAT2 : MUCLEAR DECAY H (5833) 6306A DECAT2 : MUCLEAR DECAY H (5833) 6306A F DECAT2 : MUCLEAR DECAY H (5833) 6310A M (NET : KINETIC FELO IDICUME H (5833) 6310A M (NET : KINETIC FELO IDICUME H (5833) 6310A M (NET : KINETIC FELO IDICUME H (5833) 6311A PPCNT : PERCENT COMPOSITION H (5833) 6314A CALORI : CALORIMETRY CREPERIENT H (5833) 6314A NETNZ : METON'S 2ND LA H (5833) 6314A PERLCT : L'HATSY LEVEL PHOBLEM H (5833) 6314A FELCT : L'HATSY LEVEL PHOBLEM H (5833) 6314A PERLCT : METON'S 2ND LA H (5833) 6324A VIOCTY : INSTANTANEOUS VELOCITY H (5833) 6325A VIOCTY : INSTANTANEOUS VELOCITY H (5833) 6326A A VIOCA : AVGCAR'S NUMEH H (6833) 6614A M (MER : DIFFUNCT H (5833) 6614A A VIOCA : AVGCAR'S NUMEH H (6833) 6614A A VIOCA : AVGCAR'S NUMEH H (6833) 6614A A VIOLA : AVGCAR'S NUMEH H (6833) 6614</pre>						
H 68333 36304A DECATI : MADIGACTIVE DECAY GAME H 68333 36304A DECATI : MADIGACTIVE DECAY H 68333 36304A CATI : MADIGACTIVE DECAY H 68333 36304A FEULL : EXOLLTRE LOW SYSTEMS H 68333 36314A PACCEL CREATION H 68333 36314A PHORE COMPOSITION H 68333 36314A PHORE LEVEL DIAGRAFH H 68333 36314A PHORE LEVEL DIAGRAFH H 68333 36314A PHORE LEVEL DIAGRAFH H 16333 36314A PHORE LEVEL PROBLEM H 16333 36344 PACCE I					;	PHOTOSYNTHESIS EXPERIMENT
<pre>H (6933) 63306 F00[L1 : E00L[Her]UM SYSTEMS H (6933) 63306 F00[L1 : E00L[Her]UM SYSTEMS H (6933) 63106 H ASD HASS DFCT H (6933) 63116 H FLD : MAGENT COFLOATION H (6933) 63116 H FLD : MAGENT COFLOATION H (6933) 63146 A FFLC : LADRIH COF LEVEL DIAGONAM H (6933) 63146 A FFLC : LADRIH COF LEVEL DIAGONAM H (6933) 63146 A FFLC : LADRIH COF LEVEL DIAGONAM H (6933) 63146 A FFLC : LADRIH COF LEVEL DIAGONAM H (6933) 63146 A FFLC : LADRIH COFLECTRIC EFFCT H (6933) 63146 A FFLC : LEAST TIME F01NCTPLE AND LIGHT H (6933) 63146 A FFLC : LEAST TIME F01NCTPLE AND LIGHT H (6933) 63240 SPLC : SPACECAFT ONETS H (6933) 63240 SPLC : SPACECAFT ONETS H (6933) 63240 SPLC : LONG H (1000 SPLC COFLECTRIC EFFCT H (6933) 63240 SPLC : SPACECAFT ONETS H (6933) 63240 SPLC : SPLC : LONG SPLC INCOMENTS H (6933) 63240 SPLC : SPACECAFT ONETS H (6933) 63240 SPLC : SPACECAFT ONETS H (6933) 64260 SPLC : SPLC : LONG SPLC : SPLC :</pre>				DECAYI	:	
<pre>H (5833) 53064 F F0012 : E001L1PP1UB SYSTEMS H (5833) 530404 K (THE I KINETIC CREATION H (4333) 56104 M 4550 F MASS DEFECT H (4333) 56114A M 4550 F MASS DEFECT H (5833) 56114A M F1LD I MASKETIC FIELD PICTURE H (5833) 56114A K (THEN' I FYELD FTC COMPOSITION H (5833) 56114A K (THEN' I FYELD FTC FTERPIENT H (5833) 56114A K (THEN' I FYELD FTC FTERPIENT H (5833) 56114A K (THEN' I FYELD FTC FTERPIENT H (5833) 56114A K (THEN' I FYELD FTC FTERPIENT H (5833) 56114A K (THEN' I FYELD FTC) FTC FTC H (5833) 56114A F MITTEL I FYT FYELD FTC FTC H (5833) 56124A K (THEN' I FYELD FTC) FTT H (5833) 56134 A TYT I CALCULATES ATOPHICLES INT H (5833) 56134 A TYT I CALCULATES ATOPHICLES INT H (5833) 5614A A TYTE I CALCULATES ATOPHICLES INT H (FTT) FTT I FYELD FTT H (FTT) FTT H (FTT) FYELD FTT H</pre>						
<pre>H (433) 36304 KINET : KINETIC PEACING STICM H (433) 36312A # FILED : *AGKETIC FIELD PICTURE H (433) 36312A # FILED : *AGKETIC FIELD PICTURE H (433) 36312A # FILED : *AGKETIC FIELD PICTURE H (533) 36312A # FILED : *AGKETIC FIELD PICTURE H (533) 36314A NOHR : KNERY LEVEL DIAGRAM H (533) 36314A NUMER : KNERY LEVEL DIAGRAM H (533) 36314A NUMER : KNERY LEVEL POOLLE H (533) 36314A NUMER : KNERY LEVEL POOLLE H (533) 36314A PHOTON : MERRY LEVEL POOLLE H (533) 36324A VLOCTY : NSTANTANEOUS YELOCITY H (533) 36354A VLOCTY : NSTANTANEOUS YELOCITY H (533) 36354A VLOCTY : NSTANTANEOUS YELOCITY H (533) 36354A FLLFE : JOHN CONMAYS GAME OF LIFE H (533) 36354A FLLFE : JOHN CONMAYS GAME OF LIFE H (533) 36354A FLLFE : JOHN CONMAYS GAME OF LIFE H (533) 36354A AFLIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : LOVEN CONTENT H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3651A ALIFE : JOHN CONMAYS GAME OF LIFE H (533) 3653A ALIFE : LOVEN CONTENT H (533) 3653A ALIFE : JOHN CONTENT H (533) 3</pre>						
<pre>H (433) 36314A PMCSS D: MASS DEFECT H (433) 36314A PMC Composition H (433) 36314A PMC (2007) I PMCCATC COMPOSITION H (533) 36314A PMC I PMCCATC FIELD PICTURE H (533) 36324A VLC1 I SMCLIS LAM H (533) 36324A VLC1 I SMCLIS LAM H (533) 36324A VLC2 I PMCCATANCOUS VLC2 I PMCCATCA H (533) 36324A VLC2 I SMCLIS LAM H (533) 3642A A THEI I OPTENTIAL FIELD PMCLIF H (533) 3661A M (FMF I) DIFFUNCE SMCLIF PMCLIF H (533) 3661A A LEMA I PMCPACATON C ENCLIS H (533) 3661A A LEMA I PMCPACATON C ENCLIS H (533) 3661A A MCM I DIFFUNCE SMCLIS I FORMULAS H (533) 3661A A MCM I PM, PMCPACATON C ENCLIS H (533) 3661A A MCM I PM, PMCP I SMCLIS I FORMULAS H (533) 3661A A MCM I PM, PMCP I SMCLIS I FORMULAS H (533) 3661A A MCM I PM, PMCP I SMCLIS I FORMULAS H (533) 3661A A MCM I PM, PMCP I SMCLIS I FORMULAS H (533) 3661A A MCM I PM, PMC I PMC I SMCLIS I FORMULAS H (533) 3661A A MCM I PM, PMCP I SMCLIS I FORMULAS H (533) 3661A A MCM I PM, PMC I PMC I SMCLIS I FORMULAS H (533) 3661A A MCM I PMC I PMC I PMC I SMCLIS I FORMULAS H (533) 3661A M MCLES I SMCLIS I SMCLIS I FORMULAS H (533) 3661A M MCLES I SMCLIS I SMCLIS I FORMULAS H (533) 3661A M MCLES I SMCLIS I SMCLIS I FORMULAS H (533) 3661A M MCLES I SMCLIS I SMCLIS I FORMULAS H (533) 3661A A STELL I SMCLIS I SMCLIS I MULATION H (533) 3664A STELL I SMCLIS I SMCLIS I MULATION H (533) 3664A STEL</pre>						
 H (5833) 54312. AFFELD : MAGNETIC FIELD F						
H 68333 35314A COLDT : CALOPIE TO EXPERIENT H 68333 35314A CALOPT : CALOPIE TO EXPERIENT H 68333 35314A KALADT : CALOPIE TO EXPERIENT H 68333 35314A KALADT : CALOPIE TO EXPECTIONE H 68333 35314A FREE HOTOFLECTIONE H 68333 35314A FREE SPECTIONE H 68333 35324A SPECTIONE SPECTIONE H 68333 3555A SPECTIONE SPECTIONE H H H SPECTIONE SPECTIONE H H H H SPECTIONE <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td></t<>						
H (5833) 56316A (CLOP): (CLOP)METRY EXPERIMENT H (5833) 36316A (NEWN) : EVENTON'S PAD LA H (5833) 36326A (NEWN) : SULL'S LA H (5833) 3633A (NEWN) : SULL'S LA H (5833) 3633A (NEWN) : SULL'S LA H (5833) 3631A (NEWN) : SULL'S LA H (5843) 3661A (NEWN) : SULL'S LA H (5846) 3662A (SANE : SULL'S LA H (5846) 3						
H 68333 35315A KINEW # WEVIFW OF AINEMATICS H 68533 55316A PHOTEL: HHOTOFELCENIC EFFECT H 68533 55316A PHOTEL: LEAST TIME PRINCIPLE AND LIGHT H 68533 55316A PHOTEL: LEAST TIME PRINCIPLE AND LIGHT H 68533 55216A PHOTEL: LEAST TIME PRINCIPLE AND LIGHT H 68533 55216A VIELD: LEAST TIME PRINCIPLE AND LIGHT H 68533 55226A VIELD: VIELD: POTENTIAL FIELD PLOTURE H 68533 55226A VIELD: VIELD: POTENTIAL FIELD PLOTURE H 68533 55226A VIELD: VIELD: STUTENT AND LIGHT VIELD H 68533 55226A VIELD: VIELD: STUTENT AND LIGHT H 68533 55226A VIELD: VIELD: STUTENT AND LIGHT H 68533 55226A VIELD: VIELD: STUTENT AND LIGHT H 68533 5533A ALENA LITE STUTENT AND LIGHT H 68333 5536A VIELD CAULATION H 68333 551040 LICTOTON STUTENT AND LIGHT <td></td> <td></td> <td></td> <td></td> <td>÷</td> <td>CALORIMETRY EXPERIMENT</td>					÷	CALORIMETRY EXPERIMENT
H 65333 35318A PHOTEL: PMOTEL: PMOTEL				KINERV	:	REVIEW OF KINEMATICS
H 16333 363184 PROTOR I FINERGY LEVEL Product H 16333 36324A SPELCT I EXAMPLE SPECT I EXAMPLE H 16333 36324A SPELCT I EXAMPLE SPECT I EXAMPLE H 16333 36324A VFELD POTENTIAL FIELD PICTURE AND H 16333 36324A VFELD POTENTIAL FIELD PICTURE I H 16333 36324A VATER WATER VETENDIT INTROPORTION PARES H 16333 36354A PLANK A PROPAGATION OF ENDOLE INTROPORTION INTROPORTION H 16333 36514A PHIR ITER JONG COMMARYS SOUNCE STITEMENT H 16333 36614A PHIR CALCULATES SOUNCE STITEMENT H 16333 36614A PHIR ITER JONG PARE SOUNCE STITEMENT H 164333 36614A PHIR ITER JONG PARE JONG PARE H						
H 96333 953194 PEFLCT : LEAST TIME PRINCIPLE AND LIGHT H 96333 953244 SPACE : SPACECCART UNBITS H 96333 953244 VLOCTY : INSTANTANEOUS VELOCITY H 96333 953244 CLOUDS : CLOUD FORMATION H 46333 96334 ALIFF : JONN CONMAY'S GAME OF LIFE E F6333 96344 AVIGE ENPONE H 46333 36614A FILED : CLECTRIC FILED STEMENT H 46333 36614A FILE PODUCITION SIMULATION H 46333 36614A FILED PODUCATION SIMULATION						
H (5833) 36321A SNELL						
 H (5831) 36324 V FIELD : POTENTIAL FIELD PICTURE H (5833) 36324 V (DCTY : INSTATATAGED VELOCITY H (5833) 36324 V (DCTY : INSTATATAGED VELOCITY H (5833) 363254 V (DUDS : CLOUDS 5: CLOUD FORMATIS H (5833) 363254 V (THER BUDGET PROMEME CHECK H (5833) 363254 V (THER) VICTOR (THER BUDGET PROMEME CHECK H (5833) 36326 P (LARS) 363514 S (LITS : Y (DURGES A COMMATIS GAME OF LIFE H (7833) 366134 A THT : CALCULATES A TOMIC VELONT H (4833) 366134 A THT : CALCULATES A TOMIC VELONT H (4833) 366134 A THT : CALCULATES A TOMIC VELONT H (4833) 366134 A THT : CALCULATES A TOMIC VELONT H (4833) 366134 A THT : CALCULATES A TOMIC VELONT H (4833) 366134 A THT : CALCULATES A TOMIC VELONT H (4833) 366134 A THT : V OPULATION SINULATION H (4833) 366134 A THE : SAUTO PULCTION SINULATION H (4833) 36634 H (1583) 366344 H (1583) 366344 H (1584) 366344 H (1684) 3						SNELL'S LAW
H 658333 363240 VLOCTY : INSTANTANEOUS VELOCITY H 658333 363240 VLOCTY : INSTANTANEOUS VELOCITY H 658333 363240 VLOCTY : INSTANTANEOUS VELOCITY H 658333 363240 VALES : SUDUE FORMATION H 658333 363240 VALER VUCTY : INSTANTANEOUS VELOCITY H H 168333 363540 VALER VUCTY : INSTANTANEOUS VELOCITY H 168333 365340 VUCTY : INSTANTANEOUS VELOCITY VUCTY H 168333 366144 AVOGA AVOGA DEVENDENT H 168333 366174 WHER 2.001412 PODULATS H 168333 366174 WHELS : AUD OPUCHAS AND ANTENANCE SYSTEM H 168603 363244 ALANC : TRADE AND						
H 68333 36325A CUOUS 5 CLOUD F ORALIZION H 56333 36325A CLOUDS 5 CLOUD F ORALIZION H 56333 36325A WATES FMER BUDGET STATURE H 56333 36325A WATES FMER BUDGET STATURE H 56333 36325A ALEMA FMER BUDGET STATURE H 64333 3635A ALEMA FMOR COMMAYS GALE OF LIFE H (A333) 36611A ATT CALCULATES ATOMIC SALE FMERTIN H (A333) 36613A ATT CALCULATES ATOMIC SALE FGMULAS H (A333) 36613A ATT CALCULATES ATOMIC SALE FGMULAS H (A333) 36613A ATTT PROOM FMI POLICITIC FORMULAS H (A333) 36634A FLED FMECTICULO SINULATION H (A333) 36637A POLUT WATER POLUTION SINULATION H (A333) 36643A FFLED FMECTICULON SINULATI						POTENTIAL FIELD PICTURE
H 165333 363264 CLOUDS : CLOUD FORMATION H 165433 363264 WATER : WATER BUDGET H 165433 363564 WATER : WATER BUDGET H 165833 363564 PHOTOELECTRIC SIMULATION H 165833 363564 PHOTOELECTRIC SIMULATION H 164333 36514 ALTER : JONN CONATIS GALC OLIFE H 164333 366144 AVOGA AVOGADATS NUMMER H 164333 366144 AVOGADATS NUMMER H H 164333 366174 PHOM : PH- PON- PCT : CLISSOCIATION H 164333 366174 PHOM : PH- PON- PCT : CLISSOCIATION H 164333 366174 WATER DOLLUTION SIMULATION H 164333 366374 FIELD : ELECTRIC FIELD SILVATION H 164333 366474 WISIC2 : TRIAD SOLVING PHOBEAM H 164333 366474 WISIC2 : TRIAD SOLVING PHOBEAM H 164350 363244 AALANC : TRADE AND PAYMENT RALANCES SITEM H <td< td=""><td></td><td></td><td></td><td></td><td></td><td>SUM OF TWO WAVES</td></td<>						SUM OF TWO WAVES
H 65833 36350A water Budget H 65833 36350A PLANK : A PHOTOPELECTRIC SIMULATION H (4833) 36350A ALERA : PROPAGATION OF ENROW H (4833) 36611A ATLFE : JOHN COMMAYS'S GAME OF LIFE H (4833) 36611A ATLFE : JOHN COMMAYS'S GAME OF LIFE H (4833) 36611A ATLFT : CALCULATES ATOMIC WEIGHT H (4833) 36611A ATLFT : CALCULATES ATOMIC WEIGHT H (4833) 36612A ATLFT : CALCULATES ATOMIC WEIGHT H (4833) 36612A ATLFT : CALCULATES ATOMIC WEIGHT H (4833) 36612A MULAR Y H (4860) 36124A MULAR Y H MARE PROLUMENT SIMU				CLOUDS	:	CLOUD FORMATION
H 65833 365504 PLANE: 1 A PHOTOELE SLIT ENPERIMENT E 65833 365514 AFLITE: JOHN CONWAY'S GAME OF LIFE E (5833) 365514 AFLITE: JOHN CONWAY'S GAME OF LIFE E (5833) 366514 AFLITE: JOHN CONWAY'S GAME OF LIFE E (6833) 366514 AFLITE: JOHN CONWAY'S GAME OF LIFE H (A833) 36614 AVGA IS AT AUGADAYS NUMMER H (A833) 36614 AVGA IS AUGOLALIST AUGADAYS NUMMER H (A833) 36614 AVGA IS AUGOLALIST AUGADAYS NUMMER H (A833) 366174 MOLAR : ACID-HASE TITHATION H (A833) 366174 MOLAR : ACID-HASE TITHATION H (A833) 366174 MOLAR : ACID-HASE NTENDATION H (A833) 366174 MOLAR : ACID-HASE NTENDATION H (A833) 366174 MUSIC2 : TRIAD SOLVING PHOGE H (F633) 3664754 MUSIC2 : TRIAD SOLVING PHOGE H (5660) 36174 MASE MOD PAYMENT FALANCES SYSTEM H <td></td> <td></td> <td></td> <td>WATER1</td> <td>:</td> <td></td>				WATER1	:	
 H (A#33) 36351A SLITS : YOUNG'S DOUBLE SLIT EXPERIMENT E (5833) 36653A ALEKA : PROPAGATION OF ENROW H (A#33) 36651A ALEKA : PROPAGATION OF ENROW H (A#33) 36611A ATWT : CALCULATES ATOMIC WEIGHT H (A#33) 36611A ATWT : CALCULATES ATOMIC WEIGHT H (A#33) 36611A ATWT : CALCULATES EMPIFICAL FORMULAS H (A#33) 36611A ATWT : CALCULATES EMPIFICAL FORMULAS H (A#33) 3661A SOTORT : PH-POH. PCT. DISSOCIATION H (A#33) 3661A SOTORT : PH-POH. PCT. DISSOCIATION H (A#33) 3661A SOTORT : MASS VOLUME H (A#33) 3661A SOTORT : STERL : FLY POPULATION CONTROL H (F#33) 3664A STERL : FLY POPULATION CONTROL H (F#63) 3664A STERL : TATAD SOLUMAR PHOBLEMS H (S#60) 3612A MHELS : AUTO PUNCHASE AND MAINTENANCE SYSTEM H (S#60) 3613A STOCK : STOCK MARKET SIMULATION H (S#60) 3613A STOCK : STOCK MARKET SIMULATION H (S#60) 3613A STOCK : STOCK MARKET SIMULATION H (A#03) 36002B RITE : MANAGEHENT SIMULATION GAME FOR THE 2000A H (A#03) 36002B RITE : MANAGEHENT SIM						
E (5833) 36533. AFLIFE : JOHN CONMAY'S GAME OF LIFE (F633) 366013. ALEMA : PROPAGATION OF EMRON (4833) 366014. ALEMA : PROPAGATION OF EMRON (4833) 366114. MEMBH : DIFFUSION EXPERIMENT (4833) 366114. AVUGA : AVUGADERS TOMIC WEIGHT (4833) 366114. AVUGA : AVUGADERS TOMIC WEIGHT (4833) 366114. MPHOH : PH' POH, PCT, DISSOCIATION (4833) 366114. MPHOH : PH' POH, PCT, DISSOCIATION (4833) 366114. STOLCH : MASS VOLUME (4833) 366314. DFUIT : MASS VOLUME (4833) 366314. DFUIT : MASS VOLUME (4833) 366314. STERL : FLY POPULATION ONTROL (48560) 367264. MUSIC2 : TRIAD SOLVING PHOGGAM (5860) 363244. STERL : FLY POPULATION CONTROL (5860) 363244. STERL : FLY POPULATION SHULATION (5860) 363244. STERL : TRIDE AND PAYMENT MALANCES (5860) 363244. STERL : STOCK MARET SIMULATION (5860) 363243. STOK : STOCK MARET SIMULATION (5860) 363244. STOK : STOCK MARET SIMULATION (5860) 363245. STOK : STOCK MARET SIMULATION (5860) 363314. STOK : STOCK MARET SIMULATION (5860) 36334. CONSMP : DEPRESSISTIONECOLUNCIL (6771) 361754. CARLOS : COMPUTED-ASSISTED REVIEW LESSONS ON (5860) 36002B. RITE : MANGENENT SIMULATION GAME FOR THE HP 20004 E (4880) 36002B. RITE : MANGENENT SIMULATION GAME FOR THE P20005 E (4880) 36002B. RITE : MANGENENT SIMULATION GAME FOR THE 20007 E (4880) 361933. SETUPB : MANGENENT SIMULATION GAME FOR THE 20008 E (4880) 361934. SETUPB : MANGENENT SIMULATION GAME FOR THE 20008 E (4880) 361934. SETUPB : MANGENENT SIMULATION GAME FOR THE 20009 E (4880) 361934. SETUPB : MANGENENT SIMULATION GAME FOR THE 20009 E (4880) 361934. SETUPB : MANGENENT SIMULATION GAME FOR THE 20007 E (4880) 361934. SETUPB : MANGENENT SIMULATION GAME FOR THE 20007 E (4880) 361934. SETUPB : MANGENENT SIMULATION GAME FOR THE 20007 E (4880) 361934. SETUPB : MANGENENT SIMULATION G	н	(4833)	36351A	SLITS	:	YOUNG'S DOUBLE SLIT EXPERIMENT
<pre>H (AA33) 36611A MEMBH : DIFFUSION EXPERIENT H (AA33) 36611A AVUGA : AVUGADA'S NUMMER H (AA33) 36611A AVUGA : AVUGADA'S NUMMER H (AA33) 36616A AVUGA : AVUGADA'S NUMMER H (AA33) 36616A MULAR : ACID-HASE TITHATION H (AA33) 36617A MULAR : ACID-HASE TITHATION CONTROL H (F633) 36637A POLUT : WATER POLLUTION SIMULATION H (F633) 36647A GENEL : GENETICS SIMULATION CONTROL H (F633) 36647A MUSIC2 : TRAO CAND PAYMENT PALANCES SYSTEM I (S660) 36127A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36127A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36137A WHELES : AUTO PUCHCASE AND ANINTENANCE SYSTEM I (S660) 36027B RITE : MANGEMENT SIMULATION GAME FOR THE 2000A E (AA800) 360027B RITE : MANGEMENT SIMULATION GAME FOR THE 2000A E (AA800) 36193A MARAGE : MANAGEMENT SIMULATION GAME FOR THE 2000A E (AA800) 36193A MARAGE : MANAGEMENT SIMULATION GAME FOR THE 2000A E (AA800) 36193A MARAGE : MANAGE</pre>						JOHN CONWAY'S GAME OF LIFE
++ (4033) 36614A ATWT : CALCULATES ATOWIC WEIGHT ++ (4033) 36614A EVPIR : CALCULATES EMPIFICAL FORMULAS ++ (4033) 36615A EVPIR : CALCULATES EMPIFICAL FORMULAS ++ (4033) 36615A EVPIR : CALCULATES EMPIFICAL FORMULAS ++ (4033) 36615A EVPIR : CALCULATES EMPIFICAL FORMULAS ++ (4033) 36617A PHONE CILLE AND STERNETH : HASS VOLUME ++ (4033) 36630A PFJIL : PROJECTILE MOTION : MULATION ++ (4033) 36631A PFJIL : PROJECTILE MOTION SIMULATION : HASS VOLUME ++ (4833) 36642A GENETICS SINULATION : MULATION : MULATION ++ (4833) 36642A GENETICS SINULATION : MULATION : Material Sinulation + (4833) 36642A GENETICS SINULATION CAME SINULATION : Sinulation + (5860) 3632A FALKES SINULATION : MASENTION (48600)						PROPAGATION OF ERROR
+++ (AA33) 36614A AV06ADFA*S NUMBER ++ (AA33) 36616A MOLAR : ACIO-PASE TITHATION ++ (AA33) 36616A STOICH : MASS VOLUME ++ (AA33) 36630A LENCTRIC FILD STRENGTH ++ (AA33) 36630A LENCTRIC FILD STRENGTH ++ (AA33) 36641A STERL : FV POULATION CONTROL ++ (F833) 36642A GENEI : GENETICS SIMULATION CONTROL ++ (F863) 36637A MUSIC2 : TRADE AND PAYMENT FALANCE SYSTEM + (5866) 36334A STOCK : STOCK MARKET SIMULATION + (5866) 36334A STOCK : STOCK MARKET SIMULATION + (5866) 36334A STOCK : STOCK MARKET SIMULATION + (5866) 36334A CONSMF : OLAPPERSISTED FEVIEW LESSONS ON + (5860) 36032A STOCK : STOCK MARKET SIMULATION GAME FOR THE #P 2000A						CALCULATES ATOMIC WEIGHT
+++ AE33 3A616A MOLAR : ACID-MASE TITHATION +++ (AR33) 3A617A FF+ POH-POT, DISSOCIATION +++ (AR33) 3A618A STOICH : MASS VOLUME ++ (AR33) 3A630A LENEST: SULVES LENS PROBLEMS ++ (AR33) 3A631A LENSTE: SULVES LENS PROBLEMS ++ (AR33) 3A631A LENSTE: SULVES LENS PROBLEMS ++ (AR33) 3A630A LENSTE: FIPOJECTILE MOTION ++ (F833) 3A641A STERL: FLY POPULATION CONTROL ++ (F833) 3A644A GENEI: SENTICS SIMULATION ++ (F860) 3612AA MUSIC2: TRADE AND PAYMENT RALANCE SYSTEM + (S860) 36334A STOLK: STOK MARKET SIMULATION + (S860) 36304A CONSMF: SUPERSISTED REVIEW LESSONS ON - STUDE: MANGEMENT SIMULATION GAME FOR THE HP 2000A E (A880) 36002B MANAGE HENT SIMULATION GAME FOR THE HP 2000A E (A880) 36002B MANAGE HENT SIMULATION GAME FOR THE HP 2000A E (A880) 36002B MANAGE HENT SIMULATION GAME FOR THE 2000F </td <td></td> <td></td> <td></td> <td></td> <td>:</td> <td>AVOGADRA'S NUMBER</td>					:	AVOGADRA'S NUMBER
*** **** **** *** *** </td <td></td> <td></td> <td></td> <td></td> <td></td> <td>CALCULATES EMPIRICAL FORMULAS</td>						CALCULATES EMPIRICAL FORMULAS
++ (AR33) 36618A STOICH : MASS VOLUME ++ (AR33) 36630A LENSES : SOLVES LENS PROBLEMS ++ (AR33) 36630A LENSES : SOLVES LENS PROBLEMS ++ (AR33) 36630A LENSES : SOLVES LENS PROBLEMS ++ (AR33) 36630A PPUJL : WATER PROLUTION CONTROL ++ (F833) 36642A GENEI : GENETICS SIMULATION ++ (F860) 36187A WHELES : AUTO PUNCHASE AND MAINTEMANCE SYSTEM + (S860) 36324A BANK : SOLVES FINANCIAL PROBLEMS + (S860) 36331A STOCK : STOCK MARKET SIMULATION + (S860) 36032A COMPUTE-ASSISTED REVIEW LESSONS ON - (CA71) 36175A CARLOS : COMPUTE-ASSISTED REVIEW LESSONS ON - (CA71) 36102A SETUP : MANGEMENT SIMULATION GAME FOR THE P2000A E (A880) 36002B MANAGE HENT SIMULATION GAME FOR THE 2000F E (A880) 36002B MANAGE HENT SIMULATION GAME FOR THE P2000A E (A880) 36028A MANAGE HENT SIMULATION GAME FOR THE 2000F E (A880) 36028A<						PH. POH. PCT. DISSOCIATION
 ************************************			36618A			MASS VOLUME
**** (#833) 36631A PPJUT : PROJECTILE MOTION **** (#633) 36641A STERL : FLY POPULATION CONTROL **** (#633) 36642A STERL : FLY POPULATION CONTROL **** (#633) 36642A STERL : FLY POPULATION CONTROL **** (#660) 36187A wHELS SUTOC MARCHASE AND MAINTENANCE SYSTEM **** (#660) 36187A wHELS SUTOC MARKET SIMULATION **** (*660) 36330A CONSMP : DEPERSSTON/EOULLIARIUMTION ***** (*760) 36304A CHARGE STOCK STOCK ******* (*760) 36304A CHARGE STOCK STOCK STOCK ************************************				EFIELD	:	ELECTRIC FIELD STRENGTH
 PH (F833) 36639A POLUT : WATER POLLUTION SIMULATION PH (F833) 36641A STERL : FLY POPULATION CONTROL PH (F833) 36642A GENEL : GENETICS SIMULATION PH (F833) 36642A GENEL : GENETICS SIMULATION PH (S600) 3627A WHELS : AUTO PUHCHASE AND MAINTENANCE SYSTEM H (S660) 3632A BANK : SOLVES FINANCIAL PROBLEMS H (S660) 3633A CONSPP : DEPRESTONZEOULLIARIUM H (S660) 36032B SETUP : MANGEMENT SIMULATION GAME FOR THE HP 2000A E (A880) 36002B R TET : MANAGEMENT SIMULATION GAME FOR THE P2000A E (A880) 36032B R TET : MANAGEMENT SIMULATION GAME FOR THE 2000B E (B880) 36193A MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000B E (B880) 36193A MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000B E (B880) 36193A MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000B E (B880) 36193A MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000B E (B880) 36193A MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000B E (B880) 36193A MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000B E (B880) 36193A M						
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GFNRAT : FINANCIAL RATIOS GIRRPV : INVESTMENT RETURN (CASH FLOW)	S C712 36510A S C712 36513A
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DETERMINATION GSTKVL : STOCK VALUATION	S C713 36530A S C713 36545A
GTHOR : SECURITIES EPS GROWTH	S C713 36553A
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GMCR02 # FISCAL POLICY GAME	S C830 36519A
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2000A RITE : MANAGEMENT SIMULATION GAME FOR THE HP	E A880 36002B
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MANAGU : MANAGEMENT SIMULATION GAME FOR THE 2000B	E B880 36193A
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SETUPC : MANAGEMENT SIMULATION GAME FOR THE 2000C MANAGC : MANAGEMENT SIMULATION GAME FOR THE 2000C	
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MANAG : MANGEMENT SIMULATION GAME FOR THE HP 2000A	E A880 36002B
RITE : MANAGEMENT SIMULATION GAME FOR THE HP 2000A	E A880 36002B
SETUPB : MANAGEMENT SIMULATION GAME FOR THE 2000B	E B880 36193A
MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000B MANAGU : MANAGEMENT SIMULATION GAME FOR THE 2000B	
RITET : MANAGEMENT SIMULATION GAME FOR THE 2000B	E B880 36193A
SETUPC : MANAGEMENT SIMULATION GAME FOR THE 2000C MANAGC : MANAGEMENT SIMULATION GAME FOR THE 2000C	
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CADAIN I COMPUTER ASSISTED ARITHMETIC DRILL CADAIP : COMPUTER ASSISTED ARITHMETIC DRILL	E A801 36205A E A801 36205A
CADAIM : COMPUTER ASSISTED ARITHMETIC DRILL CADAIP : COMPUTER ASSISTED ARITHMETIC DRILL CARLOS : COMPUTER-ASSISTED REVIEW LESSONS ON SYMTAX FOR SPANISH II	E C871 36175A
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-ASCII : ASCII CODE GENERATOR KEYSIG : GIVES MAJOR SCALES	T C104 36257A T A104 36258A
OT DO TABON JONES	. AIV- 30230A

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MUSICS : FINDS	DOMINANT SEVENTHS	7 <u>-</u> 7	A104	36259A	
ALFTOV : ALPHA	TO VARIABLE CONVERSION			36296A	
TIMER : TIME (DATER : DATE)	OF THE DAY And day of the week			36297A 36298A	
GTAPID : PAPER	TAPE TITLER	т	C104	36548A	
	AGE JULIAN CALENDAR	*T	F108	36279A 36288A	
CALNDR : PRINT: TITLE : CHARAG	S A GALENDAR CTER GENERATION	T	A904	36200A	
	ATES LARGE LETTERS	*T	F904	36299A	
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Indicates NEW or REVISED since February 1973
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BALANC :	TRADE AND PAYMENT BALANCES	н	5860	36328A
BANK :	SOLVES FINANCIAL PROBLEMS	н	S 860	36329A
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STOCK :	STOCK MARKET SIMULATION			36331A
	CHARGE ACCOUNT SIMULATION Simulation of City Council			36604A 36640A
SOLUTION				
SIME ON :	SOLVES SIMULTANEOUS LINEAR EQUATIONS	т	A314	36026A
	SOLVES SIMULTANEOUS LINEAR EQUATIONS	т	A314	36027A
SORTING AN	D MERGING (107)			
	INFORMATION RETRIEVAL SYSTEM	≭ T	C102	36250B
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POISON #	FILE POINTER SORT/POINTER SORT FILE SORT ROUTINE	Ť	A107	36206A 36232A 36292A
ALPHA :	ALPHANUMERIC SORT		0107	30232A
REP 1	ALFRANUMERIC SURI DATA CENTER INVENTORY REDART CENERATOR	÷.	A107	36177A
IN I	DATA CENTER INVENTORY REPORT GENERATOR Data center inventory report generator	÷	A708	36177A
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CHISQS :	VALUE5 CHI~SQUARE STATISTICS FOR M∗N	т	A407	36042A
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FC I SCORES I	ANALYSIS OF LOG TAPE Computes mean, standard deviation and			36120A
KR20 1	STANDARD SCORES FOR TEST SCORES ITEM ANALYSIS AND KUDER-RICHARDSON			36136A
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TMFCEV :	TIME FUNCTION EVALUATOR	т	A5 1 9	36063A
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	EQUATIONS	E	B 80 1	36262A
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VCHART : INVESTMENT DECISIONS USING TEXTRONIX	
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TEKTRONIX 4010	S C904 36556A
VSUB : DISPLAY ROUTINE USING TEKTRONIX 4010 VTTT : TIC-TAC-TOE ON THE TEKTRONIX 4010	S C904 36558A
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WHEELS : AUTO PURCHASE AND MAINTENANCE SYSTEM	E 8860 36187A

VOLTMETER (SEE DIGITAL VOLTMETER)

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LEGEND Volumes: T = HP BASIC, E = Education, H = Huntington, S = Stanford System Specifications: A = 2000A, B = 2000B, C = 2000C, F = 2000F, S = Single Terminal

ALPHABETICAL SUMMARY

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	AC CIRCUIT ANALYSIS PROGRAM		36057A	Ĕ	DIMIS	: X-Y AXIS SEGMENT PROGRAM	(C801)	362774
	ACTIVE FILTER DESIGN		362934			SIMULATES A DRAG RACE		36601A
	ADDRESS LAHELS		36231A			: BASIC ARITHMETIC DRILL		3615AV
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	ALPHANUMERIC SORT		36292A			UYNAMIC PROGRAMMING MODEL	(A610)	
T ANALAD :	CIRCUIT ANALYSIS	(A5]3)	36056A			ELECTRIC FIELD STRENGTH	(4833)	
	ANALYSIS OF COVARIANCE	(A4]0)	362944			DETLE ON SYMBOLS FOR CHEMICAL ELEMENTS	(8833)	
	ANNUITY ANALYSIS		36074A			CALCULATES EMPIRICAL FORMULAS	(4833)	36615A
	THREE FACTORIAL ANALYSIS OF VARIANCE		36271A			EQUILIBRIUM SYSTEMS	(5833)	
I ANVARI :	ANALYSIS OF VARIANCE FOR A RANDOMIZED ONE-	(A410)	36039B			EQUILIBRIUM SYSTEMS	(5433)	
T ANVARS	WAY DESIGN : ANALYSIS OF VARIANCE (LATIN SQUARE DESIGN)	(4410)	360408			: COST OF EQUITY CAPITAL : COMPUTES LARGEST COMMON FACTOR OF TWO	(4712)	
	ANALYSIS OF VARIANCE FOR A TWO VARIABLES OF		361724			INTEGERS	(A301)	300328
	CLASSIFICATION DESIGN			н	EVOLU :	NATURAL SELECTION EXPERIMENT	(\$833)	363014
T ANVAR4	TWU-WAY ANALYSIS OF VARIANCE FOR A TWO-WAY	(A410)	36173A	т	EXDRSK :	EXTENDED RISK ANALYSIS	(A713)	36084A
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♦T ASCII♥ :	CREATES AN ASCII FILE CONTAINING ALL 256	(C104)	362568	T	EXPEND :	BUDGET EXPENDITURES VS. TARGETS MONITOR	(A716)	36111A
C ATTONO	ASCII CHARACTERS					EAT IN SIMPLE EXPONENTIAL FUNCTIONS OF TIME	(A820)	
	: ABSENTEE LISTING : CALCULATES ATOMIC WEIGHT		36202A 36613A			: EXPRESSION SOLVING PROGRAM : EXPONENTIAL SMOUTHING ON PRICE DATA	(C810)	
	AVERAGES AND CURVES GRADES		363404			INFINITE PRECISION MATH UTTLITY PROGRAM	(A713) (C801)	
	AVOGADRA+S NUMBER		36614A	r	EXTPRE :	40-DIGIT PRECISION MATHEMATTCS	(2064)	
	THREE-DIGIT NUMBER GUESSING		36360A	т	FACTOR :	FINDS PRIME FACTORS OF POSTTIVE INTEGERS	(A 301)	
	TRADE AND PAYMENT BALANCES		36328A	F	FACTRL :	FACTORIALS TO 1000 PLACES	(A801)	
	PROFORMA INCOME STATEMENT AND BALANCE SHEET		360754			ANALYSIS OF LOG TAPE	(A408)	
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	BASIC TEST PROGRAM PLAYS THE HATTLE OF NUMBERS GAME		361164	÷	F1F17: :	EXTENDED PRECISION FACTORIAL PAPER TAPE FILE OUMP	(A901)	
	BATTLESHIP GAME		36105A 36236A			REYGUARD FILE LOADING PROGRAM	(A110) (A110)	
	RECOMMENDS CORRECT STEEL BEAM USE		36109A			FILE LISTING PROGRAM/INSTRUCTIONS	(C10H)	
T BESSEL :	CALCULATES BESSEL FUNCTION OF FIRST KIND	(A306)	360194	Т	FILIS1 :	FILE LISTING PROGRAM/INSTRUCTIONS	(C108)	
	MAGNETIC FIELD PICTURE		36312A	r	FILIST :	LISTS FILE CONTENTS BY RECORD NUMBER	(A110)	360090
	PROBABILITY DISTRIBUTION COMPARISONS		36041A			FILE MANAGER	(A110)	
	: SQUARING BINOMIALS : GAME OF TWENTY-ONE		36240A			LUADS A FILE FROM THE TELETYPE	(A110)	
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	BOND SWITCH ANALYSIS		360768 36077A			FILE POINTEP SORT/POINTER SORT	(F110) (A107)	
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	ENERGY LEVEL DIAGRAM		36313A			COPIES DNE FILE INTO ANOTHER	(A110)	36015
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	DEPARTMENTAL MANAGERIS BUDGETING PROGRAM COMPUTER ASSISTED ARITHMETIC DRILL		362054	ť	FURMAL :	ALLOWS SPECIAL FORMATTING OF DATA PRINTOUT	(A104)	
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I CALCOM	CALCULATOR PROGRAM WITH OPTIUNAL PLOTTER OUTPUT (PART 1 DF 2)	(8301)	361314			: PROCESS OF GAMETOGENESIS : ANALYSIS OF VARIANCE (2-WAY)	(5833)	
OT CALNER	PRINTS & CALENDAR	(F108)	36288A			RATING INVESTMENT FUNDS	(C410) (C713)	
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■E CHARGE :	CHARGE ACCOUNT SIMULATION	(F860)	362204				100077	
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●E CHARGE : T CHARS : ●E CHEM :	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST	(C104) (F833)	36295A	5		INVESTMENT RETURN (CASH FLOW)	(0712)	
●E CHARGE : T CHARS : ●E CHEM : T CHISQ :	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES	(C104) (F833) (A407)	36295A 36042A	s	GKASSF :	: INVESTMENT RETURN (CASH FLOW) : WARRANT PRICE CALCULATION	(C712) (C713)	36514A
●E CHARGE : T CHARS : ●E CHEM : T CHISQ :	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST	(C104) (F333) (A407) (A407)	36295A 36042A 360438	555	GKASSF : GKCOST :	: INVESTMENT RETURN (CASH FLOW) : WAHRANT PRICE CALCULATION : PRICE/EARNINGS RATIO CALCULATION	(C712) (C713) (C713)	36514A 36515A
 E CHARGE : T CHARS : E CHEM : T CHISQ : T CHISQS : H CIRFLW : 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CIRCULAR FLOW MODEL	(C104) (F333) (A407) (A407) (A830)	36295A 36042A 360438 36632A	5555	GKASSF : GKCOST : GLP :	: INVESTMENT RETURN (CASH FLOW) : WARRANT PRICE CALCULATION	(C712) (C713) (C713) (C605)	36514A 36515A 36516A
 E CHARGE : T CHARS : E CHEM : T CHISQ : T CHISQS : H CIRFLW : H CLOUDS : 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION	(C104) (F833) (A407) (A407) (A830) (S833)	36295A 36042A 360438 36632A 36325A	5 5 5 5 5 F	GKASSF : GKCOST : GLP : GLPSA1 : GMARKS :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : LINEAR PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM	(C712) (C713) (C713) (C605) (C605) (C720)	36514A 36515A 36516A 36517A 36518A
 E CHARGE : T CHARS : E CHEM : T CHISQ : T CHISQ : T CHISQ : H CIRFLW : H CLOUDS : T COLREG : 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SEH : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBAHILITY OF CHI-SQUARE VALUES : CHI-SQUARE STATISTICS FOR M≏N CONTINGENCY TABLES : CIFCULAR FLOW MODEL : CLUUD FORMATION : COLLEGE PEGISTRATION DEMO	(C104) (F333) (A407) (A407) (A407) (S830) (S833) (F720)	36295A 36042A 360438 36632A 36325A 36325A 36282A	5 5 5 5 5 1 5	GKASSF : GKCOST : GLP : GLPSA1 : GMARKS : GMCR01 :	: INVESTMENT RETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : LINEAR PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME	(C712) (C713) (C713) (C605) (C605) (C605) (C720) (C830)	36514A 36515A 36516A 36517A 36518A 36518A 36519A
 E CHARGE : T CHARS : E CHEM : T CHISQ : T CHISQS : H CIRFLW : H CLOUDS : T COLREG : E COMPLX : 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CAI IN ALGERRA OF COMPLEX NUMMERS	(C104) (F833) (A407) (A407) (A830) (S833) (F720) (A820)	36295A 36042A 36043H 36632A 36325A 36325A 36282A 36153A	5 5 5 5 5 T 5 5	GKASSF : GKCOST : GLP : GLPSA1 : GMARKS : GMCR01 : GMCR02 :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : LINEAR PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME	(C712) (C713) (C713) (C605) (C605) (C720) (C720) (C830)	36514A 36515A 36516A 36517A 36518A 36519A 36519A
 E CHARGE : T CHARS : E CHEM : T CHISQ : T CHISQ : T CHISQS : H CLOUDS : T COLREG : E COMPLX : H CONSMP : 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBAMILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CAL IN ALGEBRA OF COMPLEX NUMBERS : DEPRESSION/FQUILLBRIUM	(C104) (F333) (A407) (A407) (A830) (S833) (F720) (A820) (S860)	36295A 36042A 360438 36632A 36325A 36282A 36153A 36153A 36330A	5 5 5 5 5 F 5 5 5	GKASSF : GKCOST : GLP : GLPSA1 : GMARKS : GMCR01 : GMCR02 : GMCR05 :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : LINEAR PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME	(C712) (C713) (C713) (C605) (C605) (C720) (C720) (C830) (C830) (C830)	36514A 36515A 36516A 36517A 36518A 36518A 36519A 36519A 36521A
 E CHARGE : T CHARS : E CHEM : T CHISO : T CHISO : H CIFLW : H CLOUDS : T COLREG : E COMPLX : H CONSMP : T CPATH : 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION : COLUEGE REGISTRATION DEMO : CAI IN ALGERRA OF COMPLEX NUMMERS	(C104) (F833) (A407) (A407) (A830) (S833) (F720) (A820) (S860) (A603)	36295A 36042A 36043H 36632A 36325A 36325A 36282A 36153A	5555515555	GKASSF : GKCOST : GLP : GLPSA1 : GMCR01 : GMCR02 : GMCR05 : GMCR06 :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : LINEAR PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME	(C712) (C713) (C713) (C605) (C605) (C605) (C630) (C830) (C830) (C830) (C830)	36514A 36515A 36516A 36517A 36518A 36519A 36519A
 E CHAFGE T T CHARS E CHEM T CHISOS T CHISOS H CIUDS T COLREG E COMPLX T CONSMP T CPAIH T CRULTI H CRVLEN 	<pre>: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CLOUD FORMATION : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CALI IN ALGERRA OF COMPLEX NUMBERS : DEPRESSION/FOULLIBRIUM : CHITICAL PATH EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : COMPUTES LENGTH OF ANY CURVE</pre>	(C104) (F833) (A407) (A407) (A830) (S833) (F720) (A820) (A820) (A820) (A8603) (A814) (S801)	36295A 36042A 360438 36632A 36325A 3625A 3625A 3625A 3625A 36330A 361718 36027A 36333A	S S S S S F S S S S T	GKASSF : GKCOST : GLP : GLPSA1 : GMCR01 : GMCR01 : GMCR05 : GMCR06 : GMCR06 : GMCR06 : GMCR06 :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING : GSb GRADING PROGRAM : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTAGN : SECURITIES PORTAGN : SECURITIES PORTAGN : SECURITIES PORTAGN	(C712) (C713) (C713) (C605) (C605) (C605) (C830) (C830) (C830) (C830) (C830)	36514A 36515A 36516A 36517A 36518A 36519A 36519A 36519A 36521A 36521A 36521A
 E CHAPGE : T CHAPG : •E CHEM : T CHISO : T CHISO : T CHISO : •H CLOUDS : •T COLREG : E COMPLX : H CONSMP : T CROUTI : H CRVLEN : T CRHEL : 	<pre>CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CAL IN ALGERRA OF COMPLEX NUMBERS : DEPRESSION/FOULLIBRIUM : CHITICAL PATH EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : CASH FLOW ANALTYSIS</pre>	(C104) (F833) (A407) (A407) (A830) (S833) (F720) (A820) (S860) (A820) (A820) (A820) (A820) (A814) (S801) (A712)	36295A 36042A 36043B 36532A 36325A 36325A 36153A 36153A 36171B 36027A 36333A 36142B	5 5 5 5 5 5 5 5 5 T 5	GKASSF : GLPSAI : GLPSAI : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMCR06 : GMCR06 :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETEMHINATION	(C712) (C713) (C713) (C605) (C605) (C720) (C830) (C830) (C830) (C830) (C830) (C830) (C720) (C713)	36514A 36515A 36516A 36517A 36518A 36519A 36519A 36519A 36521A 36521A 36521A 36521A 36521A 36530A
•L CHAFGE T CHAFS •E CHEM T CHISOS T CHISOS •H CIFFLW •H CIFFLW •COUDS •T COLODS •T COLODS T COLODS T CPATH T CPATH T CSHFL T CSHFL T CSHFL	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBAMILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLIQUE OFMATION COLLEGE REGISTRATION DEMO CAL IN ALGERRA OF COMPLEX NUMBERS UEPRESSION/FOULLIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS COMPUTES LENGTH OF ARTS CONTROL</pre>	(C104) (F333) (A407) (A407) (A830) (S833) (F720) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A814) (S801) (A708)	36295A 36042A 360438 36325A 36325A 36325A 36325A 36153A 36153A 36137A 36333A 361428 362108	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	GKASSF : GKCOST : GLP : GMARKS : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMEDIT : GMRGB : GNETFL :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGHAMMING TWO-PHASE SIMPLEX METHOD : GSB GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTAGN : SECURITIES PORTAGN DETERMINATION : NETWORK FLOW	(C712) (C713) (C713) (C605) (C605) (C720) (C830) (C830) (C830) (C830) (C830) (C720) (C713) (C604)	365144 365154 365164 365174 365184 365194 365194 365214 365214 365214 365214 365214 365214 365224
 E CHAPGE T CHAPS E CHEM T CHISQS T CHISQS H CLOUDS T COLREG T COLREG T COLREG T CONSMP T CROUTI T CROUTI H CROUTI T CSHFL T CTC2 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE STATISTICS FOR M®N CONTINGENCY TABLES : CLRCULAR FLOW MODEL : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CAI IN ALGERRA OF COMPLEX NUMBERS : DEPRESSION/FOULLIBRIUM : COLICL PATH EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : COMPUTES LENGTH OF ANY CURVE : CASH FLOW ANALYSIS : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS	(C104) (F833) (A407) (A407) (A830) (S833) (F720) (A820) (A820) (A820) (A860) (A8603) (A8603) (A8603) (A801) (A712) (A708)	36295A 36042A 36043B 36632A 36325A 36325A 36432A 36135A 36171b 36027A 36133A 36142B 36210B 36211B	5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	GKASSF : GKCOST : GLP : GMARKS : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMEDIT : GMRGB : GNETFL :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING : UNEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND	(C712) (C713) (C713) (C605) (C605) (C720) (C830) (C830) (C830) (C830) (C830) (C830) (C720) (C713)	365144 365154 365164 365174 365184 365194 365194 365214 365214 365214 365214 365214 365214 365224
•E CHAPGE : T CHAPGE : T CHISQ : T CHISQ : H CIHFLW : H CLOUDS : •H CIHFLW : H CONSPD : T CPATH : T CROUTI : H CRVLEN : T CSTFL : T CTC1 : T CTC2 : •T CTC3 : •T	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : COLLEGE REGISTRATION DEMO : COLLEGE REGISTRATION DEMO : CAI IN ALGERRA OF COMPLEX NUMBERS : DEPRESSION/FOUILIBRIUM : CHITICAL PATH EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : COSH FLOW ANALYSIS : CASH FLOW ANALYSIS : CTC MANUFACTUPING PARTS CONTROL : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS : CTC PROJECTION PROGRAMS	(C104) (F333) (A407) (A407) (A407) (S833) (F720) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A814) (S801) (A712) (A708) (A717)	36295A 36042A 36043B 36632A 36325A 36325A 36325A 36325A 36330A 36171B 36027A 36333A 36127B 36142B 36210B 36211B 36212B	5 5 5 5 F 5 5 5 5 F 5 5 5 5 5 5 5 5 5 5	GKASSF : GKCOST : GLP : GM2RAS : GM2RAS : GM2R01 : GM2R05 : GM2R05 : GM2R05 : GM2R05 : GM2R05 : GM2R05 : GM2R05 : GM2R05 :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : GSB GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURTIES PORTFOLIO ANALYSIS AND DETEMPINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMPINATION	(C712) (C713) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C430) (C720) (C713) (C604) (C713)	365144 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36521A 36523A 36523A 36523A
•L CHAFGE T CHAFS •E CHEM T CHISOS T CHISOS •H CIFFL# H CLOUDS •T COLFEG E COMPLX H CONSMP T CPAIH T CROUTI H CRVLEN T CSHFL T CSHFL T CTC1 *T CTC2 *T CTC4	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBAMILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLOUD FORMATION COLLEGE REGISTRATION DEMO CAL IN ALGEBRA OF COMPLEX NUMBERS UEPRESSION/FOULLIBRIUM CHITICAL PATH EVALUATION COLLEGE SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CAS FFLOW ANALYSIS CTC MANUFACTURING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC PROJECTION PROGRAMS</pre>	(C104) (F333) (&407) (&407) (&407) (&4830) (S433) (F720) (&4820) (&5860) (&5860) (&5860) (&5801) (&5801) (&6712) (&7708) (&7708) (&7708) (&7708) (&7708)	36295A 36042A 36043B 36632A 36325A 36325A 36432A 36135A 36171b 36027A 36133A 36142B 36210B 36211B	55555F5555F5 55 TT	GKASSF : GKCOST : GLPSA1 : GLPSA1 : GMCR01 : GMCR02 : GMCR05 : GMCR05 : GMCR06 : GMCR06 : GMETFL : GNMRVB : GNPSUM : GNPSUM : GNPSUM :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/FARNINGS HATIO CALCULATION : LINEAH PROGRAMMING : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : GROSS NATIONAL PRODUCT SUMMARY : A GOUF GAME	(C712) (C713) (C713) (C605) (C605) (C720) (C830) (C830) (C830) (C830) (C720) (C713) (C713) (C604) (C713)	365144 365154 365164 365174 365184 365194 365214 365214 365214 365214 365214 365230 365230 365294 365300
 L CHAPGE : T CHAPGE : T CHASS : E CHEM : T CHISQS : T CHISQS : H CIFFLW : H CLOUDS : T COLREG : T COLREG : T COMPLX : H CONSMP : T CPATH : T CROUTI : H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC4 : 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : COLLEGE REGISTRATION DEMO : COLLEGE REGISTRATION DEMO : CAI IN ALGERRA OF COMPLEX NUMBERS : DEPRESSION/FOUILIBRIUM : CHITICAL PATH EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : COSH FLOW ANALYSIS : CASH FLOW ANALYSIS : CTC MANUFACTUPING PARTS CONTROL : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS : CTC PROJECTION PROGRAMS	(C104) (F333) (A407) (A407) (A407) (S833) (F720) (A820) (S860) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A712) (A708) (A717) (A708) (A711)	36295A 36043B 36643B 36632A 36325A 36282A 361753A 36171B 36027A 36133A 36171B 36027A 36133A 36142B 36212B 36212B	55555F555F5 55 FTH	GKASSF : GKCOST : GLPSAI : GLPSAI : GMCR01 : GMCR02 : GMCR05 : GMCR05 : GMCR05 : GMCR05 : GMCR05 : GMCR05 : GMRG8 : GMRG9 : GNMRV9 : GNMRV9 : GNPSUM : GOLF : GOLF :	: INVESTMENT PRITURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : GROSS NATIONAL PRODUCT SUMMARY : A GOLF GAME : TEST GRADE FOR NUMBER OF JUESTIONS MISSED	(C712) (C713) (C713) (C605) (C605) (C420) (C430) (C430) (C430) (C430) (C720) (C720) (C713) (C713) (C604) (C713) (A714) (A903)	365144 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36521A 36523A 36523A 36523A
 L CHAPGE : T CHAPGE : GE CHEM : T CHISQS : CHISQS : H CLUUDS : T COLREG : COUREG : T CORLEG : T CORLEG : T CONSMP : T CRUITI H CRVLEN : T CRUITI H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC4 : T CTC5 : 	<pre>CHARGE ACCOUNT SIMULATION SACII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLOUD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMRERS UEPRESSION/FOULLIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC PROJECTION PROGRAMS CTC ACCOUNTS RECEIVARLE COMPLEX TO REAL FAST FOURIER THANSFORM</pre>	(C104) (F333) (A407) (A407) (A407) (A407) (A407) (A407) (A820) (A820) (A820) (A820) (A814) (A801) (A712) (A708) (A717) (A708) (A711) (F709) (A316)	36295A 36043B 36043B 36032A 36325A 36325A 36375A 36375A 36330A 36171B 36027A 36171B 36210B 36210B 36210B 36212B 36212B 36212B 36214B 36214B 36214B	55551555555555555555555555555555555555	GRADSF : GKCOST : GLPSA1 : GLPSA1 : GMCR01 : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMCR06 : GMCP16 : GMCP16 : GMCP5UM : GNPSUM : GNPSUM : GRADK :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING : UNEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GS5 GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NEIWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NEIWORK FLOW : GROSS NATIONAL PRODUCT SUMMARY : A GOLF GAME : TEST GRADE FOR NUMBER OF WUESTIONS MISSED : RANKING STATISTICS	(C712) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C720) (C720) (C713) (C721) (C713) (C604) (C713) (C703) (C	365144 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36520A 36530A 36529A 36530A 36086A 36102A 36342A 36541A
•L CHAPGE : T CHAPGE : T CHISO : T CHISO : T CHISO : H CINFLW : H CLOUDS : T COLREG : T CONFL : H CONSMP : T CPATH : T CROUT! H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC5 : T CIAFFT : T CIAFFT : T CIAFFT : T CIAFFT :	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLUDD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS DEPRESSION/EQUILIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COSTING AND FANY CURVE CASH FLOW ANALYSIS CATE NAUFACTURING PARTS CONTROL CIC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC PAYROLL PRUGRAMS CIC PAYROLL PRUGRAMS CIC ACCOUNTS RECEIVABLE CIC ACCOUNTS RECEIVABLE CIC ACCOUNTS PAYABLE COMPLEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT</pre>	(C104) (F333) (A407) (A407) (A407) (S833) (F720) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A820) (A708) (A708) (A708) (A707) (A708) (A711) (F709) (A316) (A404)	36295A 36042A 36043B 36632A 36325A 36325A 36325A 36325A 36153A 36171B 36027A 36333A 36127B 36210B 36212B 36212B 36212B 36212B 36212B 36214B 36638A 36028A 36038C	SSSSISSSISSSISS SS ТТНЭТ	GKASSF : GKCOST : GLP : GLPSAI : GMARKS : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMCR0	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/FARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : METWORK FLOW : GROSS NATIONAL PRODUCT SUMMARY : A GOLF GAME : TEST GRADE FOR NUMBER OF WUESTIONS MISSED : RANKING STATISTICS : DEMO FLOT PROGRAM FOR HP 7200 PLOTTER	(C712) (C713) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C430) (C720) (C713) (C720) (C713) (C614) (C713) (C713) (C614) (C713) (C714) (C712) (C712) (C713) (C714) (C714) (C712) (C714) (C712) (C712) (C712) (C712) (C713) (C712) (C	365144 365154 365164 365174 365194 365194 365214 365214 365214 365214 365214 365230 365304 365304 365304 3663294 3663424 3653414 3653414 365154
 L CHAPGE T CHAPS E CHEM T CHISQS T CHISQS H CLIFFLW H CLUDDS T COLREG T COLREG T CONSMP T CROUTI T CROUTI H CROUTI T CTC1 T CTC2 T CTC4 T CTC4 T CTC6 T CURFIT T CURFIT T CURFIT 	CHARGE ACCOUNT SIMULATION SACII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE STATISTICS FOR MON CONTINGENCY TABLES CLECULAR FLOW MODEL CLOUD FORMATION COLLEGE REGISTRATION DEMO CAI IN ALGEARA OF COMPLEX NUMBERS DEPRESSION/FOULLIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC MANUFACTUFING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC PROJECTION PRUGRAMS CTC ACCOUNTS RECEIVARLE COMPUTEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE	(C104) (F333) (A407) (A407) (A407) (A407) (A407) (A403) (F720) (A820) (A603) (A603) (A603) (A603) (A712) (A708) (A718) (A708) (A711) (A706) (A711) (A706) (A711) (A706) (A711) (A706) (A711) (A706) (A704) (A801)	36295A 36043B 36043B 36043B 36325A 3627A 36153A 36173B 36027A 36171B 36027A 36142B 36210B 36210B 36210B 36212B 36214B 36214B 36214B 36214B 36214B 36214B 36214B 36214B 36224A	алан аларын а Солорон аларын	GKASSF : GKCOST : GLP : GLPSA1 : GMCR01 : GMCR01 : GMCR01 : GMCR01 : GMCR05 : GMCR05 : GMFGB : GNFGF : GNMRVB : GNPSUM : GOLF : GRADF. : GRADK : GRAPK : GAPK :	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING : UNEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NEIWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NEIWORK FLOW : GROSS NATIONAL PRODUCT SUMMARY : A GOLF GAME : TESI GRADE FOR NUMBER OF UUESTIONS MISSED : RANKING STATISTICS : DEMO PLOT PROGRAM FOR HP 7200 PLOTTER : SIMPLE REGRESSION AND PLOT	(C712) (C713) (C713) (C605) (C605) (C720) (C430) (C430) (C730) (C730) (C730) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C714) (C714) (C712) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C700) (C	365144 365154 365164 365174 365194 365194 365214 365214 365214 365214 365294 365304 365294 365304 361024 361024 363424 363424
 L CHAPGE : T CHAPGE : T CHISQS : T CHISQS : T CHISQS : H CIFFLW : H CLOUDS : T COLREG : C COMPLX : H CONSMP : T CPATH : T CROUTI : H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC4 : T CTC5 : T CTC4 : T CTC5 : T CTC4 : T CTC4 : T CTC5 : T CTC4 : T CTC5 : T CTC5 : T CTC6 : T CTC7 : T CUFFT : CUFFT : CUFFT : 	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLOUD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS UEPRESSION/FOULLIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COLT NA ALGERRA OF ANY CURVE CASH FLOW ANALYSIS CTC MANUFACTUPING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC ACOUNTS RECEIVANLE CCOMPLEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE</pre>	(C104) (F33) (A407) (A407) (A407) (A830) (S833) (F720) (A820) (A603) (A603) (A603) (A614) (A717) (A706) (A717) (A706) (A717) (F709) (A716) (A716) (A404) (A801) (A801)	36295A 36042A 36043B 36632A 36325A 36325A 36325A 36325A 36153A 36171B 36027A 36333A 36127B 36210B 36212B 36212B 36212B 36212B 36212B 36214B 36638A 36028A 36036C	555515555T5 55 TTHST55	GKASSF : GKCOST : GLPSAI : GLPSAI : GMARKS : GMARKS : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR07 : GMCR07 : GMAGN : GNPSUM : GRAPK : GRAF	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/FARNINGS HATIO CALCULATION : LINEAR PROGRAMMING : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : METWORK FLOW : GROSS NATIONAL PRODUCT SUMMARY : A GOLF GAME : TEST GRADE FOR NUMBER OF WUESTIONS MISSED : RANKING STATISTICS : DEMO FLOT PROGRAM FOR HP 7200 PLOTTER	(C712) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C430) (C720) (C713) (C713) (C713) (C713) (C713) (C712) (C712) (C404) (C404) (C712)	365144 36515A 36516A 36517A 36519A 36519A 36519A 36521A 36521A 36521A 36521A 36523A 36530A 36530A 36002A 36342A 36115A 36542A 36543A
•L CHAFGE T CHAFG •E CHEM T CHISOS •H CIFFLW H CIFFLW H COUDS •T COLREG •T COLREG •T COLREG T CROUTI H CRVLEN T CSHFL T CTC1 T CTC2 •T CTC3 •T CTC4 T CTC5 •T CTC6 T CTC6 T CTC6 T CTC6 T CTC6 T CTC7 •T CC6 T CTC6 T CTC7 •T CC6 T CTC6 T CARFIT •H CVAREA T CXARTH	CHARGE ACCOUNT SIMULATION SACII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE STATISTICS FOR MON CONTINGENCY TABLES CLECULAR FLOW MODEL CLOUD FORMATION COLLEGE REGISTRATION DEMO CAI IN ALGEARA OF COMPLEX NUMBERS DEPRESSION/FOULLIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC MANUFACTUFING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC PROJECTION PRUGRAMS CTC ACCOUNTS RECEIVARLE COMPUTEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE	(C104) (F∂33) (A407) (A407) (A407) (A830) (S803) (F720) (A820) (A8420) (A840) (A708) (A708) (A708) (A708) (A708) (A708) (A708) (A708) (A709) (A711) (F709) (A811) (A801) (A801) (A803) (A803)	36295A 36042A 36043B 36043B 36032A 36325A 36272A 36153A 36173A 36173B 36027A 36174B 36210B 36210B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 3622A	らうどうでにいいいましょう マントレート しょういいしょう	GKASSF : GKCOST : GLPSA1 : GLPSA1 : GMARKS : GMARKS : GMCR01 : GMCR01 : GMCR05 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GNDSUM : GADKT : GNDSUM : GADART : GRARK : GGANK : GGANK : GGAST : GSTMG : GSTMG : GSTMG : SSTMG : S	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSS GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : ROTS NATIONAL PRODUCT SUMMARY : A GOLF GAME : TEST GRADE FOR NUMBER OF JUESTIONS MISSED : RANKING STATISTICS : DEMG PLOT PROGRAM FOR HP 7200 PLOTTER : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : STANFORD PORTFOLIO MANAEMENT GAME	(C712) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C720) (C713) (C	365144 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36521A 36528A 36530A 36588A 3650A 36002A 36102A 36543A 36543A
•L CHAPGE : T CHAPGE : T CHISQ : T CHISQ : T CHISQ : H CIHFLW : H CLOUDS : T COLREG : COMPLX : H CONSMP T CPATH : T CROUT! H CRVLEN : T CTC1 T CTC2 : T CTC2 : T CTC4 T CTC5 : T CTC6 T CTC6 T CTC7 T CTC	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLRUCHAR FLOW MODEL CLOUD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS DEPRESSION/EQUILIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CCTC MANUFACTUPING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC PAYROLL PRUGRAMS CTC PAYROLL PRUGRAMS CTC ACCOUNTS RECEIVANLE CTC ACCOUNTS RECEIVANLE CTC ACCOUNTS PAYABLE CCTC ACCOUNTS RECEIVANLE CTC ACCOUNTS RECEIVANLE VECTOR ANITHETIC VECTOR ANITHETIC VECTOR ANITHETIC SOLVES TIME COMPLEX LINEAR EQUATIONS SOLVENG SYSTEMS OF COMPLEX LINEAR EQUATIONS COMPLEX TO ANITHETIC SUMPS FILE TO DATA STATEMENTS</pre>	(C104) (F33) (A407) (A407) (A407) (A407) (A503) (F720) (A513) (F720) (A514) (S801) (A514) (A514) (A708) (A708) (A707) (A7	36295A 36042A 36043B 36632A 36325A 36325A 36325A 36325A 36330A 36173A 36330A 36174B 36210B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36214B 36638A 36028A 36038C 36620A 36119A 36262A	シャンド・シート ひょうしょう しょうしょう しょうしょう しょうしょう	GKASSF GKCOST GKCOST GKCOST GKCOST GKCMCOST GGKCMCOST	<pre>INVESTMENT PRICE CALCULATION I WARRANT PRICE CALCULATION PRICE/EARNINGS HATIO CALCULATION ILINEAR PROGRAMMING TWO-PHASE SIMPLEX METHOD IS SD GRADING PROGRAM IFISCAL POLICY GAME IFISCAL POLICY GAME ISCUNTIES PORTFOLIO ANALYSIS AND DETERMINATION INTWORF FLOW SECUNTIES PORTFOLIO ANALYSIS AND DETERMINATION INTWORF FLOW IS COLF GAME ISTOLE GAME IFISCAL PORDECT SUMMARY A GOLF GAME INTIG STATISTICS INTUL PRODECT SUMMARY IA GOLF CADE FOR NUMBER OF GUESTIONS MISSED IRANKING STATISTICS SIMPLE REGRESSION AND PLOT RISK ANALYSIS IN CAPITAL INVESTMENT SIMULTANEOUS LINEAR EQUATIONS STANFORD POHTFOLIO MANAGEMENT GAME IS SMALL SYSTEMS SIMULATOR</pre>	(C712) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C720) (C	365144 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36521A 36521A 36520A 36520A 36529A 36529A 36102A 36342A 36542A 36542A 36547A 36552A
 L CHAPGE T CHAPG E CHEM T CHISQS T CHISQS T CHISQS T COLREG T COUPLX H CONSMP T CROUTI H CRVLEN T CROUTI T CTC1 T CTC2 T CTC4 T CTC4 T CTC5 T CTC6 T CANFA T CXARTH T CXAPEA T CXATA T CASSS T DATA T DATER 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR MON CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CAL IN ALGERRA OF COMPLEX NUMBERS : DEPRESSION/FOULLIBRIUM : COLIEGE APATI EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : COMPUTES LENGTH OF ANY CURVE : CASH FLOW ANALYSIS : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS : CTC PROJECTION PRUGRAMS : CTC PROJECTION PRUGRAMS : CTC ACCOUNTS RECEIVABLE : COMPLEX TO REAL FAST FOURIER THANSFORM : PERFORMS LEAST-SQUARES FIT : AREA UNDER CURVE : VECTOR ARITHAETIC : VECTOR ANDER VENE : VECTOR ANDER COMPLEX LINEAR EQUATIONS : SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS : DUMPS FILE TO DATA STATEMENTS : DATE AND DAY OF THE WEEK	(C104) (F33) (A407) (A407) (A407) (A407) (A30) (S803) (A520) (A5801) (A603) (A5801) (A708) (A	36295A 36043B 36043B 36043B 36032A 36325A 36325A 36375A 36375A 36171B 36027A 36171B 36027A 36210B 36210B 36210B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36214B 36620A 36118A 3603C 36118A 36626A 36118A 36287A 36628A	いいいいいいいいいい ひょういいしょう	GKASSF : GKCOST : GLPSA1 : GLPSA1 : GMARKS : GMARKS : GMARKS : GMARKS : GMARKS : GMARKS : GMARKS : GMARKS : GNARKS : GANAK : GSAK : GSTKVL : GSTKVL :	: INVESTMENT PETURN (CASH FLOW) : WANRANT PRICE CALCULATION : WANRANT PRICE CALCULATION : LINEAH PROGRAMMING : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORK FLOW : GRUSS NATIONAL PRODUCT SUMMARY : A GOLF GAME : TESI GRADE FOR NUMBER OF WUESTIONS MISSED : RANKING STATISTICS : DEMO PLOT PROGRAM FOR HP 7200 PLOTTER : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLENEOUS LINEAR EQUATIONS : STANFORD PORTFOLIO MANAGEMENT GAME : SMALL SYSTEMS SIMULATOR : STOCK VALUATION	(C712) (C713) (C605) (C605) (C720) (C430) (C430) (C730) (C730) (C730) (C730) (C713) (C713) (C713) (C713) (C604) (C713) (C408) (C408) (C408) (C712) (C314) (C	365144 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36528A 36530A 36529A 3650A 366086A 36102A 36542A 36542A 36542A 36542A 36552A
 L CHAPGE : T CHAPGE : T CHISQS : C CHEM : T CHISQS : T CHISQS : H CLOUDS : T COLREG : H CONSMP : T COMPLX : H CONSMP : T CROUTI : H CRVLEN : T CTC1 : T CTC2 : T CTC4 : T CTC5 : T CTC5 : T CTC6 : T CTC5 : T CTC5 : T CTC5 : T CTC4 : T CTC5 : T CTC5 : T CTC5 : T CTC4 : T CTC5 : T CTC4 : T CTC4 : T CTC5 : T CTC5	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLUUD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS UPPRESSION/FOULLIBRIUM COLLEGE NEATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS CONPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC MANUFACTURING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC AVACOUNTS RECEIVANLE CTC ACOUNTS RECEIVANLE CTC ACCOUNTS PATABLE CCMPIES TO PROLETAS CTC ACCOUNTS PATABLE CTC ACCOUNTS RECEIVANLE CCMPLEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE VECTOR ARITHMETIC VECTOR ARITHMETIC SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS DUMPS FILE TO DATA STATEMENTS DATE AND DAY OF THE WEEK COMPLES DATE FHOM SYSTEM CLOCK</pre>	(C104) (F833) (A407) (A407) (A407) (A407) (A503) (A503) (A503) (A503) (A514) (A714) (A714) (A704) (A714) (A704) (A7174) (A704) (A711) (A704) (A316) (A303) (A303) (A303) (B303) (F212) (F104)	36295A 36042A 36043B 36632A 36325A 36325A 36372A 36330A 36171B 36027A 36210B 36210B 36210B 36210B 36212B 36212B 36212B 36212B 36212B 36212B 36214B 36624A 36034C 36034C 36119A 36287A 36298A 36228A	いいいいいいいいいいい ひょういいしょう しょうしょう	GKASSF : GKCOST : GLPSAI : GLPSAI : GMARKS : GMARKS : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR07 : GMAGN : GNPSUM : GOLF : GRAPK : GRAPK : GRAPK : GSISKA :	<pre>INVESTMENT PETURN (CASH FLOW) : WARBANT PRICE CALCULATION PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGHAMMING TWO-PHASE SIMPLEX METHOD : G5b GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : RETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : RETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : BENGE SAME : TEST GRADE FOR NUMBER OF JUESTIONS MISSED : RANKING STATISTICS : DEMG PLOT PROGRAM FOR HP 7200 PLOTTER : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMULTANEOUS LINEAR EQUATIONS : STANFORD PORTFOLIO MANAGEMENT GAME : SMALL SYSTEMS SIMULATOR : PAPEH TAPE IITLER</pre>	(C712) (C713) (C605) (C605) (C720) (C720) (C830) (C830) (C720) (C713) (C713) (C713) (C713) (C701) (C702) (C408) (C408) (C408) (C408) (C404) (C713) (C713) (C713) (C713)	365144 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36521A 36523A 36530A 36530A 36342A 36342A 36544A 36544A 36544A 36552A 36552A 36545A 36545A
 L CHAPGE T CHAPG E CHEM T CHISQS H CLIFFLW H CLOUDS T CHISQS T COLREG E COMPLX H CONSMP T CPATH T CROUTI H CRVLEN T CTC1 T CTC4 T CTC4 T CTC6 T CARFH T CXARTH T CXARTH T CXARTA T DATA T DATA T DATES T DATES 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE STATISTICS FOR MAN CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CAI IN ALGEARA OF COMPLEX NUMBERS : DEPRESSION/FOULLINFIUM : COLICA PATH EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : COMPUTES LENGTH OF ANY CURVE : CASH FLOW ANALYSIS : CTC MANUFACTUFING PARTS CONTROL : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS : CTC PROJECTION PRUGRAMS : CTC PROJECTION PRUGRAMS : CTC ACCOUNTS RECEIVANLE : COMPLEX TO REAL FAST FOURIER THANSFORM : PERFORMS LEAST-SQUARES FIT : AREA UNDER CURVE : VECTOR ARITAMETIC : VECTOR ARITAMETIC : VECTOR ARITAMETIC : DUMPS FILE TO DATA STATEMENTS : DATE AND DAY OF THE WEEK : COMPUTES DATE FHOM SYSTEM CLOCK : STO READE TOMENTAL EQUATION	(C104) (F33) (A407) (A407) (A407) (A407) (A503) (F720) (A503) (A514) (A514) (A514) (A714) (A708) (A714) (A708) (A711) (A708) (A711) (A708) (A711) (A708) (A711) (A708) (A711) (A708) (A711) (A708) (A711) (A708) (A711) (A708) (A7	36295A 36043B 36043B 36043B 36043B 36025A 36175A 36175A 36175A 36175A 36171B 36027A 36171B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36214B 36212B 36214B 36214B 36212B 36214B 3622A 36119A 3628A 36119A 36287A 36298A 36117A 36287A	どうどうがいいいいいいい ひょうしょう しょうしょう しょうしょう	GKASSF : GLP : GLPSAI : GLPAI : GMARKS : GMARKS : GMARKS : GMARKS : GMARKS : GMARKS : GMARKS : GNETFL : GMARKS : GNARYS : GANAKYS : GANA	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : WARRANT PRICE CALCULATION : LINEAH PROGRAMMING : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION NETWORK FLOW : GROSS NATIONAL PRODUCT SUMMARY : A GOLF GAME : RESIGNE FOR NUMBER OF QUESTIONS MISSED : RANKING STATISTICS DEMU PLOT PROGRAM FOR HP 7200 PLOTTER : SIMULE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMULTANEOUS LINEAR EQUATIONS : STANFORD PORTFOLIO MANAGEMENT GAME : SMALL SYSTEMS SIMULATOR : SOUS VALUATION : PAPEH TAPE TITLER	(C712) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C720) (C720) (C720) (C720) (C720) (C720) (C720) (C713) (C713) (C704) (C712) (C314) (C13) (C	36514A 36515A 36516A 36517A 36519A 36519A 36521A 36521A 36521A 36528A 36530A 36529A 3650A 366086A 36102A 36542A 36542A 36542A 36542A 36552A
 L CHAPGE : T CHAPGE : T CHAPG : E CHEM : T CHISOS : T CHISOS : H CIFLW : H CLOUDS : T COLREG : COMPLX : H CONSMP : T CPATH : T CROUTI : H CRVLEN : T CROUTI : H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC4 : T CTC4 : T CTC4 : T CTC5 : T CTC6 : T CTC6 : T CTC6 : T CTC6 : T CTC6 : T CTC7 : CURFIT : CURFIT : CURFIT : CURFIT : CAARTH : T CAARTH : T CA	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CLUUD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS UPPRESSION/FOULLIBRIUM COLLEGE NEATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS CONPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC MANUFACTURING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC AVACOUNTS RECEIVANLE CTC ACOUNTS RECEIVANLE CTC ACCOUNTS PATABLE CCMPIES TO PROLETAS CTC ACCOUNTS PATABLE CTC ACCOUNTS RECEIVANLE CCMPLEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE VECTOR ARITHMETIC VECTOR ARITHMETIC SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS DUMPS FILE TO DATA STATEMENTS DATE AND DAY OF THE WEEK COMPLES DATE FHOM SYSTEM CLOCK</pre>	(C104) (F833) (A407) (A407) (A407) (A407) (A720) (A820) (S803) (A314) (S801) (A314) (A712) (A708) (A712) (A708) (A712) (A708) (A711) (A708) (A711) (A708) (A711) (A712) (A711) (F709) (A316) (F104) (F104) (F104) (A318) (A318)	36295A 36042A 36043B 36632A 36325A 36325A 36372A 36330A 36171B 36027A 36210B 36210B 36210B 36210B 36212B 36212B 36212B 36212B 36212B 36212B 36214B 36624A 36034C 36034C 36119A 36287A 36298A 36228A	くびどうないのののです ひょう ちょうしゅうしょう	GKASSF : GKCOST : GLPSAI : GLPSAI : GMARKS : GMARKS : GMCPN2 : GMCPN2 : GMCPN2 : GMCPN2 : GMCPN5 : GMC	: INVESTMENT PETURN (CASH FLOW) : WARBANT PRICE CALCULATION : WARBANT PRICE CALCULATION : LINEAH PROGRAMMING : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORF FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : SHOUS ANTIONAL PRODUCT SUMMARY : A GOLF GAME : TEST GRADE FOR NUMBER OF QUESTIONS MISSED : RANKING STATISTICS : DEMO PUCT PROGRAM FOR HP 7200 PLOTTER : SIMULTANEOUS LINEAR EQUATIONS : STANFURD PORTFOLIO MANAGEMENT GAME : STAFURD PORTFOLIO MANAGEMENT GAME : STAFURD PORTFOLIO MANAGEMENT GAME : STOCK VALUATION : SOUJECTIVE PROBABILITY DISTRIBUTION : SECURITIES CHOLE ANALYSTS	(C712) (C713) (C713) (C605) (C605) (C720) (C430) (C430) (C430) (C720) (C713) (C713) (C713) (C713) (C703) (C703) (C703) (C703) (C703) (C713) (C713) (C604) (C713) (C	365144 365154 365174 365174 365194 365194 365214 365214 365214 365214 365214 365214 365214 365214 365214 365214 365224 365424 365424 365424 365424 365424 365424 365524 365454 365534 365534
 L CHAPGE T CHAPGE T CHAPG T CHISOS T CHISOS T CHISOS T COLREG T COUTI H COUDS T COLREG T COMPLX H CONSMP T CPATH T CROUTI H CRVLEN T CTC1 T CTC2 T CTC2 T CTC4 T CTC5 T CTC6 T CTC6 T CTC6 T CTC6 T CTC6 T CTC7 C CUCFIT C CUCFIT T CVAFLA T CAARTH T CXARTH T CXARTH T CASTS T DATA 	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SLT SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CIRCULAR FLOW MODEL CLOUD FORMATION COLLEGE REGISTRATION DEMO CAI IN ALGERRA OF COMPLEX NUMBERS UPPRESSION/FOULLIBRIUM COLLEGE REGISTRATION DEMO CAI IN ALGERRA OF COMPLEX NUMBERS UPPRESSION/FOULLIBRIUM COLLEGE NEWSTON SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC ACCOUNTS RECEIVABLE CTC ACCOUNTS PAYABLE COMPLEX TO REAL FAST FOURIER THANSFORM UPEFORMS LEAST-SQUARES FIT AREA UNDER CURVE VECTOR ARITHMETIC VECTOR EXPONENTIATION SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS DUMPS FILE TO DATA STATEMENTS DATE AND DAY OF THE WEEK IST ORDER DIFFEMENTIAL EQUATION 2 AND OHDER DIFFEMENTIAL EQUATION SOLVING POTHE WEEK IST ORDER DIFFEMENTIAL EQUATION COMPLES DATE FROM SYSTEM CLOCK IST ORDER DIFFEMENTIAL EQUATION COMPUES DATE FROM STSTEN FUNCTION RADIDACTIVE DEATS AND AND OF THE WEEK IST ORDER DIFFEMENTIAL EQUATION COMPUTES DATE FROM STSTEN FUNCTION RADIDACTIVE DECAT GAME</pre>	(C104) (F33) (A407) (A407) (A407) (A830) (S803) (A603) (A603) (A603) (A603) (A603) (A708) (A7	36295A 36043B 36043B 36043B 36043B 36032A 36153A 36173B 36171B 36027A 36171B 36027A 36171B 36210B 36210B 36210B 36210B 36210B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 3622A 3611BA 3611BA 3611BA 3611BA 3611BA 3611BA 3625A 3611BA 3625A 36298A 36117A 36295A 36298A 36117A 36295A 36298A 36117A 36295A 36298A 36117A 36295A 36298A 36117A 36295A 36298A 36117A 36295A 36298A 36117A 36295A 36298A 36117A 36295A 36298A 36305A	くびょうぶつのかいしてい ママートマーマン しょういいしょう	GKASSF : GKCOST : GLP : GLPSA1 : GMARKS : GMARKS : GMCPA0 : GAAKK : GAAKK : GAAKK : GAAKK : GFAPK : GSISKU : GSISKU : GTASPO : GT	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : WARRANT PRICE CALCULATION : LINEAR PROGRAMMING : LINEAR PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NEIWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NEIWORK FLOW : A GOLF GAME : TESI GRADE FOR NUMBER OF UNESTIONS MISSED : RANKING STATISTICS : DEMO PLOT PROGRAM FOR HP 7200 PLOTTER : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : SIMPLE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : PAPEH TAPE TITLE : DOUTING DATA	(C712) (C713) (C713) (C605) (C605) (C720) (C730) (C730) (C730) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C404) (C404) (C712) (C314) (C607) (C607) (C607) (C607) (C713) (C104) (C713) (C713) (C713)	365144 365154 365164 365174 365194 365194 365214 365214 365214 365214 365214 365294 365304 365294 36504 361024 363424 365424 365424 365424 365424 365424 365454 3655524 365555
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 L CHAPGE : T CHAPGE : T CHAPG : E CHEM : T CHISOS : T CHISOS : H CIFLW : H CLOUDS : T COLREG : T COLREG : T COMPLX : H CONSMP : T CPATH : T CROUTI : H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC4 : T CTC4 : T CTC4 : T CTC5 : T CTC6 : T CTC6 : T CTC6 : T CTC6 : T CTC7 : CURFIT : CURFIT : CARTH : T CAARTH : T DE-20R : T DE-20R : T DECAY1 : 	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CIRCULAR FLOW MODEL CLUUD FORMATION COLLEGE REGISTRATION DEMO CAI IN ALGERRA OF COMPLEX NUMBERS DEPRESSION/FOULLIBRIUM COLLEGE NEGISTRATION DEMO CAI IN ALGERRA OF COMPLEX NUMBERS DEPRESSION/FOULLIBRIUM SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC ACCOUNTS RECEIVANLE CTC ACCOUNTS PATABLE CCOMPLEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE VECTOR ARITHMETIC VECTOR ARITHMETIC SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS DUMPS FILE TO DATA STATEMENTS DATE AND DAY OF THE WEEK COMPUTES DATE FHOM SYSTEM CLOCK I STO ORDER DIFFERENTIAL EQUATION COMPUTES DATE FHOM SYSTEM CLOCK SAD ORDER DIFFERENTIAL EQUATION COMPUTES DATE FHOM SYSTEM CLOCK I STO ORDER DIFFERENTIAL EQUATION COMPUTES DATE FHOM SYSTEM CLOCK I STO ORDER DIFFERENTIAL EQUATION COMPUTES DECAY GAME NUCLEAR DECAY GAME NUCLEAR DECAY GAME DEPRECLIATION METHOD COMPARISON</pre>	(C104) (F833) (A407) (A407) (A407) (A772) (A782) (S803) (F720) (A820) (S803) (A314) (S801) (A314) (A712) (A708) (A712) (A708) (A712) (A712) (A711) (F709) (A316) (A303) (F212) (F104) (F212) (F104) (F316) (A318) (A318) (A316) (S833) (S833) (A606) (A6712)	36295A 36042A 36043B 36043B 36043B 36032A 36325A 36272A 36153A 36173A 36173A 36173B 3627A 36210B 36210B 36210B 36210B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 3622A 36033A 36059A 36117A 36262A 36298A 36117A 36262A 36298A 36117A 36262A 36295A 36295A 36295A 36295A 36305A 36305A 36307A 36065C 36082A	シンシンシーションシート シン エイエットシンショントレッション	GKASSF : GKCOST : GLPSA1 : GLPSA1 : GMARKS : GMARKS : GMCR01 : GMCR01 : GMCR05 : GMCR06 : GNCR06 : GNC	<pre>INVESTMENT PHIURN (CASH FLOW) : WARBANT PHICE CALCULATION PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : G5b GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : RETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : STADE FOR NUMBER OF JUESTIONS MISSED : RANK ING STATISTICS : DEMG PLOT PROGRAM FOR HP 7200 PLOTTER : SIMULE REGRESSION AND PLOT : RISK AMALYSIS IN CAPITAL INVESTMENT : SIMULTANEOUS LINEAR EQUATIONS : STANFORD POHTFOLIO MANAGEMENT GAME : STALE SYSTEMS SIMULATOR : SOCK VALUATION : PAPEH TAPE IITLÉR : SUBJECTIVE PROBABILITY DISTRIBUTION : SECURITIES EPS GROWTH : COMMITTEE CHOICE ANALYSTS : PLOITING DATA : SUBJECTIVE PROBABILITY - RANDOM VALUES</pre>	(C712) (C713) (C605) (C605) (C605) (C720) (C730) (C730) (C730) (C713) (C713) (C713) (C713) (C713) (C713) (C703) (C408) (C408) (C408) (C408) (C713) (C714) (C714) (C714) (C714) (C713) (C	365144 365154 365164 365174 365194 365194 365214 365214 365214 365214 365294 365304 365294 36504 365024 365424 365424 365424 365424 365424 365424 365424 365524 365524 36555 36555 36555 36555
 L CHAPGE T CHAPGE T CHISOS T CHISOS T CHISOS T CHISOS T COLREG T COLREG T CONSMP T CONSMP T CROUTI T CRUEN T CRUEN T CTC1 T CTC2 T CTC4 T CTC4 T CTC4 T CTC6 T CTC7 T CARFH T CXARTH T CXARTH T CXARTA T DATES T DATES T DATES T DE-20R T DECSNI 	: CHARGE ACCOUNT SIMULATION : ASCII CHARACTER SET : SELF-CORRECTING CHEMISTRY TEST : COMPUTES PROBABILITY OF CHI-SQUARE VALUES : CHI-SQUARE SIATISTICS FOR MON CONTINGENCY TABLES : CIRCULAR FLOW MODEL : CLOUD FORMATION : COLLEGE REGISTRATION DEMO : CAL IN ALGEBRA OF COMPLEX NUMBERS : DEPRESSION/FOULLIBRIUM : COLLEGE APATI EVALUATION : SOLVES SIMULTANEOUS LINEAR EQUATIONS : COMPUTES LENGTH OF ANY CURVE : CASH FLOW ANALYSIS : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS : CTC INVENTORY CONTROL FOR FINISHED PRODUCTS : CTC PROJECTION PRUGRAMS : CTC ACCOUNTS PATABLE : COMPLEX TO REAL FAST FOURIER THANSFORM : PERFORMS LEAST-SQUARES FIT : AREA UNDER CURVE : VECTOR ARITHMETIC : VECTOR ARITHMETIC : SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS : DUMPS FILE TO DATA STATEMENTS DATE AND DAY OF THE WEEK : COMPUTES DATE FROM SYSTEM CLOCK : IST ORDER DIFFERENTIAL EQUATION : COMPUTES DETE FROM SYSTEM CUCK : STO ORDER DIFFERENTIAL EQUATION : COMPUTES DETE FROM SYSTEM FUNCTION : ADD ORY OF THE WEEK : COMPUTES DETE FROM SYSTEM FUNCTION : ADD ORY OF THE WEEK : COMPUTES DETE FROM SYSTEM FUNCTION : RADIOACTIVE DECAY GAME : NUCCLEAR DECAY : TOP MANAGEMENT DECTSION GAME	IC104) (F33) (A407) (A603) (A314) (A314) (A708) (A711) (A706) (A711) (F709) (A316) (A401) (A303) (H04) (A318) (A318) (A318) (A318) (A317) (A317)	36295A 36043B 36043B 36043B 36043B 36072A 36175A 36175A 36175A 36171B 36077A 36171B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 36212B 3622A 36119A 36262A 36119A 36262A 36119A 36262A 36117A 36296A 36117A 36296A 36117A 36296A 36305A 36305A 36305A 36305A 36305A 36305A 36305A 36305A 36305A	ひょうかいしょう いいしょう しょうしょう しょうしょう しょうしょう しょうしょう	GKASSF : GKCOST : GLPSA1 : GLPSA1 : GMARKS : GMARKS : GMCPA01 : GACANC	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : WARRANT PRICE CALCULATION : LINEAH PROGRAMMING : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : NETWORK FLOW : A GOLF GAME : TESI GRADE FOR NUMBER OF QUESTIONS MISSED : RANKING STATISTICS : DEMG PLOT PROGRAM FOR HP 7200 PLOTTER : SIMPLE REGRESSION AND PLOT : RISS ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISS ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISS ANALYSIS IN CAPITAL INVESTMENT : SIMPLENEDUS LINEAR EQUATIONS : STANFORD PDRTFOLIO MANAGEMENT GAME : SMALL SYSTEMS SIMULATOR : SUBJECTIVE PROBABILITY DISTRIBUTION : SECURITIES CONTH : COMMITEE CHOICE ANALYSTS : PLOTING DATA : SUBJECTIVE PROBABILITY - RANDOM VALUES : MALF LIFE SIMULATION : TYPES DATE. TIME, AND PORT NUMBER ON TERMINAL : SAMPLE STATISTICS AND HISTOGRAM FORMED FROM : SAMPLE STATISTICS	(C712) (C713) (C713) (C605) (C605) (C720) (C730) (C730) (C730) (C713) (C713) (C713) (C713) (C713) (C713) (C713) (C408) (C408) (C408) (C404) (C404) (C604) (C606) (C713) (C606) (C713) (C606) (C713) (C606) (C713) (C606) (C713) (C606) (C713) (C606) (C713) (C606) (C713) (C606) (C713) (C706) (C706) (C706) (C706) (C706) (C706) (C706) (C706) (C706) (C706) (C707) (C	365144 365154 365154 365174 365194 365194 365214 365214 365214 365214 365214 365294 365304 365304 36504 361024 361024 365424 365424 365424 365424 365424 365454 3655524 3655534 3655534 3655534 3655534 3655534 3655534 3652534 3652534
 L CHAPGE : T CHAPGE : T CHAPG : C CHEM : T CHISOS : H CIFLW : H CLOUDS : T COLREG : COMPLX : H CONSHP : T CROUTI : H CRVLEN : T CROUTI : H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC4 : T CTC5 : T CTC5 : T CTC6 : T CTC6 : T CTC6 : T CTC7 : T CARTH : T DATES : T DE-100 : T DE-200 : T DE-200 : T DE-200 : T DECAY2 : T DECAY2 : 	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M⊕N CONTINGENCY TABLES CLUUD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS DEPRESSION/FOULLIBRIUM CHITICAL PATH EVALUATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COLEGE NEGISTRATION OF ANY CURVE CASH FLOW ANALYSIS CTC MANUFACTURING PARTS CONTROL CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC ANOUTS PAYABLE CTC ACCOUNTS RECEIVANLE CCOMPLEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE VECTOR ARITHMETIC VECTOR ARITHMETIC VECTOR ARITHMETIC SOLVES OF COMPLEX LINEAR EQUATIONS DUMPS FILE TO DATA STATEMENTS DATE AND DAY OF THE WEEK COMPUTES DATE FROM SYSTEM CLOCK SIST ORDER DIFFEMENTIAL EQUATION COMPUTES DATE FROM SYSTEM CLOCK SIST ORDER OF FEMENTIAL EQUATION COMPUTES DATE FROM SYSTEM CLOCK SIST ORDER OF FEMENTIAL EQUATION COMPUTES DATE FROM SYSTEM CLOCK SIST ORDER OF FEMENTIAL EQUATION COMPUTES DATE FROM SYSTEM CLOCK SIST ORDER DIFFEMENTIAL EQUATION COMPUTES DATE FROM SYSTEM CLOCK SIST ORDER OFFEMENTIAL EQUATION COMPUTES DEGRE OF AFUNCTION AT A POINT DEFENSIONAL COMPUTES OF A FUNCTION AT A POIN</pre>	(C104) (F∂33) (A407) (A407) (A407) (A407) (A20) (SH33) (A503) (A503) (A314) (S801) (A712) (A708) (A714) (A708) (A714) (A708) (A714) (A708) (A714) (A711) (A708) (A316) (A404) (A303) (A303) (H301) (S1833) (S174) (S174) (A317) (A317) (A317) (A317) (A317)	36295A 36043B 36043B 36043B 36043B 36055A 361753A 361753A 36171B 36027A 36172B 36212B 3622A 3603A 36117A 36287A 36287A 36298A 3617A 36298A 3633A 36052A 36305A 36305A 36305A 36031A 36263A	シンシンシーション ちょうしょう しょう しょうしょう	GKASSF : GKCOST : GLPSA1 : GLPSA1 : GMARKS : GMARKS : GMCR01 : GMCR02 : GMCR05 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR06 : GMCR07 : GMCR07 : GMCR07 : GNPSUM : GNPSUM : GNPSUM : GNPSUM : GNPSUM : GNPSUM : GSTAFUT : GTAPT : GSTME0 : GSTME0 : GSTME0 : GSTME0 : GSTME0 : GSTME0 : GTAPT	: INVESTMENT PRICE CALCULATION : WARBANT PRICE CALCULATION : PRICE/EARNINGS HATIO CALCULATION : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONOMIC POLICY GAME : ECONOMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION NETWORF FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION NETWORF FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : NETWORF FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : SECURITIES PORTFOLIO ANALYSIS AND DETERMINATION : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : STADE FOR NUMBER OF JUESTIONS MISSED : RANK ING STATISTICS : DEMG PLOT PROGRAM FOR HP 7200 PLOTTER : SIMULE REGRESSION AND PLOT : RISK ANALYSIS IN CAPITAL INVESTMENT : SIMULTANEOUS LINEAR EQUATIONS : STANFORD POHTFOLIO MANAGEMENT GAME : STOCK VALUATION : STOCK VALUATION : SOUSJECTIVE PROBABILITY DISTRIBUTION : SECURITIES CHORAMILTY - RANDOM VALUES : MALF LIFE SIMULATION : SUBJECTIVE PROBABILITY - PANDOM VALUES : MALF LIFE SIMULATION : TYPES DATA : SAMEL STATISTICS AND PHISTOGRAM FORMED FROM A SET OF NUMBERS : A HISTOGRAM FORMED FROM A SET OF NUMBERS	(C712) (C713) (C605) (C605) (C720) (C720) (C730) (C730) (C730) (C730) (C730) (C713) (C	365144 365154 365174 365174 365194 365194 365214 365214 365214 365214 365214 365214 365214 365214 365214 365214 365214 365214 36524 36524 361154 365424 365424 365424 365424 365424 365424 365524 36555 361344 361344 361344 362354 362558
 L CHAPGE : T CHAPGE : T CHAPG : C CHEM : T CHISOS : H CIFLW : H CLOUDS : T COLREG : COMPLX : H CONSHP : T CROUTI : H CRVLEN : T CROUTI : H CRVLEN : T CTC1 : T CTC2 : T CTC2 : T CTC3 : T CTC4 : T CTC5 : T CTC5 : T CTC6 : T CTC6 : T CTC6 : T CTC7 : T CARTH : T DATES : T DE-100 : T DE-200 : T DE-200 : T DE-200 : T DECAY2 : T DECAY2 : 	<pre>CHARGE ACCOUNT SIMULATION ASCII CHARACTER SET SELF-CORRECTING CHEMISTRY TEST COMPUTES PROBABILITY OF CHI-SQUARE VALUES CHI-SQUARE SIATISTICS FOR M®N CONTINGENCY TABLES CIRCULAR FLOW MODEL CLOUD FORMATION COLLEGE REGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS UPPRESSION/FOULLIBRIUM COLLEGE NEGISTRATION DEMO CALI IN ALGERRA OF COMPLEX NUMBERS UPPRESSION/FOULLIBRIUM COLLEGE NEGISTRATION SOLVES SIMULTANEOUS LINEAR EQUATIONS COMPUTES LENGTH OF ANY CURVE CASH FLOW ANALYSIS CTC INVENTORY CONTROL FOR FINISHED PRODUCTS CTC ACCOUNTS RECEIVABLE CTC ACCOUNTS RECEIVABLE CTC ACCOUNTS PAYABLE COMPLEX TO REAL FAST FOURIER THANSFORM PERFORMS LEAST-SQUARES FIT AREA UNDER CURVE VECTOR APITHMETIC VECTOR APITHMETIC SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS DUMPS FILE TO DATA STATEMENTS DATE AND DAY OF THE WEEK IST ORDER DIFFEMENTIAL EQUATION COMPLES DATE FROM SYSTEM CLOCK IST ORDER DIFFEMENTIAL EQUATION COMPLES DATE FROM SYSTEM CLOCK IST ORDER DIFFEMENTIAL EQUATION COMPUTES DATE FROM STEIN FUNCTION RADIOACTIVE DECAY GAME NUCLEAR DECAY STOP MANAGEMENT DECISION GAME DEPRECIATION METHOD COMPARISON DEPRECIATION METHOD COMPARISON DEPRECIATION METHOD COMPARISON DEPRECIATION METHOD COMPARISON DEFINITION OF A FUNCTION AT A POINT DETEMINANTS, CHARACTERISTIC POLYNOMIALS AND</pre>	(C104) (F∂33) (A407) (A407) (A407) (A407) (A20) (SH33) (A503) (A503) (A314) (S801) (A712) (A708) (A714) (A708) (A714) (A708) (A714) (A708) (A714) (A711) (A708) (A316) (A404) (A303) (A303) (H301) (S1833) (S174) (S174) (A317) (A317) (A317) (A317) (A317)	36295A 36043B 36043B 36043B 36043B 36055A 361753A 361753A 36171B 36027A 36172B 36212B 3622A 3603A 36117A 36287A 36287A 36298A 3617A 36298A 3633A 36052A 36305A 36305A 36305A 36031A 36263A	く く く う う う う う う う う う う う う う う う う う	GKASSF : GKCOST : GLPSA1 : GLPSA1 : GMCPA2 : GMCPA2 : GMCPA2 : GMCPA2 : GMCPA2 : GMCPA2 : GMCPA2 : GMCPA6 : GACPA6 : GAC	: INVESTMENT PETURN (CASH FLOW) : WARRANT PRICE CALCULATION : WARRANT PRICE CALCULATION : LINEAH PROGRAMMING : LINEAH PROGRAMMING TWO-PHASE SIMPLEX METHOD : GSb GRADING PROGRAM : FISCAL POLICY GAME : FISCAL POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : ECONUMIC POLICY GAME : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : NETWORK FLOW : SECURITIES PORTFOLIO ANALYSIS AND DETEMMINATION : NETWORK FLOW : A GOLF GAME : TESI GRADE FOR NUMBER OF QUESTIONS MISSED : RANKING STATISTICS : DEMG PLOT PROGRAM FOR HP 7200 PLOTTER : SIMPLE REGRESSION AND PLOT : RISS ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISS ANALYSIS IN CAPITAL INVESTMENT : SIMPLE REGRESSION AND PLOT : RISS ANALYSIS IN CAPITAL INVESTMENT : SIMPLENEDUS LINEAR EQUATIONS : STANFORD PDRTFOLIO MANAGEMENT GAME : SMALL SYSTEMS SIMULATOR : SUBJECTIVE PROBABILITY DISTRIBUTION : SECURITIES CONTH : COMMITEE CHOICE ANALYSTS : PLOTING DATA : SUBJECTIVE PROBABILITY - RANDOM VALUES : MALF LIFE SIMULATION : TYPES DATE. TIME, AND PORT NUMBER ON TERMINAL : SAMPLE STATISTICS AND HISTOGRAM FORMED FROM : SAMPLE STATISTICS	(C712) (C713) (C605) (C605) (C605) (C720) (C430) (C430) (C430) (C720) (C713) (C713) (C713) (C604) (C713) (C404) (C712) (C404) (C713) (C404) (C713) (C404) (C713) (C404) (C713) (C405) (C405) (C405) (C404) (C713) (C405) (C405) (C405) (C406) (C713) (C406) (C713) (C405) (C713) (C405) (C405) (C405) (C405) (C713) (C405) (C405) (C405) (C405) (C713) (C405) (C	365144 365154 365174 365174 365194 365194 365214 365214 365214 365214 365214 365214 365214 365214 365214 365214 365214 365214 36524 36524 361154 365424 365424 365424 365424 365424 365424 365524 36555 361344 361344 361344 362354 362558

ALPHABETICAL SUMMARY

т	HPMLUT :	LIST/DUMP HP ASSEMBLER FILES	(A108) 36218A
			(C904) 72051A (A514) 36058A
т	1ATA.1 :	: TWO DIMENSIONAL HEAT TRANSFER : CALCULATE AIR FREIGHT RATES	(C718) 36164B
т	IATA.C :	CALCULATES BREAKPOINT OF 1ATA CONTAINERS	(C718) 36241A
		INSTRUCTIONAL DIALOGUE FACILITY DATA CENTER INVENTORY REPORT GENERATOR	(A708) 36177A
т	IN/OUT :	INPUT/OUTPUT ANALYSIS ON ECONOMIC FLOWS	(A714) 36088A
T E	INACNT :	: NATIONAL INCOME & PRODUCT ACCOUNTS : ANALYSIS OF A BALANCED POLYPHASE INDUCTION	(A714) 36087A (A820) 36154A
-	INDALK	MOTOR	(4020/ 301944
Ţ	INSTMT	INCOME STATEMENT	(A712) 36089B
T E	INTGRT 10NIC	: COMPUTES NUMERIC INTEGRAL OF A FUNCTION : DRILL ON FORMULAS AND CHARGES OF IONS	(A310) 36021A (8833) 36260A
Ε	IONIC1	DRILL ON FORMULAS OF 10N1C COMPOUNDS	(B833) 36266A
E		: FILE SORT ROUTINE ; DRILL ON NAMING ALKANES	(C107) 36232A (B833) 36261A
		NUMBER FREQUENCIES	(\$720) 36343A
ε	JACOBI	EIGENVALUES AND EIGENVECTORS OF A REAL	(A820) 36167A
۰T	JULI	SYMMETRIC MATRIX : ONE PAGE JULIAN CALENDAR	(F108) 36279A
Ţ	JULIAN	: JULIAN CALENDAR FOR THE CURRENT YEAR	(A108) 36197A
		: \$25,000.00 KENO GAME : GIVES MAJOR SCALES	(A903) 36244A (A104) 36258A
н	KINERV	REVIEW OF KINEMATICS	(S833) 36315A
		: KINETIC REACTION : ITEM ANALYSIS AND KUDER-RICHARDSON FORMULA	(S833) 36309A (A408) 36137A
		20 RELIABILITY	
		: LABOR/MANAGEMENT BARGAINING : LEASE INCOME	(A880) 36233A (C712) 36194A
Ť	LENDER	SIMPLE LOAN ANALYSIS	(A712) 36090A
		SOLVES LENS PROBLEMS	(A833) 36630A
Ť	LESSEE LIFE	: LEASE ANALYSIS AS DETERMINED BY THE LESSEE : A GAME OF CELLULAR GENERATION GROWTH	(A712) 36091A (A903) 36138A
¢Η	LIMSIN	: LIMIT OF (SIN X)/X	(A801) 36622A
		: LINEAR PROGRAMMING MODEL : LINEAR TREND FORECASTING	(A605) 360688 (A608) 36069A
T	LOAN	: LOAN AMORTIZATION	(C712) 36226A
E		: LOGIC EXAMINATION PROGRAMS : LOG-ON TAPE ANALYZER	(8801) 36251A (A408) 36001A
т	LPFLTR	: DESIGNS LOW-PASS FILTERS	(A513) 36060A
T		: COMPUTES LIQUID CONTROL VALVE COEFFICIENTS : LARGE NUMBER ADDITION & MULTIPLICATION	(A511) 36061A
Ť	MACRD	A TEXT AND FILE PROCESSING SYSTEM	(A302) 360168 (A101) 36003A
	MANAG	MANGEMENT SIMULATION GAME FOR THE HP 2000A	(A880) 360028
E	MANAGR MANAGC		(8880) 36193A (C880) 36209A
Ε	MANAGU	: MANAGEMENT SIMULATION GAME FOR THE 2000B	(B880) 36193A
т	MARKOW	: SECURITIES PORTFOLIO USING MARKOWITZ MODEL : MASS DEFECT	(A713) 36092A
			(A833) 36310A
1	MATHE	CAT MATH PACKAGE (2000B VERSION)	(A833) 36310A (A801) 208798 (C802) 242638
	MATHB NATHC MEMBR	S CAI MATH PACKAGE (2000B VERSION) S CAI MATH PACKAGE (2000C VERSION) S DIFFUSION EXPERIMENT	(AB01) 208798 (C801) 242438 (A833) 36611A
۹T	MATHO NATHC MEMBR MESSAG	S CAI MATH PACKAGE (2000B VERSION) SCAI MATH PACKAGE (2000C VERSION) S DIFFUSION EXPERIMENT : INTERTERMINAL COMMUNICATOR	(A801) 208798 (C801) 242438 (A833) 36611A (F102) 36284A
∙⊺ ¢⊺ ⊺	MATHO HATHC MEMBR MESSAG METRIC MICRO	CAI MATH PACKAGE (2000) VERSION) CAI MATH PACKAGE (2000) VERSION I OIFFUSION EXPERIMENT : INTERTERMINAL COMMUNICATOR : Converts English to Metric : Microwave parameters conversion	(A801) 208798 (C601) 242438 (A833) 36611A (F102) 36284A (F514) 36635A (A513) 36062A
●⊺ ♦⊺ ⊺ ⊺	MATHB NATHC MEMBR MESSAG METRIC MICRO MIXSPR	CAI MATH PACKAGE (2000B VERSION) CAI MATH PACKAGE (2000B VERSION) CIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION : MIXER SPURIOUS RESPONSE PROGRAM	(ABD11 208798 (C8031 242438 (A833) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A
•т •т Т Т	MATHE HATHC MEMBR MESSAG METRIC MICRO MIXSPR MKBUY	CAI MATH PACKAGE (2000) VERSION) CAI MATH PACKAGE (2000) VERSION I OIFFUSION EXPERIMENT : INTERTERMINAL COMMUNICATOR : Converts English to Metric : Microwave parameters conversion	(A801) 208798 (C801) 242438 (A833) 36611A (F102) 36284A (F514) 36635A (A513) 36062A
•T •T T T •H T	MATHE NATHC MEMBR MESSAG METRIC MICRO MIXSPR MKBUY MOLAR MORGAG	CAT MATH PACKAGE LOODE VERSION SCAT MATH PACKAGE LOODOC VERSION DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MIXER SPURIOUS RESPONSE PROGRAM MAKE-BUY DECISION ANALYSIS ACID-WASE TITRATION MORTGAGE ANALYSIS	(ABD11 200798 (C001) 242439 (AB33) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 360948
•T *T T T •H T E	MATHE HATHC MEMBR MESSAG METRIC MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM	CAI MATH PACKAGE (2008 VERSION) CAI MATH PACKAGE (2008 VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MILAER SPURIOUS RESPONSE PROGRAM MAKE-BUY DECISION ANALYSIS ACLD-BASE TIRATION MORTGAGE ANALYSIS MARKETING SIMULATION	(ABD11 200798 (C604) 242439 (AB33) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 360948 (A812) 360948 (A860) 361994
•T T T •H T E T	MATHE MATHC MEMBR MESSAG METRIC MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULREG MULTX	CAI MATH PACKAGE (2008 VERSION) CAI MATH PACKAGE (2008 VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MIXER SPURIOUS RESPONSE PROGRAM MIXER SPURIOUS RESPONSE PROGRAM MAREAUY DECISION ANALYSIS ACLD-WASE TITRATION MORTGAGE ANALYSIS MARRETING SIMULATION MULTIPLE REGRESSION/CORRELATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X	(AB011 200798 (C6001) 202798 (A833) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36062A (A513) 36064A (A712) 36094A (A712) 360948 (A800) 36199A (A404) 36178A (A404) 36178A
●T T T T H T E T E T	MATHE MEMBR MESSAG METRIC MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULREG MULTX MUSIC2	CAI MATH PACKAGE (2008 VERSION) CAI MATH PACKAGE (2008 VERSION) IDIFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MILAR SPURIOUS RESPONSE PROGRAM MAKE-BUY DECISION ANALYSIS ACID-BASE TITRATION MORTGAGE ANALYSIS MARKETING SIMULATION MULTIPLE REGRESSION/CORRELATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM	(ABD11 200798 (C001) 242439 (AB33) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 360948 (A712) 360948 (A880) 361994 (A404) 36178A (A404) 36186A (A850) 36276A
•T T T H T E T E T E T E	MATHE MEMBR MESSAG METRIC MIXSPR MKBUY MOLAR MORGAG MRKSIM MULREG MULTX MUSIC2 MUSIC5 NET-3	CAI MATH PACKAGE (2008 VERSION) CAI MATH PACKAGE (2008 VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MIXER SPURIOUS RESPONSE PROGRAM MARE-BUY DECISION ANALYSIS ACLD-WASE TITRATION MORTGAGE ANALYSIS MARKETING SIMULATION MULTIPLE REGRESSION/CORRELATION MULTIPLE REGRESSION/CORRELATION ELEAST-SQUARES FIT, MULTIPLE Y'S PER X ITRIAD SOLVING PROGRAM FINOS DOMINANT SEVENTHS COMPLEX NUMBER OPERATIONS	(ABD11 200798 (C604) 242436 (AB33) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 360948 (A404) 36199A (A404) 36199A (A404) 36199A (A404) 36196A (A850) 36276A (A104) 36259A (A820) 36150A
●T *T T T T H T E T E T E T E T E T E T	MEMAR MEMAR MESSAG METRIC MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULREG MULTX MUSIC2 MUSIC2 MUSIC5 NET-3 NEWIDS	CAT MATH PACKAGE LOODE VERSION CAT MATH PACKAGE LOODE VERSION DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MARE-BURIOUS RESPONSE PROGRAM MAKE-BUY DECISION ANALYSIS ACID-BASE TITRATION MORTGAGE ANALYSIS MARKETING SIMULATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM FINOS DOMINANT SEVENTHS CORPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS	(ABD)1 200790 (CAD)1 200790 (CAD)1 220790 (F514) 36631A (F514) 36635A (A513) 36062A (A513) 36062A (A513) 36064A (A712) 36093A (A712) 36093A (A712) 360948 (A863) 36199A (A404) 36178A (A404) 36178A (A404) 36178A (A850) 36276A (A104) 36259A (A820) 36150A (F108) 36248A
•T T T H T E T E T E T H H	MATHE MEMAR MEMAR MESSAG METRIC MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULREG MULTX MUSIC2 NET-3 NEWIDS NEWIDS	CAI MATH PACKAGE (2008 VERSION) CAI MATH PACKAGE (2008 VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MIXER SPURIOUS RESPONSE PROGRAM MARE-BUY DECISION ANALYSIS ACLD-WASE TITRATION MORTGAGE ANALYSIS MARKETING SIMULATION MULTIPLE REGRESSION/CORRELATION MULTIPLE REGRESSION/CORRELATION ELEAST-SQUARES FIT, MULTIPLE Y'S PER X ITRIAD SOLVING PROGRAM FINOS DOMINANT SEVENTHS COMPLEX NUMBER OPERATIONS	(ABD11 200798 (C604) 242436 (AB33) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 360948 (A404) 36199A (A404) 36199A (A404) 36199A (A404) 36196A (A850) 36276A (A104) 36259A (A820) 36150A
• T T T H T E T T E T E T H H H	MATHO MEMAR MESSAG METRIC MICRO MIXSPR MKBUY MOLAR MORAGA MULREG MULTZ MUSIC5 NET-3 NEWIDS NEWIDS NEWIDS NEWIDS NEWIDS	CAT MATH PACKAGE L2000B VERSION) CAT MATH PACKAGE L2000C VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MAKE-BUY DECISION ANALYSIS ACLD-BASE TITRATION MARKETING SIMULATION MORTGAGE ANALYSIS MARKETING SIMULATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X ITALAD SOLVING PROGRAM COMPLEX NUMBER OPERATIONS CORPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS NEWTON'S 2ND LAW ENZYME REACTION RATE ENZYMEIC REACTION RATES	(AB011 200790 (C6001 22250 (C6001 22250) (C6001 22250) (C6001 22250) (C6001 2250) (C6001 2250) (
•TTTTH •HTETTETHH	MATHOR MEMRA MEMRA METRICO MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULTX MUSICS MUSICS NET-3 NEWTN2 NZYM2 NZYM2 NZYM2 ORBIT	CAI MATH PACKAGE (2008 VERSION) CAI MATH PACKAGE (2008 VERSION) CIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MIXER SPURIOUS RESPONSE PROGRAM MIXER SPURIOUS RESPONSE PROGRAM MAKE-BUY DECISION ANALYSIS ACLO-MASE TITRATION MORTGAGE ANALYSIS MARKETING SIMULATION MULTIPLE REGRESSION/CORRELATION MULTIPLE REGRESSION/CORRELATION ELEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM FINOS DOMINANT SEVENTHS COMPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS NEWTON'S 2ND LAW ENZYME REACTION RATES ENTEGRATES EQUALIONS OF MOTION	(AB011 200798 (C6001) 242430 (A833) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 360948 (A800) 36199A (A404) 36178A (A850) 36276A (A104) 36150A (A104) 36150A (F108) 36316A (S833) 36316A (S833) 36314A (S833) 36121A
• T T T H T E T T E T E T H H H E H H	MATHE MEMAR MESAG METRICO MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULTX MUSICS NET-3 NEWIDS NEWIDS NEWTOS NE	E CAT MATH PACKAGE L2000B VERSION CAT MATH PACKAGE L2000C VERSION DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MAKE-BUURIOUS RESPONSE PROGRAM MAKE-BUUP DECISION ANALYSIS ACLD-BASE TITRATION MARTEAGE ANALYSIS MARRETING SIMULATION MULTIPLE REGRESSION/CORRELATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM FINOS DOWINANT SEVENTHS COMPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS NEWTON'S 2ND LAW ENZYME REACTION RATE ENZYMEIC REGRESSION FOOTION ENDIONSYNTHESIS EXPERIMENT PHOTOGYNTHESIS EXPERIMENT	(AB011 200790 (C6001) 202790 (C6001) 20284A (F514) 36635A (A513) 36061A (A513) 36062A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36064A (A712) 36094B (A404) 36186A (A404) 36186A (A404) 36186A (A850) 36276A (A404) 36186A (A850) 36276A (A820) 36150A (F108) 36248A (S833) 36316A (S833) 36317A (S833) 36317A
• • • • • • • • • • • • • • • • • • • •	MEMAR MESSAG METRICO MIXSPR MKBUY MOLAR MULREG MULREG MULTX MUSICS NET-3 NEWIDS NEWIDS NEWIDS NEWIDS NEWIDS NEWIDS NEWIDS NEYNP NZYMC ORBIT PHOTOL	CAT MATH PACKAGE LODOR VERSION) CAT MATH PACKAGE LODOR VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MIXER SPURIOUS RESPONSE PROGRAM MARE-BUY DECISION ANALYSIS ACID-BASE TITRATION MORTGAGE ANALYSIS MARKETING SIMULATION MULTIPLE REGRESSION/CORRELATION I LEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM FINOS DOMINANT SEVENTHS COMPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS NEWTON'S 2ND LAW ENZYME REACTION RATES ENTER EACTION RATES ENTER ESEQUATIONS PHOTOSYNTHESIS EXPERIMENT PHOTOLECTRIC EFFECT PHOTOLECTRIC EFFECT	(ABD)1 200790 (CB061 242436 (AB33) 366114 (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 36093A (A712) 360948 (A880) 36199A (A712) 360948 (A880) 36199A (A404) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (A850) 36276A (A104) 36259A (A820) 36150A (F108) 36246A (S833) 36303A (S833) 36305A (S833) 36317A (S833) 36317A
• • • • • • • • • • • • • • • • • • • •	MATHE MEMAR MESSAG METRICC MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULTX MUSIC2 HUSIC5 NET-3 NEWIDS NET-3 NE NE NE NE NE NE NE NE NE NE NE NE NE	E CAI MATH PACKAGE (2008 VERSION) : CAI MATH PACKAGE (2008 VERSION) : DIFFUSION EXPERIMENT : INTERTERMINAL COMMUNICATOR : CONVERTS ENGLISH TO METRIC : MICROWAVE PARAMETERS CONVERSION : MIXER SPURIOUS RESPONSE PROGRAM : MARE-BUY DECISION ANALYSIS : ACC-BASE TITRATION : MORTGAGE ANALYSIS : MORTGAGE ANALYSIS : MARETING SIMULATION : MULTIPLE REGRESSION/CORRELATION : LEAST-SQUARES FIT, MULTIPLE Y'S PER X : TRIAD SOLVING PROGRAM : FINOS DOWINANT SEVENTHS : COMPLEX NUMBER OPENATIONS : CREATES NEW USER NUMBERS : NEWTON'S 2ND LAW : ENZYME REACTION RATE : ENZYME TEACTION RATE : ENZYME TEACTION RATES : INTEGRATES EQUATIONS OF MOTION : PHOTOSYNTHESIS EXPERIMENT : PHOTOLECTRIC EFFECT : ENERGY LEVEL PROBLEM : CALCULATES PI	(AB011 200790 (CA001) 202790 (CA001) 20284A (F514) 36635A (A513) 36661A (A513) 36062A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 36094B (A404) 36199A (A404) 36199A (A404) 36198A (A404) 36259A (A820) 365276A (A820) 365276A (A820) 365276A (S833) 36316A (S833) 36317A (S833) 36317A (S833) 36317A
• • • • • • • • • • • • • • • • • • • •	MATHE MEMAR MESSAG METRICO MICRO MIXSPR MKBUY MOLAR MORGAG MULREG MULREG MULTX MUSIC2 MUSIC2 NET-3 NEWIDS N	E CAT MATH PACKAGE LOODE VERSION) : CAT MATH PACKAGE LOODEC VERSION) : DIFFUSION EXPERIMENT : INTERTERMINAL COMMUNICATOR : CONVERTS ENGLISH TO METRIC : MICROWAVE PARAMETERS CONVERSION : MIXER SPURIOUS RESPONSE PROGRAM : MAKE-BUY DECISION ANALYSIS : ACID-BASE TITRATION : MORTGAGE ANALYSIS : MARKETING SIMULATION : LEAST-SQUARES FIT, MULTIPLE Y'S PER X : TRIAD SOLVING PROGRAM : FINOS DOMINANT SEVENTHS : CREATES NEW USER NUMBERS : NETON'S 2ND LAW : ENZYME REACTION RATES : INTEGRATES EQUATIONS OF MOTION : PHOTOSYNTHESIS EXPERIMENT : PHOTOSULECTRIC EFFECT : ENERGY LEVEL PROBLEM : CALCULATES PI : A PHOTOBULECTRIC SIMULATION	(AB011 200790 (CB001 202790 (CB001 2020) (F514) 36635A (A513) 36062A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 36094B (A800) 36199A (A801) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (S833) 36303A (S833) 36303A (S833) 36317A (S833) 36617A (A801) 36623A (S833) 36317A
• T T T T T T E T T E T E T E T E T E T	MEMAR MESSAG METRICO MIXSPR MKBUY MOLARG MULREG MULREG MULTS MULSICS NET-3 NEWIDS NEWI	E CAT MATH PACKAGE LOODE VERSION) : CAT MATH PACKAGE LOODE VERSION) : DIFFUSION EXPERIMENT : INTERTERMINAL COMMUNICATOR : CONVERTS ENGLISH TO METRIC : MICROWAVE PARAMETERS CONVERSION : MIXER SPURIOUS RESPONSE PROGRAM : MAKE-BUY DECISION ANALYSIS : ACID-BASE TITRATION : MORTGAGE ANALYSIS : MARKETING SIMULATION : ULAST-SQUARES FIT, MULTIPLE Y'S PER X : TRIAD SOLVING PROGRAM : FINDS DOMINANT SEVENTHS : CORPLEX NUMBER OPERATIONS : CREATES NEW USER NUMBERS : NEVTON'S 2ND LAW : ENZYMATIC REACTION RATES : INTEGRATES EQUATIONS OF MOTION : PHOTOSUNTHESIS EXPERIMENT : PHOTOSUNTHESIS EXPERIMENT : PHOTOSUNTHESS EXPERIMENT : PHOTOSUNTHESS EXPERIMENT : PHOTOSUNTHESS EXPERIMENT : PHOTOSUNTHESS EXPERIMENT : PHOTOELECTRIC EFFECT : ENERGY LEVEL PROBLEM : A PHOTOELECTRIC SIMULATION : FLUCSION PLOTTER	(AB011 200798 (C604) 242438 (A833) 36611A (F102) 36284A (F514) 36635A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 360948 (A800) 36199A (A404) 36196A (A800) 36276A (A800) 36276A (A800) 36276A (B833) 36316A (S833) 36316A (S833) 36315A (S833) 36315A (S833) 36316A (S833) 36318A (S833) 36318A (S833) 36318A (S833) 36318A (S833) 36318A (S833) 36318A (S833) 36318A (S833) 36318A (S833) 36318A (S833) 36318A
* T T T H T E T T E T E T H H H E H H H H	MATHE MEMAR MESSAG METRICO MICRO MIXSPR MKBUY MOLAR MORGAG MRKSIM MULTS	E CAT MATH PACKAGE L2000B VERSION) : CAT MATH PACKAGE L2000C VERSION) : DIFFUSION EXPERIMENT : INTERTERMINAL COMMUNICATOR : CONVERTS ENGLISH TO METRIC : MICROWAVE PARAMETERS CONVERSION : MAKE-BUY DECISION ANALYSIS : ACLD-WASE TITRATION : MAKE-BUY DECISION ANALYSIS : ACLD-WASE TITRATION : MORTGAGE ANALYSIS : MARTETING SIMULATION : MULTIPLE REGRESSION/CORRELATION : LEAST-SQUARES FIT, MULTIPLE Y'S PER X : TRIAD SOLVING PROGRAM : FINOS DOMINANT SEVENTHS : COMPLEX NUMBER OPERATIONS : CREATES NEW USER NUMBERS : NEWTON'S 2ND LAW E NZYME REACTION RATE : ENZYMEIC REACTION RATES : INTEGRATES EQUATIONS OF MOTION : PHOTOSYNTHESIS EXPERIMENT : PHOTOSLECTRIC EFFECT : ENERGY LEVEL PROBLEM : PH, PON, PCT, DISSOCIATION : CALCULATES PI : A PHOTOBLECTRIC SIMULATION : A CHOTER : WORD PLOTTER	(AB011 200790 (C8001 202790 (C8001 20260) (A833) 36611A (F514) 36635A (A513) 36062A (A513) 36062A (A513) 36064A (A712) 36093A (A833) 36616A (A712) 36093A (A712) 36094B (A712) 36094B (A712) 36094B (A712) 36094B (A712) 36094A (A404) 36186A (A404) 36176A (A404) 36276A (A833) 36316A (S833) 36316A (S833) 36317A (S833) 36333 (S833) 36333 (S833) 36333 (S833) 36337A (S833) 3637A (S833)
* T T T T T T E T T E T E T E T H H H E H H H H	MATHE MEMAR MESSAG METRICO MICRO MIXSPR MKBUY MOLAR MORGAG MULTS SILCA MULTS MULTS MULTS MULTS NET-3 NEVIDS	E CAI MATH PACKAGE L2000B VERSION) CAI MATH PACKAGE L2000C VERSION) CONFERSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MAKE-BUY DECISION ANALYSIS ACLD-WASE TITRATION MARE-BUY DECISION ANALYSIS ACLD-WASE TITRATION MARETING SIMULATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X ITALD SOLVING PROGRAM FINOS DOWINANT SEVENTHS COMPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS NEWTON'S 2ND LAW ENZYME REACTION RATE ENZYMEIC REACTION RATE ENZYMEIC REACTION RATE PHOTOGLECTRIC EFFECT PHOTOGLECTRIC SAFENT PHOTOGLECTRIC SIMULATION CALCULATES PI A PHOTOELECTRIC SIMULATION PHOTOS A GIVEN FUNCTION ON THE TELETYPE FUNCS ON PLOTTER WORD PLOTTER PHOTOS SINGE VARIABLE IN POLAR FORM	(AB011 200790 (CB001 202790 (CB001 22200) (CB001 22200) (CB001 22000) (CB001 2000) (CF) (CF) (CF) (CF) (CF) (CF) (CF) (CF
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	MEMBR MESSAG METRICO MICRO MIXSPR MKBUY MOLARG MULREG MULTCO MULT	CAI MATH PACKAGE L2000B VERSION) CAI MATH PACKAGE L2000B VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MARE SUPURIOUS RESPONSE PROGRAM MARE-BUY DECISION ANALYSIS ACID-BASE TITRATION MORIGAGE ANALYSIS MARKETING SIMULATION IMULTIPLE REGRESSION/CORRELATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM FINDS DOMINANT SEVENTHS COMPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS NETON'S 2ND LAW ENZYME REACTION RATES INTEGRATES EQUATIONS OF MOTION PHOTOSYNTHESIS EXPERIMENT PHOTOSYNTHESIS EXPERIMENT PHOTOSYNTHESIS EXPERIMENT PHOTOSULECTRIC EFFECT ENERGY LEVEL PROBLEM PH, POH, PCT, DISSOCIATION CALCULATES PI A PHOTODELECTRIC SIMULATION PLOTS A GIVEN FUNCTION ON THE TELETYPE FINS LEAST-SQUARES POLYNOMIALS FITS LEAST-SQUARES POLYNOMIALS PLOTS SINGLE VARIABLE IN POLAR FORM FITS LEAST-SQUARES POLYNOMIALS POLYNOMIAL SUBTRACTION SIMULATION OF CITY COUNCIL WATER POLUTION SIMULATION PERCENT COMPOSITION SIMULATION OF A 2ND ORDER EQUATION IN PLOTS LARGE LETTERS POLYNOMIAL SUBTRACTION SIMULATION OF A 2ND ORDER EQUATION IN PUCYNOMIAL APPROXIMATION PERCENT COMPOSITION SAMLOR OF GAPH OF A 2ND ORDER EQUATION IN TWO VARIABLES PLAYS 3-DIMENSIONAL TIC-TAC-TOE GENERATES LARGE BERATOR	(AB01) 200790 (CB001 202090 (CB001 24230 (F514) 36635A (A513) 36062A (A513) 36062A (A513) 36062A (A513) 36062A (A712) 36093A (A833) 36616A (A712) 36093A (A833) 36616A (A712) 360948 (A800) 36199A (A404) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (S833) 36316A (S833) 36316A (S833) 36317A (S833) 36316A (S833) 36317A (S833) 36337A (S833) 36337A (S8
	MEMBR MEMBR MESSAG METRICO MICRO MIXSPR MKBUY MOLARG MULTCO MULTC	CAI MATH PACKAGE L2000B VERSION) CAI MATH PACKAGE L2000B VERSION) CONVERTS ENGLISH TO METRIC INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICEROWAVE PARAMETERS CONVERSION MARES PURIOUS RESPONSE PROGRAM MARE-BUY DECISION ANALYSIS ACID-BASE TITRATION MORIGAGE ANALYSIS MARKETING SIMULATION IMULTIPLE REGRESSION/CORRELATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM FINDS DOMINANT SEVENTHS COMPLEX NUMBER OPERATIONS CORPLEX NUMBER OPERATIONS ENZYMATIC REACTION RATES INTEGRATES EQUATIONS OF MOTION PHOTOSYNTHESIS EXPERIMENT PHOTOSYNTHESIS EXPERIMENT PHOTOSYNTHESIS EXPERIMENT PHOTOSUNTHESTS EXPERIMENT PHOTOELECTRIC EFFECT ENERGY LEVEL PROBLEM PH, POH, PCT, DISSOCIATION CALCULATES PI A PHOTOELECTRIC SIMULATION PLOTS A GIVEN FUNCTION ON THE TELETYPE FINS LAST-SQUARES POLYNOMIALS FITS LEAST-SQUARES POLYNOMIALS PLOTS SINGLE VARIABLE IN POLAR FORM FITS LEAST-SQUARES POLYNOMIALS PLOTS ONTER PLOTS SINGLE VARIABLE IN POLAR FORM FITS LEAST-SQUARES POLYNOMIALS PLOTYNMIAL APPROXIMATION PERCENT COMPOSITION SIMULATION OF CITY COUNCIL WATER POLLUTION SIMULATION PERCENT COMPOSITION CALCULATES LARGE LETTERS PROJECILE MOTION NATURE OF GRAPH OF A 2ND ORDER EQUATION IN TWO VARIABLES PLAYS 3-DIMENSIONAL TIC-TAC-TOE GEMERATES LARGE MERATOR SOLVES PROPORTIONS SUMUSER PLAYS 3-DIMENSIONAL TIC-TAC-TOE GEMERATES RANDOM DEVIATES-SUBROUTINE RANDOM NUMBER GENERATOR SOLVES PROPORTIONS SUMUSER	(ABD)1 200790 (CBD)1 200790 (CBD)1 220790 (CBD)1 220790 (CBD)1 36631A (F514) 36635A (A513) 36064A (A712) 36093A (A712) 36093A (A712) 360948 (AB3) 36164A (A712) 360948 (AB3) 36164A (A712) 360948 (AB3) 36164 (A404) 36178A (A404) 36178A (A404) 36178A (A404) 36178A (A850) 36276A (A104) 36259A (A104) 36259A (A104) 36259A (A820) 36150A (F108) 36276A (SB33) 36316A (SB33) 36316A (SB33) 36316A (SB33) 36317A (SB33) 36316A (SB33) 36317A (SB33) 36317A (SB33) 36316A (SB33) 36317A (SB33) 36316A (SB33) 36317A (SB33) 36317A (SB33) 36317A (SB33) 36316A (A820) 36128A (A804) 36228A (A107) 36206A (A805) 3655A (CB01) 36234A (CB01)
	MEMBR MEMBR MESSAG METRICO MICRO MIXSPR MKBUY MOLARG MULTCO MULTC	CAI MATH PACKAGE L2000B VERSION) CAI MATH PACKAGE L2000B VERSION) DIFFUSION EXPERIMENT INTERTERMINAL COMMUNICATOR CONVERTS ENGLISH TO METRIC MICROWAVE PARAMETERS CONVERSION MARE SUPURIOUS RESPONSE PROGRAM MARE-BUY DECISION ANALYSIS ACID-BASE TITRATION MORIGAGE ANALYSIS MARKETING SIMULATION IMULTIPLE REGRESSION/CORRELATION LEAST-SQUARES FIT, MULTIPLE Y'S PER X TRIAD SOLVING PROGRAM FINDS DOMINANT SEVENTHS COMPLEX NUMBER OPERATIONS CREATES NEW USER NUMBERS NETON'S 2ND LAW ENZYME REACTION RATES INTEGRATES EQUATIONS OF MOTION PHOTOSYNTHESIS EXPERIMENT PHOTOSYNTHESIS EXPERIMENT PHOTOSYNTHESIS EXPERIMENT PHOTOSULECTRIC EFFECT ENERGY LEVEL PROBLEM PH, POH, PCT, DISSOCIATION CALCULATES PI A PHOTODELECTRIC SIMULATION PLOTS A GIVEN FUNCTION ON THE TELETYPE FINS LEAST-SQUARES POLYNOMIALS FITS LEAST-SQUARES POLYNOMIALS PLOTS SINGLE VARIABLE IN POLAR FORM FITS LEAST-SQUARES POLYNOMIALS POLYNOMIAL SUBTRACTION SIMULATION OF CITY COUNCIL WATER POLUTION SIMULATION PERCENT COMPOSITION SIMULATION OF A 2ND ORDER EQUATION IN PLOTS LARGE LETTERS POLYNOMIAL SUBTRACTION SIMULATION OF A 2ND ORDER EQUATION IN PUCYNOMIAL APPROXIMATION PERCENT COMPOSITION SAMLOR OF GAPH OF A 2ND ORDER EQUATION IN TWO VARIABLES PLAYS 3-DIMENSIONAL TIC-TAC-TOE GENERATES LARGE BERATOR	(AB011 200790 (CB001 201790 (CB001 22200 (CB001 22200) (CB001 22000) (AB000 2000) (A513) 36061A (A513) 36062A (A513) 36064A (A712) 36093A (A803) 36616A (A712) 36093A (A712) 36094B (A712) 36094B (A712) 36094B (A712) 36094B (A712) 36094B (A712) 36094B (A712) 36199A (A404) 36199A (A404) 36199A (A404) 36199A (A404) 36259A (A803) 36316A (S833) 36316A (S833) 36317A (S833) 36318A (A904) 36228A (A904) 36228A (C801) 36239A (S833) 36631A (S833) 36518A (S833) 36518A (S83

	REGCOR	:	REGRESSION/CORRELATION	(A404)	
	REP	:	DATA CENTER INVENTORY REPORT GENERATOR	(A708)	
	RITE	:	MANAGEMENT SIMULATION GAME FOR THE HP 2000A		36002B
			MANAGEMENT SIMULATION GAME FOR THE 2000B PLACING INTEGERS IN RANDOM ORDER		36193A 36264A
			NETWORK SIMULTANEOUS EQUATIONS		36158A
		;	INTEGRATES A FUNCTION (ROMBERG METHOD)		36022B
	ROOTER				36024A
	ROOTS2		QUADRATIC EQUATION SOLVER		36625A
	RTCFFT				36029A
T		:			36095A
T	SALSIM				36072A
	SAT	:	TRIGONOMETRIC SOLUTIONS OF TRIANGLES	(A801)	36182A
	SCORES	:	COMPUTES MEAN, STANDARD DEVIATION AND STANDARD SCORES FOR TEST SCORES	(A408)	36136A
н	SETS	:		158011	36337A
		÷	MANGEMENT SIMULATION GAME FOR THE HP 2000A	(A880)	36002B
	SETUPH		MANAGEMENT SIMULATION GAME FOR THE 2000B	(8880)	36193A
Ε	SETUPC		MANAGEMENT SIMULATION GAME FOR THE 2000C	(C880)	
T	SIMEQN	:	SOLVES SIMULTANEOUS LINEAR EQUATIONS	(A314)	36026A
				(C801)	36238A
н	SLITS	:	PRACTICE WITH SIGNED NUMBERS YOUNG'S DOUBLE SLIT EXPERIMENT FINDS DERIVATIVES	(A833)	36351A 36626A
*H	SLOPE	:	FINDS DERIVATIVES	(A801)	36626A
					36107A
	SLSMN	:	SALES MANAGER'S INFORMATION RETRIEVAL SYSTEM	(A102)	36004A
	SNELL	1	SNELL'S LAW DRAWS SNOOPY ON THE TELEPRINTER	(5833)	36320A
F	SOL VER	;	SOLVES COMPLEX SIMULTANEOUS EQUATIONS	(4820)	36108A 36149A
			SIMULTANEOUS LINEAR EQUATIONS USING GAUSSIAN	(4314)	36196A
		•	REDUCTION	(4514)	301704
т	SORT	:	FILE SERIAL STRING SORT	(C107)	36122A
н			SPACECRAFT ORBITS	(\$833)	36321A
E	SPCTRA	:	OPTICAL ABSORPTION SPECTRA SIMULATION, 2-		36184A
			SPECIES EQUILIBRIUM MIXTURES		
I	SPHERE	:	SOLVES SPHERICAL TRIANGLES		36034A
Ţ	SQR(Z)	:	COMPUTES SQUARE ROOT OF A COMPLEX NUMBER		36018A
	SORS	:	AN INTEGER AS THE SUM OF FOUR SQUARES		36036A
×H H	SORT	:	FINDS SQUARE ROOT STATISTICAL ANALYSIS OF LAB DATA		366274
÷т	STATIO	:	KRUSKAL-WALLIS ONE WAY ANALYSIS OF VARIANCE		36344A 36607A
			MANN-WHITNEY 2 SAMPLE RANK TEST		36052A
			SPEARMAN RANK CORRELATION COEFFICIENTS		36052A
۰H	STATAL	:	ARITHMETIC MEAN		36628A
eн			FLY POPULATION CONTROL		36641A
т			STRING-INTEGER CONVERSIONS		36176A
T	STGSRT	:	SORTS STRINGS FROM FILES	(C107)	36145A
			STOCK MERGER INCENTIVE PROGRAM		36096A
			STOCK RETURNS REPORT		36098A
			EXPONENTIAL SMOOTHING AS A STOCK GUIDE		36099A
	STKVAL	:	STOCK VALUE & EVALUATION REPORT	(A713)	
н	STOCK	:	STOCK MARKET SIMULATION	(\$860)	36331A
н ++	STOCK STOICH	:	MASS VOLUME	(S860) (A833)	36331A 36618A
н •н Е	STOCK STOICH STOP	:	MASS VOLUME TIES MATH CALCULATOR PACKAGE	(S860) (A833) (A810)	36331A 36618A 36014A
H H E E	STOCK STOICH STOP STOPB	:::::::::::::::::::::::::::::::::::::::	MASS VOLUME	(S860) (A833) (A810) (A810)	36331A 36618A
H H E E T I	STOCK STOICH STOP STOPB STTRI SUBRTN		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SURROUIINES	(\$860) (A833) (A810) (A810) (C903) (A800)	36331A 36618A 36014A 36208A 36243A 24243A
H H E E T E	STOCK STOICH STOP STOPB STTRI SUBRIN SUNSET		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBROUTINES SUMRISE-SUNSET PREDICTOR	(\$860) (A833) (A810) (A810) (C903) (A800) (\$509)	36331A 36618A 36014A 36208A 36243A 26243A 26243A
H H E E T H	STOCK STOICH STOP STOPB STTRI SUBRTN SUBRTN SURSET	·····································	MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SURFOUTINES SUNRISE-SUNSET PREDICTOR AREA OF SUMERACE OF REVOLUTION	(\$860) (A833) (A810) (A810) (C903) (A800) (\$509) (\$801)	36331A 36618A 36014A 36208A 36243A 26243A 36180A 36338A
н е Е Е Т н е Е	STOCK STOICH STOP STOPB STTRI SUBRIN SUNSET SURFAC SYSSOL		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SURROUTINES SUNRISE-SUNSET PREDICTOR AREA OF SURFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EGUATIONS	(\$860) (A833) (A810) (A810) (C903) (A800) (\$509) (\$801) (\$801)	36331A 36618A 36014A 36208A 36243A 36180A 36180A 36388A 36278A
н е Е Е Т н е Е	STOCK STOICH STOP STOPB STTRI SUBRIN SUNSET SURFAC SYSSOL		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBROUTINES SUNRISE-SUNSET PREDICTOR AREA OF SUBFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOTHESES USING STUDENTS T	(\$860) (A833) (A810) (A810) (C903) (A800) (\$509) (\$801) (\$801)	36331A 36618A 36014A 36208A 36243A 26243A 36180A 36338A
н е Е Т н е Е Т н е Е Т	STOCK STOICH STOP STOPB STTRI SUBSTN SUBST SURFAC SYSSOL T-TEST		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SURFOUTINES SUNRISE-SUNSET PREDICTOR AREA OF SUFFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOITHESES USING STUDENTS T DISTRIBUTION	(\$860) (A833) (A810) (A810) (C903) (600) (\$509) (\$801) (\$801) (\$801) (\$401)	36331A 36618A 36014A 36208A 36243A 26243A 36180A 3638A 3638A 36278A 36170A
н е Е Е Т н е Е Т н т т т т т	STOCK STOICH STOP STOPB STTRI SUBRIN SUNSET SURFAC SYSSOL T-TEST TALK		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SURPOUTINES SUNRISE-SUNSET PREDICTOR AREA OF SURFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF MYPOTHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION	(\$860) (A833) (A810) (A810) (C903) (A810) (C903) (S801) (S801) (C801) (A401) (A108)	36331A 36618A 36014A 36208A 36243A 36243A 36180A 36338A 36278A 36170A 36222A
н е Е Е Т н е Е Т н т т т т т	STOCK STOICH STOP STOPB STTRI SUBRIN SUNSET SURFAC SYSSOL T-TEST TALK		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBROUTINES SUNFISE-SUNSET PREDICTOR AREA OF SUBFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOTHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH	(\$860) (A833) (A810) (A810) (C903) (\$801) (\$801) (\$801) (\$801) (\$4401) (A108) (\$110)	36331A 36618A 36014A 36208A 36243A 36243A 36180A 36338A 36278A 36170A 36222A
H ●H E E T ■ T H ●E T T T E	STOCK STOICH STOP STOPB STTRI SUBRTN SUBRTN SURFAC SYSSOL T-TEST TALK TAPDUM TENS		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBROUTINES SUNRISE-SUNSET PREDICTOR AREA OF SUHFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOTHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS	(\$860) (A833) (A810) (A810) (C903) (\$801) (\$801) (\$801) (\$801) (\$4401) (A108) (\$110)	36331A 36618A 36014A 36208A 36243A 36180A 3638A 3638A 36378A 36170A 36222A 36221A
H ●H E E T ■ T H ●E T T T E T	STOCK STOICH STOPB STOPB STTRI SUBSET SURFAC SYSSOL T-TEST TALK TAPDUM TENS IERTES		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBPOUTINES SUNFISE-SUBSET PREDICTOR AREA OF SUBFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOITHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC	(\$860) (A833) (A810) (C903) (C903) (S801) (C801) (C801) (A401) (A108) (B110) (B801) (C205)	36331A 36618A 36014A 36208A 36243A 36243A 36180A 36278A 36170A 36222A 36222A 36221A 36128A 36185A
H € E T E T T E T T	STOCK STOICH STOP STOPB STTRI SUBETN SUBET SUBETN SUBET SUBETN SU		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUMPOUTINES SUNRISE-SUNSET PREDICTOR AREA OF SUMFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EGUATIONS TEST OF HYPOITHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC TESTS THE OPERATION OF A REMOTE TELETYPE	(\$860) (A833) (A810) (C903) (\$209) (\$201) (A401) (A401) (A108) (8801) (C205) (A217)	36331A 36618A 36014A 36208A 36243A 36243A 36180A 36388A 36388A 36378A 36170A 36222A 36221A 36222A 36221A 36128A 36128A
	STOCK STOICH STOPB STOPB STTRI SUBRTM. SUNSET SURFAC SYSSOL T-TEST TALK TAPDUM TENS TERTES TESTTY TIDE		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBPOUTINES SUNFISE-SUNSET PREDICTOR AREA OF SUMFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOITHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC TESTS THE OPERATION OF A REMOTE TELETYPE TEXI EDIOR FOR THF 2000C	(\$860) (A833) (A810) (C903) (6903) (5801) (C801) (C801) (A401) (A108) (8110) (8801) (C205) (A217) (C101)	36331A 36618A 36014A 36208A 36243A 36243A 36180A 36338A 36170A 36222A 36221A 36222A 36221A 36128A 36128A 36128A
	STOCK STOICH STOPB STOPB STTRI SUBRTM. SUNSET SURFAC SYSSOL T-TEST TALK TAPDUM TENS TERTES TESTTY TIDE		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBPOUTINES SUNFISE-SUNSET PREDICTOR AREA OF SUMFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOITHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC TESTS THE OPERATION OF A REMOTE TELETYPE TEXI EDIOR FOR THF 2000C	(\$860) (A833) (A810) (C903) (A800) (C903) (A800) (S801) (C801) (C801) (A401) (A401) (A108) (B801) (C205) (A217) (C101) (A101)	36331A 36618A 36014A 36208A 36228A 36180A 3638A 3638A 36278A 36170A 36222A 36128A 36128A 36128A 36128A
	STOCK STOICH STOPB STOPB STTRI SUNSET SUNSET SURFAC SYSSOL T-TEST TALK TAPDUM TENS TERTES TESTTY TIDE TIDEX TIMER		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK SUMROUTINES SUMROUTINES SUMROUTINES SUMPACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOINESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC TESTS THE OPERATION OF A REMOTE TELETYPE TEXI EDITOR FOR THE 2000C SYMBOLIC FILE EDITOR TIME OF THE DAY	(\$860) (A833) (A810) (C903) (A810) (C903) (A801) (C801) (A801) (A401) (A108) (B10) (B801) (C205) (A217) (C101) (A101) (F104)	36331A 36618A 36614A 36208A 362208A 36243A 36243A 36243A 36278A 36170A 36222A 36221A 36128A 36128A 36128A 36128A 3613A 362008 36204A 36297A
	STOCK STOICH STOPB STOPB STTRI SUBRTM.		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK SUMROUTINES SUMROUTINES SUMROUTINES SUMPACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOINESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC TESTS THE OPERATION OF A REMOTE TELETYPE TEXT EDITOR FOR THE 2000C SYMBOLIC FILE EDITOR TIME OF HE DAY CHARACTER GENERATION TIME FOUNCTION EVALUATOR	(\$860) (A833) (A810) (C903) (C903) (\$8010) (C801) (C801) (A401) (A108) (8110) (8801) (C205) (A217) (C201) (A101) (A101) (C101) (A101)	36331A 36618A 36014A 36208A 36243A 36180A 3638A 3638A 3638A 3638A 36278A 36128A 36128A 36128A 36128A 36128A
	STOCK STOPK STOPB STOPB STTRI SURFAC SUNSET SUNSET SUNSET SYSSOL T-TEST TALK TAPDUM TENS IERTES TESTIY TIDE TIDEX TIDEX TIMER TITLE TIMER TITLE		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK SUMROUTINES SUMROUTINES SUMROUTINES SUMPACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOINESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC TESTS THE OPERATION OF A REMOTE TELETYPE TEXT EDITOR FOR THE 2000C SYMBOLIC FILE EDITOR TIME OF HE DAY CHARACTER GENERATION TIME FOUNCTION EVALUATOR	(\$860) (A833) (A810) (C903) (A810) (C903) (A810) (C903) (A801) (C	36331A 36618A 36014A 36208A 36243A 36283A 36283A 36278A 36170A 36222A 36222A 36222A 36120A 36128A 36128A 36185A 36208 36208 36208 36207A 3614A
	STOCK STOICH STOPB STOPB STTRI SUBRET SUBRET SUSFET SYSSOL T-TEST TALK TAPDUM TENS TERTES TESTTY TIDE TIDE TIDEX TIMER TIMER TITLE TMERES		MASS VOLUME TIES MATH CALCULATOR PACKAGE MATH CALCULATOR PACKAGE STAR TREK CAL SUBROUTINES SUNFISE-SUNSET PREDICTOR AREA OF SUMFACE OF REVOLUTION SOLVING SYSTEMS OF LINEAR EQUATIONS TEST OF HYPOTHESES USING STUDENTS T DISTRIBUTION TIME SHARING SYSTEM COMMUNICATION FILE UTILITY PROGRAM DRILL IN MULTIPLICATION OF NUMBERS WITH TRAILING ZEROS TELETYPE-CRT DIAGNOSTIC TESTS THE OPERATION OF A REMOTE TELETYPE TEXT EDITOR TIME OF THE DAY CHARACTER GENERATION TIME FUNCTION EVALUATOR TRANSPORTATION PROBLEM CALCULATE TRUCK REIGHT RATES	(\$860) (A833) (A810) (C903) (A810) (C903) (A810) (C903) (A801) (C	36331A 36618A 36014A 36208A 36243A 36283A 36283A 36278A 36170A 36128A 36128A 36128A 36185A 36185A 36013A 36208 36185A 36208 36185A 36297A 36114A
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<u> \$ 6\$ \$\$ \$.8 \$ K</u>		<u>_</u>
E 208798 (A801) MATHB : CAI MATH PACKAGE (20008 VERSION) E 242418 (C800) IDF : INSTRUCTIONAL DIALOGUE FACILITY	T 361024 (A903) GOLF : A GOLF GAME T 36103A (A903) BLJACK : GAME OF TWENTY-ONE	
E 242428 (C800) EXEC I CAT EXECUTIVE PACKAGE	T 361044 (A904) PLOT : PLOTS A GIVEN FUNCTION ON	THE TELETYPE
E 24243B (CBO1) MATHC : CAI MATH PACKAGE (2000C VERSION) E 24244A (A800) SUBATN : CAI SUBROUTINES	T 36105A (A903) BATNUM : PLAYS THE BATTLE OF NUMBE T 36106A (A903) QUBIC : PLAYS 3-DIMENSIONAL TIC-T	RS GAME AC-TOF
T 36001A (A408) LOGRAM : LOG-ON TAPE ANALYZER E 36002B (A880) SETUP : MANGEMENT SIMULATION GAME FOR THE HP 2000A	T 36107A (A903) SLOT : SIMULATES A SLOT MACHINE ONLY)	USE IN NEVADA
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SYSTEM	T 361138 (A717) RECRUT : RECRUTING INFORMATION SYS	TEM
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T 36007A (Allo) FILIN : KEYBOARD FILE LOADING PROGRAM T 3600BC (Allo) FILDUM : PAPER TAPE FILE DUMP	T 36116A (A211) BASTES : BASIC TEST PROGRAM T 36117A (B104) DATES : COMPUTES DATE FROM SYSTEM	
T 36009C (A110) FILIST : LISTS FILE CONTENTS BY RECORD NUMBER T 36010C (A110) FILOAD : LOADS A FILE FROM THE TELETYPE	T 36118A (A303) CXARTH : VECTOR ARITHMETIC T 36119A (A303) CXEXP : VECTOR EXPONENTIATION	
T 36011A (A110) FILREA : REENTERS THE DATA TAPE DUMPED HY FILDUM	T 36120A (A408) FC : ANALYSIS OF LOG TAPE	
T 36013A (A217) TESTTY : TESTS THE OPERATION OF A REMOTE TELETYPE	T 361224 (C107) SORT : FILE SERIAL STRING SORT	
E 36014A (A810) STOP : TIES MATH CALCULAIOR PACKAGE T 36015A (A302) CALC : EXTENDED PRECISION CALCULATOR	T 361258 (H104) HELLO : TYPES DATE. TIME. AND POR TERMINAL	NUMBER ON
*T 36016B (A302) LRGNUM : LARGE NUMBER ADDITION & MULTIPLICATION T 36017A (A303) FNCTS : COMPUTES TRIG FUNCTIONS FOR COMPLEX	E 361284 (R801) TENS : DRILL IN MULTIPLICATION OF TRAILING ZEROS	F NUMBERS WITH
ARGUMENTS	E 361294 (B801) DRILL : HASIC ARITHMETIC DRILL	
T 36018A (A303) SQR(Z) : COMPUTES SQUARE ROOI OF A COMPLEX NUMBER T 36019A (A306) BESSEL : CALCULATES BESSEL FUNCTION OF FIRST KIND	T 36131A (8301) CALCOM : CALCULATOP PROGRAM WITH O	IY QUESTIONS PTIONAL PLOTTER
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T 360238 (A404) POLFIT : FIIS LEAST-SQUARES POLYNOMIALS	OUTPUT (PART 2 OF 2)	TONAL TEOTIER
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T 36026A (A314) SIMEGN : SOLVES SIMULTANEOUS LINEAR EQUATIONS T 36027A (A314) CPOUT1 : SOLVES SIMULTANEOUS LINEAR EQUATIONS	T 361364 (A408) SCORES : COMPUTES MEAN, STANDARD DE STANDARD SCORES FOR TES	
T 36029A (A316) CTPFFT : COMPLEX TO REAL FAST FOURIER TRANSFORM T 36029A (A316) RTCFFT : REAL TO COMPLEX FAST FOURIER TRANSFORM	I 361374 (4408) KR20 : ITEM ANALYSIS AND KUDEK-R Formula 20 Reliability	CHARDSON
T 36030A (A316) GFFT : GENERAL FAST FOURIER TRANSFORM	I 36139A (A903) LIFE : A GAME OF CELLULAR GENERAT	ION GROWTH
T 36031A (A317) DERIV : DERIVATIVE OF A FUNCTION AT A POINT T 36032A (A318) DE-IOR : IST ORDER DIFFERENTIAL EQUATION	E 36139A (AULO) TUTOR ; TUTOR SERIES BASIC LANGUA COURSE, IUTO1 - TUT25	E PROGRAMMING
T 36033A (A318) DE-20R : 2ND ORDER DIFFERENTIAL EQUATION T 36034A (A301) SPHERE : SOLVES SPHERICAL TRIANGLES	I 361428 (A712) CSHFL : CASH FLOW ANALYSIS I 36143C (C211) XREF : BASIC LANGUAGE PROGRAM CR(SS-REFERENCE
T 360358 (A301) EUCLID : COMPUTES LARGEST COMMON FACTOR OF TWO	GENERATOR	
INTEGERS T 360364 (A301) SOPS : AN INTEGER AS THE SUM OF FOUR SQUARES	I 36145A (C107) STGSRT : SORTS STRINGS FROM FILES	
T 360374 (A301) FACTOR : FINDS PRIME FACTORS OF POSITIVE INTEGERS T 36039C (A404) CURFIT : PERFORMS LEAST-SQUARES FIT	E 36148A (A820) EXPNTL : CAI IN SIMPLE EXPONENTIAL TIME	FUNCTIONS OF
T 36039B (A410) ANVARI : ANALYSIS OF VARIANCE FOR A RANDOMIZED ONE- WAY DESIGN	E 36149A (A820) SOLVER : SOLVES COMPLEX SIMULTANEOU E 36150A (A820) NET~3 : COMPLEX NUMBER OPERATIONS	
T 360408 (A410) ANVAR2 : ANALYSIS OF VARIANCE (LATIN SQUARE DESIGN) T 36041A (A406) BINOPO : PROBABILITY DISTRIBUTION COMPARISONS	E 361524 (AR20) AC-1 : COMPUTER AIDED PRACTICE IN	N EE AC ANALYSIS
T 36042A (4407) CHISQ : COMPUTES PROBABILITY OF CHI-SQUARE VALUES	E 361544 (A820) INDMTR : ANALYSIS OF A BALANCED POL	YPHASE
T 36043R (A407) CHISUS : CHI-SOUARE STATISTICS FOR MAN CONTINGENCY TABLES	INDUCTION MOTOR E 36155A (AU20) POLAR : PLOTS SINGLE VARIABLE IN F	POLAR FORM
T 36045A (A408) GEOMEN : STATISTICS OF GEOMETRIC DISTRIBUTION T 36050B (A405) RANDEV : GENERATES RANDOM DEVIATES-SUBROUTINE	E 36156A (A820) DVDRS : CAI IN VOLTAGE AND CURRENT E 36157A (A820) UNITS : CAI IN INTERPRETATION OF E	DIVIDERS
T 36052A (A407) STAT2 : MANN-WHITNEY 2 SAMPLE PANK TEST I 36053A (A407) STAT3 : SPEARMAN RANK CORRELATION COEFFICIENTS	E 36158A (A820) RNET : NETWORK SIMULTANEOUS EQUAT	TIONS
T 36054B (A404) REGCOR : REGRESSION/CORRELATION	DIFFERENTIAL EQUATIONS	
T 360558 (A408) HISTOG : A HISTOGRAM FORMED FROM A SET OF NUMBERS T 36056A (A5I3) ANALAD : CIRCUIT ANALYSIS	T 361648 (C718) IATA.1 : CALCULATE AIR FREIGHT RATE T 36165A (A904) FORAPH : SIMULTANEOUS FUNCTION GRAF	.S PHER
T 36057A (A513) ACNODE : AC CIRCUIT ANALYSIS PROGPAM T 36058A (A514) HTXFR : TWO DIMENSIONAL HEAT TRANSFER	E 36166A (A820) DETERM : MATRIX DETERMINANT USING G ELIMINATION	AUSSIAN
T 36059A (A516) DEBYE : COMPUTES DERYE OR EINSTEIN FUNCTION T 36060A (A513) LPFLTR : DESIGNS LOW-PASS FILTERS	E 36167A (A820) JACOBI : EIGENVALUES AND EIGENVECTO	RS OF A REAL
T 36061A (A511) LQVALV : COMPUTES LIQUID CONTROL VALVE COEFFICIENTS	T 36168A (A301) CALC2 : THREE REGISTER CALCULATOR	
T 36062A (A513) MICRO : MICROWAVE PARAMETERS CONVERSION T 36063A (A519) TMFCEV : TIME FUNCTION EVALUATOR	T 36169A (A901) FIFTY! : EXTENDED PRECISION FACTORI T 361704 (A401) T-TEST : TEST OF HYPOTHESES USING S	
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T 36067A (A610) DYNPRO : DYNAMIC PROGRAMMING MODEL T 36068B (A605) LINPRO : LINEAR PROGRAMMING MODEL	T 36172A (A410) ANVAR3 : ANALYSIS OF VARIANCE FOR A	TWO VARIABLES
T 36069A (A608) LNTRND : LINEAR TREND FORECASTING	OF CLASSIFICATION OESIGN T 361734 (A410) ANVAR4 : TWO-WAY ANALYSIS OF VARIAN	ICE FOR A TWO-
T 36072A (A720) SALSIM : SALARY SCHEDULE COST SIMULATOR T 36073A (A716) BUDGET : DEPARTMENTAL MANAGER'S BUDGETING PROGRAM	WAY EXPERIMENT T 36174A (C718) TRCK.1 : CALCULATE TRUCK FREIGHT RA	TES
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T 36078B (A713) BNDYLD : BOND YIELD ANALYSIS T 36079A (A713) BNKRSV : BANK RESERVE CALCULATIONS	T 36178A (A404) MULREG : MULTIPLE REGRESSION/CORREL T 36179A (C713) DROIPB : DISCOUNTED RETURN ON INVES	ATION TMENT AND
T 36080A (A713) CAPINV : CAPITAL INVESTMENT ANALYSIS T 36082A (A712) DEPCOM : DEPRECIATION METHOD COMPARISON	PAYBACK I 36180A (S509) SUNSET : SUNRISE-SUNSET PREDICTOR	
T 36083A (A712) EQUITY : COST OF EQUITY CAPITAL	T 36181A (A903) FTBL : FOOTBALL	
T 36084A (A713) EXDRSK : EXTENDED RISK ANALYSIS T 36085A (A713) EXSMOD : EXPONENTIAL SMOOTHING ON PRICE DATA	E 36184A (A833) SPCTRA : OPTICAL ABSORPTION SPECTRA	SIMULATION, 2-
T 360864 (A714) GNPSUM : GROSS NATIONAL PRODUCT SUMMARY T 36087A (A714) INACNT : NATIONAL INCOME & PRODUCT ACCOUNTS	SPECIES EQUILIBRIUM MIXT T 36185A (C205) TERTES : TELETYPE-CRT DIAGNOSTIC	
T 36088A (A714) IN/OUT : INPUT/OUTPUT ANALYSIS ON ECONOMIC FLOWS T 36089B (A712) INSTMT : INCOME STATEMENT	T 36186A (A404) MULTX : LEAST-SQUARES FIT, MULTIPL E 36187A (8860) WHEELS : AUTO PURCHASE AND MAINTENA	E YIS PER X
T 36090A (A712) LENDER : SIMPLE LOAN ANALYSIS	I 361884 (5309) POLY : POLYNOMIAL APPROXIMATION T 361918 (4408) FRQ : FREQUENCY BETWEEN BOUNDRIE	
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T 36093A (A712) MKBUY : MAKE-BUY DECISION ANALYSIS T 36094B (A712) MORGAG : MORTGAGE ANALYSIS	E 36193A (B880) MANAGE : MANAGEMENT SIMULATION GAME E 36193A (B880) MANAGU : MANAGEMENT SIMULATION GAME	FOR THE 20008
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T 361014 (A713) TRUINT : TRUE ANNUAL INTEREST RATE ANALYSIS	E 361994 (AB80) MRKSIM : MARKETING SIMULATION	

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T 36200A (C101)	TIDE : TEXT EDITOR FOR THE 2000C	H 363249 (5833)	WAVES : SUM OF TWO WAVES
E 362024 (C720)	ATTEND : ARSENTEE LISTING	H 363254 (5833)	CLOUDS : CLOUD FORMATION
T 36203A (A405)	RANDOM : RANDOM NUMBER GENERATOR	H 36326A (5833)	WATER1 : WATER RUDGET PROBLEM CHECK WATER2 : WATER BUDGET
T 36204A (A101) E 36205A (A801)	CADAIT : COMPUTER ASSISTED ARITHMETIC DRILL	H 36327A (5853)	BALANC : TRADE AND PAYMENT BALANCES
E 362054 (4801)	CADAIM : COMPUTER ASSISTED ARITHMETIC DRILL	H 36329A (5860)	BANK : SOLVES FINANCIAL PROBLEMS
E 36205A (A801)	CADAIP : COMPUTER ASSISTED ARITHMETIC DRILL	H 36330A (S860)	CONSMP : DEPRESSION/EQUILIBRIUM
T 36206A (A107)	FILSOR : FILE POINTER SORT/POINTER SURT	H 36331A (5860)	STOCK : STOCK MARKET SIMULATION CRVLEN : COMPUTES LENGTH OF ANY CURVE
T 362064 (A107) E 362084 (A810)	STORE - MATH CALCULATOR BACKAGE	H 363334 (5801)	PLOTTE : FUNCTION PLOTTER
E 36209A (C880)	SETUPC : MANAGEMENT SIMULATION GAME FOR THE 2000C	H 363354 (S810)	QUADT : NATURE OF GRAPH OF A 2ND ORDER EQUATION
E 362094 (C880)	MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000C		IN TWO VAPIABLES
T 362108 (A708)	MANAGE : MANAGEMENT SIMULATION GAME FOR THE 2000C CTC1 : CTC MANUFACTURING PARTS CONTHOL TC2 : CTC INVENTORY CONTROL FOP FINISHED PRODUCTS CTC3 : CTC PAYHOL PROGRAMS CTC4 : CTC PAYHOL PROGRAMS CTC5 : CTC ACCOUNTS PECEIVABLE HPMLUT : LIST/DUMP HP ASSEMALEM FILES HPMLTT : LIST/DUMP HP ASSEMALEM FILES HPMLTT : LIST/DUMP HP ASSEMALEM FILES HPMLTT : LIST/DUMP HP ASSEMALEM FILES HAAIN : HNAIN SIMULATOM PROGRAM CHAPS : ASCII CHAPACTEM SET XTHACT : FILE UTILITY PROGRAM TAPDUM : FTLE UTILITY PROGRAM TALK : TIME SHARING SYSTEM COMMUNICATION LOAN AMOMOFIZATION FACTHL : FACTORIALS TO 1000 PLACES PLOTWO : WORD PLOTTER TRANSPT ITANSPORTATION PROGLEM ADDRES : ADDMESS LAHELS IPW : FLE SORT ROUTINE LAPOR : LAROP/MANAGEMENT BARGAINING HISS : SAMPLE STATISTICS AND HISTOGRAM FORMED FROM A SET OF NUMBERS HATLE : BATLESHIP GAME	H 363364 (5801)	RATIO : SOLVES PROPORTIONS
T 362118 (A708)	CTC2 : CTC INVENTORY CONTROL FOR FINISHED	H 36337A (SHUI)	SETS : UNION AND INTERSECTION OF SETS SURFAC : AREA OF SURFACE OF REVOLUTION
♦T 362128 (A717)	CTC3 : CTC PROJECTION PROGRAMS	H 363394 (S801)	VULSOL : VOLUME OF SULID OF REVOLUTION
*T 36213H (A706)	CTC4 : CTC PAYROLL PROGRAMS	H 363404 (5720)	AVERGI : AVERAGES AND CURVES GRADES
T 36214P (A711)	CTC5 : CTC ACCOUNTS RECEIVABLE	H 36341A (5720)	FRED : HAP GRAPHS OF GRADES
T 36218A (A108)	HPMLUT : LIST/OUMP HP ASSEMBLER FILES	H 363424 (\$720)	GRADE : TEST GRADE FOR NUMHER OF QUESTIONS MISSED TIEMI : NUMBER FREQUENCIES
T 36218A (A108) E 36219A (C810)	HEATN : HRAIN SIMULATOR PROGRAM	H 363444 (5720)	STAT : STATISTICAL ANALYSIS OF LAH DATA
T 36220A (C104)	CHARS : ASCII CHARACTER SET	H 36350A (5833)	PLANK : A PHOTOELECTRIC SIMULATION
I 36221A (8110)	XTRACT : FILE UTILITY PPOGRAM	H 36351A (A833)	SLITS : YOUNG'S DOUBLE SLIT EXPERIMENT
T 362214 (8110)	TAPDUM : FILE UTILITY PROGRAM	E 36353A (\$833)	AFLIFE : JOHN CONWAY'S GAME OF LIFE HAGELS : THREE-DIGIT NUMBER GUESSING
T 36222A (A108) T 36226A (C712)	IDAN : IDAN AMOPTIZATION	5 36501A (5801)	GANOVA : ANALYSIS OF VAPIANCE (2-WAY)
E 36227A (A801)	FACTHE : FACTORIALS TO 1000 PLACES	5 36502A (C880)	GSPMG : STANFORD PORTFULIO MANAGEMENT GAME
T 362284 (A904)	PLOTWD : WORD PLOTTER	S 36503A (C713)	GCHLIN : RATING INVESTMENT FUNDS
T 36230A (A605)	TRANSP : TRANSPORTATION PROBLEM	S 36504A (C603)	GCPATH : CRITICAL PATH ANALYSIS
T 36231A (A102) T 36232A (C107)	ADDRES : ADDRESS LAMELS	S 36505A (C603)	GCPMI : CRITICAL PATH ANALYSIS GUAPI : ARNORMAL PERFORMANCE INDEX
E 36233A (A880)	LABOR : LABOP/MANAGEMENT BARGAINING	S 36508A (C713)	GDPA : EFFICIENT 'CORNER' POPTFOLIOS
T 36235A (C904)	HISS : SAMPLE STATISTICS AND HISTOGRAM FORMED	S 36510A (C712)	GENRAT : FINANCIAL RATIOS
	FROM A SET OF NUMBERS	\$ 36512A (C605)	GINTLE : LINEAR PROGRAMMING-VARIABLES RESTRICTED
T 362364 (4903)	HATTLE : BATTLESHIP GAME		TO VALUES OF ONE OF ZEPO
E 36237A (C801) E 36239A (C801)	TRIFAC : FACTORING QUADRATIC TRINOMIALS SIPHAC : PRACTICE WITH SIGNED NUMMERS POLSUB : POLYNOMIAL SURTRACTION RISGAR : SQUAPING RINOMIALS IATA.C : CALCULATES BREAKPOINT OF IATA CONTAINERS	5 36513A (C/12) 5 36514A (C713)	GIRRPV : INVESTMENT RETURN (CASH FLOW) GKASSF : WARRANT PRICE CALCULATION
E 36239A (C801)	POLSUB : POLYNOMIAL SUBTRACTION	S 36515A (C713)	GKCOST : PRICE/EARNINGS PATIO CALCULATION
E 36240A (C801)	BISWAR : SQUARING RINOMIALS	S 36516A (C605)	GLP : LINEAR PPOGRAMMING
5 36241A (C718)	IATA.C : CALCULATES BREAKPOINT OF TATA CONTAINEPS	S 36517A (C605)	GLPSAL : LINEAR PPOGRAMMING TWO-PHASE SIMPLEX
T 36243A (C903) T 36244A (A903)	STTR1 : STAP TREK KENO : \$25.000.00 KENO GAME	T 246144 (C720)	METHOD GMARKS : USB GPADING PPUGRAM
T 36246A (A309)	POLETE : FITS LEAST-SQUARES POLYNOMIALS	T 36519A (C720)	GMEDIT : GSH GHADING PROGRAM
*T 36247A (F110)	FILRPT : REPORTS FILE CONTENTS AND STRUCTURE	S 36519A (C830)	GMCRO1 : FISCAL POLICY GAME
*[36248A (F108)	NEWIDS : CREATES NEW USER NUMBERS	S 36519A (C830)	GMCR02 : FISCAL POLICY GAME
*F 36250B (C102) E 36251A (B801)	FINDIT : INFORMATION RETRIEVAL SYSTEM	5 36521A (CH30)	GMCF06 : ECONOMIC POLICY GAME GMCF05 : ECONOMIC POLICY GAME
E 362534 (C801)	STINE : STAP DEC KENO : \$75,000.00 KENO GAME POLFTE : FITS LEAST-SQUARES POLYNUMIALS FILHPT : REPORTS FILE CONTENTS AND STRUCTUPE NEWIDS : CPEATES NEW USEN NUMBERS FINDIT : TNFURMATION RETPIEVAL SYSTEM LOGIC : LOGIC EXAMINATION PROGRAMS EXTEND : INFITE PRECISION MATH UTILITY PROGRAM SAPHES : EXPRESSION SOLVING PROGRAM ASSITE : CPEATES AN ASCUL FILE CONTAINING ALL 255	5 365294 (C604)	GNERDS : ECONOMIC POLICI GAME GNETFL : NETWORK FLOW
£ 362544 (C810)	EXPRES : EXPRESSION SOLVING PROGRAM	S 36530A (C713)	GNMRVH : SECURITIES PORTFOLIO ANALYSIS AND
♥T 362568 (C104)	ABOLT I CALLED AN ADOLT THE CONTAINED HER CON		DETERMINATION
T 36257A (C104)	ASCTI CHARACTERS -ASCII : ASCII CODE GENERATOR	S 365304 (C713)	GMP68 : SECURITIES PORTFOLIO ANALYSIS AND
T 36259A (A104)	KEYSIG : GIVES MAJOR SCALES	5 345414 (0409)	DETERMINATION GRANK : RANKING STATISTICS
T 36259A (A104)	MUSIC5 : FINDS DOMINANT SEVENTHS	S 36542A (C404)	GROPLT : SIMPLE PEGRESSION AND PLOT
E 36260A (8833)	IONIC : ORILL ON FORMULAS AND CHAPGES OF IONS	5 36543A (C712)	GPISKA : RISK ANALYSIS IN CAPITAL INVESTMENT
E 36261A (8833)	KEYSIG : GTVES MAJOR SCALES MUSICS : FINDS DOMINANT SEVENTHS IONIC : OFILL ON FOHMULAS AND CHAPGES OF IONS ISDMER : DRILL ON NAMING ALKANES CASYSS : SOLVING SYSTEMS OF COMPLEX LINEAR EQUATIONS	S 36545A (C713)	GSTKVL : STOCK VALUATION
E 362624 (8801)	EQUATIONS	S 365474 (C314)	GSIMED : SIMULTANEOUS LINEAR EQUATIONS GTAPID : PAPER TAPE TITLER
T 36263A (8312)	EQUATIONS DETER4 : DETERMINANTS, CHARACTERISTIC POLYNOMIALS AND INVERSES OF MATRICES RNDORD : PLACING INTEGERS IN RANDOM OPDER GAME : CLASSIC MATRIX OF GAME THEORY IONICI : DRILL ON FORMULAS OF IONIC COMPOUNDS ELMENT : DRILL ON FORMULAS OF IONIC COMPOUNDS ELMENT : DRILL ON SYMBOLS FOR CHEMICAL ELEMENTS ANOVAS : THREE FACTORIAL ANALYSIS OF VARIANCE FILIS : FILE LISTING PROGRAM/INSTRUCTIONS FILISI : FTLE LISTING PROGRAM/INSTRUCTIONS MUSIC2 : TRIAD SOLVING PROGRAM	5 365494 (0406)	GTASPD : SUBJECTIVE PROBABILITY DISTRIBUTION
	AND INVERSES OF MATRICES	S 36550A (C606)	GVOTE : COMMITTEE CHOICE ANALYSIS
T 36264A (8405)	RNDORD : PLACING INTEGERS IN RANDOM ORDER	S 365514 (C405)	GWHULL : SUBJECTIVE PROBABILITY - HANDOM VALUES
E 36265A (A801) E 36266A (P833)	GAME : CLASSIC MATRIX OF GAME THEORY TONICL : DRILL ON FORMULAS OF TONIC COMPOUNDS	S 36552A (C607)	GSSS : SMALL SYSTEMS SIMULATOR GTHOR : SECUPITIES EPS GROWTH
E 36267A (8833)	ELMENT : DRILL ON SYMBOLS FOR CHEMILAL ELEMENTS	S 365544 (C713)	GVPDUT : PLOTTING DATA
*T 36271A (F410)	ANOVA3 : THREE FACTORIAL ANALYSIS OF VARIANCE	S 36554A (C713)	VPDU : PLOTTING DATA
T 36272A (C108)	FILIS : FILE LISTING PROGRAM/INSTRUCTIONS	S 36555A (C904)	VCHART : INVESTMENT DECISIONS USING TEKTRONIX 4010
T 36272A (C108) E 36276A (A850)	FILISI : FILE LISTING PROGRAM/INSTRUCTIONS MUSIC2 : TRIAD SOLVING PROGRAM DIMIS : X-Y AXIS SEGMENT PROGRAM SYSSOL : SOLVING SYSTEMS OF LINEAR EQUATIONS JULI : ONE PAGE JULIAN CALENDAR COLREG : COLLEGE REGISTRATION DEMO	5 36556A (C904)	VREGPL : PLOTTING X AND Y VARIABLES USING TEKTPONIX 4010
E 36277A (C801)	DIMIS : X-Y AXIS SEGMENT PROGRAM	5 365574 (07)3)	VRRC : INVESTMENT STRATEGY ANALYSTS
₽E 3627HA (C801)	SYSSOL : SOLVING SYSTEMS OF LINEAR EQUATIONS	5 36558A (C904)	VSU4 : DISPLAY POUTINE USING TEKTRONIX 4010
*T 36279A (F108)	JULI : ONE PAGE JULIAN CALENDAR	T 36559A (C904)	VITT : TIC-TAC-TOE ON THE TEKTRONIX 4010 DISPLAY
♦T 36282A (F720) ♦T 36284A (F102)	COLREG : COLLEGE REGISTRATION DEMO MESSAG : INTERTERMINAL COMMUNICATOR		TERMINAL DRAG : SIMULATES A DRAG RACE
*T 36287A (F212)	DATA : DUMPS FILE TO DATA STATEMENTS	#F 366024 (FH01)	TRUTH : TRUTH TABLES FOR BOOLFAN EXPRESSIONS
*T 36288A (F108)	CALNDR : PRINTS & CALENDAR	*E 36603A (F833)	ALERA : PROPAGATION OF ERROR
*T 36292A (A107)	ALPHA : ALPHANUMERIC SORT	*E 366034 (F853) *E 366044 (F860) *T 366064 (F407) *T 366074 (F410)	CHARGE : CHARGE ACCOUNT SIMULATION FISHER : FISHERIS EXACT PROBABILITY TEST
*T 36293A (F513) *T 36294A (A410)	ALPHA : ALPHANUMERIC SORT ACTFIL : ACTIVE FILTER DESIGN ANCOV : ANALYSIS OF COVARIANCE CHEM : SELF-CORRECTING CHEMISTRY TEST	PT 36607A (F407)	STATIG : KRUSKAL-WALLTS ONE WAY ANALYSIS OF
*E 36295A (F833)	CHEM : SELF-CORRECTING CHEMISTRY TEST		VARIANCE
*T 36296A (F104)	ALFTOV : ALPHA TO VARIABLE CONVERSION	*H 36611A (A833)	MEMAR : DIFFUSION EXPERIMENT
ФТ 362974 (F104) ФТ 362984 (F104)	LIMENT : LIME OF THE DAY DATER : DATE AND DAY OF THE HEEK	PH 366134 (AB33)	ATWI : CALCULATES ATOMIC WEIGHT AVOGA : AVOGADRA'S NUMHER
•T 362994 (F904)	PRINT : GENERATES LARGE LETTERS	PH 366154 (4833)	EMPIR : CALCULATES EMPIRICAL FORMULAS
H 36300A (S833)	DROS : GENETIC CHARACTERISTICS	*H 36616A (A833)	MOLAR : ACID-RASE TITRATION
H 36301A (5833)	EVOLU : NATUPAL SELECTION EXPERIMENT	*H 366174 (A833)	PHPOH : PH. POH. PCT. DISSOCIATION
H 36302A (S833) H 36303A (S833)	GAMON : PROCESS OF GAMETOGENESIS	PH 36618A (4833)	STOICH : MASS VOLUME
H 36304A (S833)	NZYM2 : ENZYME REACTION RATE	*H 366224 (4801)	CVAREA : AREA UNDER CURVE LIMSIN : LIMTT OF (SIN X)/X
H 36305A (5833)	PHOSYN : PHOTOSYNTHESIS EXPERIMENT	*H 36623A (A801)	PI : CALCULATES PI
H 36306A (S833)	DECAY1 : RADIOACTIVE DECAY GAME	*H 36625A (A801)	POOTS2 : QUADRATIC EQUATION SOLVER
H 36307A (5833) H 36308A (5833)	EQUIL : FOULT TRATING SYSTEMS	*H 366264 (A801)	SLOPE : FINDS DEPIVATIVES
H 36308A (5833)	EQUIL2 : EQUILIBRIUM SYSTEMS	*** 36627A (A801) 9H 36628A (A801)	SORT : FINDS SQUARE POOT STATAL : ARITHMETIC MEAN
H 36309A (5833)	KINET : KINETIC PEACTION	*H 36629A (A833)	EFIELD ; ELECTRIC FIELD STRENGTH
H 36310A (A833)	MASSD : MASS DEFECT	*H 36630A (A833)	LENSES : SOLVES LENS PROBLEMS
H 36311A (S833)	PRCNT : PERCENT COMPOSITION	°H 36631A (A833)	PRJTL : PROJECTILE MOTION
H 36312A (5833) H 36313A (5833)	BOHR : ENERGY LEVEL DIAGRAM	PH 36632A (A830)	CIRFLW : CIRCULAR FLOW MODEL METRIC : CONVERTS ENGLISH TO METRIC
H 36314A (5833)	CALORI : CALORIMETRY EXPERIMENT	91 366384 (F704)	METRIC : CONVERTS ENGLISH TO METRIC CTC5 : CTC ACCOUNTS PAYABLE
H 36315A (5833)	KINERV : REVIEW OF KINEMATICS	*H 366394 (F833)	POLUT : WATEP POLLUTION SIMULATION
H 36316A (5833)	NEWINZ : NEWIONIS 2ND LAW	PH 36640A (F860)	POLSYS : SIMULATION OF CITY COUNCIL
H 36317A (5833) H 36318A (5833)	ACTFIL : ACTIVE FILTER DESIGN ANCOV : ANALYSIS OF COVARIANCE CHEM : SELF-CORRECTING CHEMISTRY TEST ALFTOV : ALPHA TO VARIARLE CUNVERSION TIMER : TIME OF THE OAY DATER : DATE AND DAY OF THE WEEK PRINT : GENERTES LARGE LETTERS DROS : GENETIC CHARACTERISTICS EVOLU : NATURAL SELECTION EXPERIMENT GAMGN : PROCESS OF GAMETOGENESIS NZYMC : ENZYMATIC REACTION RATES NZYMC : ENZYMATIC REACTION RATE PHOSYN : PHOTOSYNTHESIS EXPERIMENT DECAY1 : HADIOACTIVE DECAY GAME DECAY2 : NUCLFAR DECAY EQUIL1 : EOUTLIARTUM SYSTEMS KINET : KINETIC PEACTION MASSO : MASS DEFECT PRONT : PROFENT COMPOSITION BFIELD : MAGNETIC FIELD PICTURE ROHM : ENERGY LEVEL DIAGRAM CALORI : CALORIMETRY EXPERIMENT KINET : CALORIMETRY EXPERIMENT KINERY : REVIEW OF KINEMATICS NEWTNS : NEWTON'S 2ND LAW PHOTON : ENERGY LEVEL DROBLEM REFLCT : LEAST TIME PRINCIPLE AND LIGHT SPACE : SPACECRAFT ORBITS	PH 366414 (F833)	STERL : FLY POPULATION CONTROL
H 36319A (5833)	REFLCT : LEAST TIME PRINCIPLE AND LIGHT	T 720504 (1033)	GENEL : GENETICS SIMULATION HPLOTE : AUTOMATIC PLOTTING PROGRAM FOR THE HP
H 36320A (S833)	SNELL : SNELL'S LAW		Record . Molowarie Hearing Product file internet
H 36321A (S833)			
		1 720514 (0904)	HPPLOT : AUTOMATIC PLOTTING PROSPAM
H 36322A (5833) H 36323A (5833)	SPACE : SPACECRAFT ORBITS VFIELD : POTENTIAL FIELD PICTURE VLOCTY : INSTANTANEOUS VELOCITY	T 720514 (C904)	HPPLOT : AUTOMATIC PLOTTING PROSPAN

CONTRIBUTED PROGRAM BASIC

FINDIT C102-36250B

TITLE:

DESCRIPTION:

The Information Retrieval System is used with the HP 2000C and 2000F. It provides the on-line user with the ability to create, update, and interrogate data files from one or more terminals. Once a file is created, records may be added, modified, and deleted. Any record in the file is available to be printed in a variety of forms such as lists, tabulated reports, or address labels. Records may be retrieved by comparing their contents to a set of file search conditions.

Additional programs permit calculations to be performed on numerical file data, output listings to be ordered on any element, and multi-level file sorts to be performed.

INSTRUCTIONS:

SYSTEM

SPECIAL

PRICE

SPECIFICATIONS:

CONSIDERATIONS:

A. File Structure

- 1. Master file (up to 10,000 records)
- Auxiliary file (32-record scratch file)
 Gate file (4-record scratch file)
- DO file (2-record scratch file) 4.

B. Program Descriptions

INFORMATION RETRIEVAL SYSTEM

- 1. CREATE Used to initially define the master file structure and passwords, and to subsequently modify the file structure.
- UPDATE Used to add, modify, and delete records in the master file. 2. Retrival program which allows data output in a variety of SEARCH 3.
- formats.
- 4. FINDIT Driver program for SEARCH and UPDATE, requiring a password for access to them.
- 5. CAL Calculator program which permits computation and highprecision sums to be made on numerical file data during SEARCH operations.
- FIND] File sort program which permits output listings to be 6. ordered in any element.
- 7. IRV1 File sort program which permits multi-level file sorts to be executed.
- 8. FINDOR Driver program for FIND1 and IRV1.

Complete User Instructions are contained in the FINDIT manual HP 36250, option DOO.

2000C and Teletype

This system is designed for a data file of 10,000 records or less. Each record may contain approximately 425-500 characters. Element field width is variable. In a typical installation it is recommended that FINDIT be CSAVed and PROtected, except for the program CAL, which should be <u>SAVed</u> and not PROtected. For this reason, listings are not included in this Handbook.

Not available on paper tape. To order a magnetic tape of all contributed BASIC programs, order HP Part No. 02000-90029 for 2000C, or HP Part No. 02000-90060 for 2000F, Price \$25.00. User's Manual, HP Part No. 36250A, Option DOO, Price \$5.00

ACKNOWLEDGEMENTS:

Irv Brenner

FINDIT, Page 2 June 1973 C102-36250B

RUN

```
SEARCH CONDITIONS:
? STATE=CA
? STATE>R
? STATE=OH
? CLASS<55
? CLASS>62
? cr
 PRINT OPTION? SPECIAL
    ELEMENTS, FIELD WIDTH:
?
   ID,4
?
   CLASS,5
   STATE,5
?
?
   NAME,1
?
   cr
```

CLASS STATE NAME ID

997	43	CA	BELAIR, R. JAMES
2274	51	ОН	BURDETT, HENRY
2991	63	TE	BURNS, VIRGINIA
650	24	CA	THOMAS, JOHN F.

TOTAL RECORDS= 4

```
RUN
FINDIT
```

```
FILE: BERRAM
PASSWORD: ERNNHN
**INVALID PASSWORD.
PASSWORD: ERRARE
**INVALID PASSWORD.
PASSWORD: HENNHN
**INVALID PASSWORD.
PASSWORD: BRANEN
SEARCH CONDITIONS:
? MARITAL=S
?
  PRINT OPTION? SPECIAL
    ELEMENTS, FIELD WIDTHS:
?
    NAME, 20
    CITY, 10
?
?
    MARITAL, 1
?
    DEGREE, 3
?
    CLASS, 1
?
```

NAME	ÇITY	М	DEG	CLASS
ALTMAN, LEO S. BRENNAN, RICHARD R. BURDETT, HENRY **2**	CHICAGO WASHINGTON CLEVELAND	S S	MBA BBA	53 51
BURNS, VIRGINIA JACKSON, MILTON PRICE, HAROLD **!**	DALLAS CHICAGO CHICAGO	S	_	63 49 49
SANȚIN, ANDRE TAO, KENNETH WHITE, SANDRA R. WILLIS, DONALD L. YOUNG, REMINGTON	PARIS DENNIS CLEVELAND WASHINGTON CHICAGO	S S S	BFA	67 61

TOTAL RECORDS= 11

```
SEARCH CONDITIONS:
? CITY=CHICAGO
? MARITAL=S
?
PRINT OPTION? SPECIAL
ELEMENTS, FIELD WIDTHS:
? NAME,20
? CITY,10
? DEGREE,3
? CLASS,1
?
```

NAME	ÇITY	DEG	CLASS
ALTMAN, LEO S.	CHICAGO	BBA	37
JACKSON, MILTON	CHICAGO	BM	49
PRICE, HAROLD	CHICAGO	BS	49
YOUNG, REMINGTON	CHICAGO	BS	49

TOTAL RECORDS= 4

AGAIN? YES

```
SEARCH CONDITIONS:
? STATE=IL
? STATE=OH
? STATE=TE
? MARITAL=S
?
 PRINT OPTION? SPECIAL
   ELEMENTS, FIELD WIDTHS:
  NAME, 20
?
? CITY 10
?
   STATE, 5
   DEGREE, 3
?
?
    CLASS, 1
?
```

ALTMAN, LEO S. CHICAGO IL BBA 37 BURDETT, HENRY CLEVELAND OH BBA 51 **2** BURNS, VIRGINIA DALLAS TE BJ 63 JACKSON, MILTON CHICAGO IL BM 49 PRICE, HAROLD CHICAGO IL BS 49	NAME	CITY	STATE	DEG	CLASS
JACKSON, MILTON CHICAGO IL BM 49	BURDETT, HENRY				
WHITE, SANDRA R. CLEVELAND OH BFA 61 YOUNG, REMINGTON CHICAGO IL BS 49	JACKSON, MILTON PRICE, HAROLD WHITE, SANDRA R.	CHICAGO CHICAGO CLEVELAND	IL IL OH	BM BS BFA	49 49 61

TOTAL RECORDS= 7

AGAIN? NO

DONE

,

CONTRIBUTED PROGRAM **BASIC**

TITLE:	MESSAG INTERTERMINAL COMMUNICATOR F102-36284A
DESCRIPTION:	This program allows messages to be entered at one user terminal and to be received anytime afterward at another user terminal. Messages are self-dating and include the sender's and receiver's names. It is useful, for example, when a number of schools use the same computer, as it pro- vides a fast and simple means of sending printed messages from school to school.
INSTRUCTIONS:	Open a file named MSFILE in a semi-privileged user code (i.e., one that begins with the letter A) to which all users who are to use the program have access. The program contains buffer handling routines to prevent any confusion when two or more users are writing on the file at the same time. The size of the file is variable from 2 to 128 records. Suggested starting sizes: For 256-word records (i.e., 2000C or 2000C'/F): 20 records. For 64-word records (i.e., 2000B): 60 records.
	The program compensates for varying number of records and varying record sizes.
	The program has four options selected by number:
	STOP (option number 0): Stops the program.
	RECEIVE MESSAGE (option number 1): The user selects the message to be printed by its number (a listing of available messages is given at the beginning of the RUN and when option number 3 is selected). After the message is printed the user may have the option of deleting the message from the file. (The program will not allow any user except the sender of the message to remove it from the file within five minutes after it is entered. This prevents one user from deleting a message being entered concurrently by another user.)
	ENTER MESSAGE (option number 2): The user inputs the receiver's and his names. The program assigns the message a number and labels it with the current data and time. The user inputs his message using as many lines as needed and types the word END for the last input to stop.
·	RECEIVE LIST OF AVAILABLE MESSAGES (option number 3): This option gives a listing of currently available messages. It is auto- matically selected at the beginning of the RUN.
SYSTEM SPECIFICATIONS:	2000F and Teletype
SPECIAL CONSIDERATIONS:	None

ACKNOWLEDGEMENTS:

MESSAG, Page 2 June 1973 F102-36284A

RUN

RUN STOP RUN MESSAG

INTERTERMINAL COMMUNICATOR

THERE ARE MESSAGES FOR:

1. BOB COLLINS

- 2. EVERYONE3. J BENTLY S.H.S
- 4. ANYBODY

OPTION? \emptyset = STOP, 1 = RECEIVE MESSAGE, 2 = ENTER MESSAGE, 3 = RECEIVE LIST OF AVAILABLE MESSAGES - ?1

TYPE THE NUMBER OF THE MESSAGE YOU WANT. - ?1

FOR: BOB COLLINS FROM: D. MCCARTNEY 3/29/73 2:54 AM

BOB, I'VE COPIED YOUR PROGRAM FOR EXPERIMENT 15 FROM B102 AND WILL HAVE MY STUDENTS BEGIN WORK ON IT TOMORROW. I HAVE FOUND AN ERROR IN EXPT14. USING DATA OF 1,2,.54,.737 I OBTAIN 'SUBSCRIPT OUT OF BOUNDS IN LINE 1750' BEFORE THE FOURTH ITERATION IS PRINTED. END OF MESSAGE. DO YOU WANT IT REMOVED FROM THE FILE?YES

OPTION?2 THIS MESSAGE IS FOR?DON MCCARTNEY AND IS FROM?BOB COLLINS

ENTER MESSAGE (ANY NUMBER OF LINES, 3 MINUTE TIME LIMIT PER LINE). TYPE END FOR LAST LINE TO STOP INPUT.

? THANKS, DON. I HAVE ALREADY FOUND THE ERROR IN EXPT14. I HAVE SAVED ? THE CORRECTED VERSION IN THE B100 LIBRARY. ? END

OPTION?1

TYPE THE NUMBER OF THE MESSAGE YOU WANT. - ??

FOR: EVERYONE FROM: EASTERN H.S. 3/29/73 2:56 AM

ANNOUNCING A NEW LIBRARY PROGRAM: TRIG

TRIG IS A DRILL PROGRAM OF TRIGONOMETRIC ANGLES. EXAMPLE QUESTIONS ARE 'WHAT IS THE COSINE OF 45 DEGREES?' STUDENT RESPONSE IS 'SQR(2)/2' OR 'WHAT ANGLE HAS .5 AS ITS SINE?' STUDENT MAY RESPOND EITHER '30 DEGREES' OR '150 DEGREES'. TO USE IT GET AND RUN \$TRIG. INSTRUCTIONS ARE GIVEN. END OF MESSAGE. DO YOU WANT IT REMOVED FROM THE FILE?NO

OPTION?Ø

DONE

LISTING

MESSAG

**** HP BASIC PROGRAM LIBRARY *********************** 1 REM REM 2 INTERTERMINAL COMMUNICATOR 3 REM MESSAG: 4 REM 6/73 36284 REV A 5 REM REM 6

7 REM **** CONTRIBUTED PROGRAM ****************************** 10 REM MESSAG - INTERTERMINAL COMMUNICATOR 20 DIM M[127]+M\$(72)+T\$[14]+F\$[14]+X\$[10]+Z\$[6]+T[127]+G\$[72] FILES MSFILE 30 40 DEF FNW(X)=INT((X+3)/2) 50 X\$="0123456789" 70 D0 = 18080 PRINT "INTERTERMINAL COMMUNICATOR" REM DETERMINE NUMBER OF RECORDS IN FILE 90 100 IF END #1 THEN 140 110 FOR R0=1 TO 128 120 READ #1.R0 130 NEXT RO 140 R0=R0-1 JF RO#1 THEN 180 150 PRINT "FILE TOO SMALL - MUST BE AT LEAST 2 RECORDS" 160 170 STOP REM DETERMINE NUMBER OF WORDS PER RECORD 180 190 READ #1.RO 200 IF END #1 THEN 240 FOR WO=0 TO 254 STEP 2 210 220 PRINT #1;0 230 NEXT WO 240 GOSUR 1630 250 $F_{1}=0$ PRINT "OPTION": 260 IF F1 THEN 310 270 PRINT "? 0 = STOP. 1 = RECEIVE MESSAGE. 2 = ENTEP MESSAGE." 280 290 PRINT "3 = RECEIVE LIST OF AVAILABLE MESSAGES - "; 300 F1=1 310 INPUT F2 320 IF F2<0 OR F2>3 OR F2#INT(F2) THEN 250 330 GOTO F2+1 OF 1980+340+1020+1520 PRINT "TYPE THE NUMBER OF THE MESSAGE YOU WANT. - ": 340 INPUT M1 350 F0=0360 370 FOR R1=1 TO R0-1 380 READ #1.R1 390 IF TYP(-1)#1 THEN 770 400 READ #1:MO IF M1#M0 THEN 770 410 420 READ #1.RI IF FO THEN 730 430 440 F0=1450 READ #1:M0.T\$.F\$.T0.T1.T2.T3.M\$ 460 T9=T2 PRINT "FOR: ":TS:" 470 FROM: ":F\$:" RESTORE 1970 480 490 FOR T4=1 TO 12 500 READ T5 T5=T5+(T4=2 AND T3/4=INT(T3/4)) 510 520 1F T5 >= T2 THEN 550 530 T2=T2-T5 540 NEXT T4 550 Z0=10000*T4+100*T2+T3 GOSUB 1850 PRINT Z\$[1,Z1-3];"/";Z\$[71-2,Z1-1];"/";Z\$[71,Z1+1];" 560 570 ... 580 Z0=100*(T1-12*INT((T1-1)/12))+T0 GOSUB 1850 PRINT Z\$[1+Z1-1];":";Z\$[Z1+Z1+1]; 590 600 610 IF T1=0 AND T0=0 THEN 700 IF T1=12 AND T0=0 THEN 680 IF T1<12 THEN 660 620 630 PRINT " PM" 640 650 GOTO 710 PRINT " AM" 660 670 GOTO 710 PRINT " NOON" 680 690 GOTO 710 700 PRINT " MIDNIGHT" 710 PRINT 720 GOTO 750 730 IF TYP(-1)=4 THEN 770 740 READ #1:M0,T0,T1,M\$ 750 PRINT MS 760 GOTO 430 770 NEXT R1 780 IF FO THEN 840

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MESSAG, Page 4
June 1973
F102-36284A
     PRINT "THERE IS NO MESSAGE NUMBER":M1
790
     PRINT "POSSIBLY IT HAS BEEN REMOVED FROM THE FILE SINCE THE LAST"
800
     PRINT "LISTING OF AVAILABLE MESSAGES WAS PRODUCED. OPTION 3 WILL"
810
     PRINT "GIVE A LISTINE OF AVAILABLE MESSAGES."
820
830
     GOT0 260
840
     T=60*TIM(1)+TIM(0)-60*T1-T0
845
     T[M]]=0
850
    IF T >= 0 AND T <= 4 AND T9=TIM(2) AND NOT T[M1] THEN 1000
     PRINT "END OF MESSAGE. DO YOU WANT IT REMOVED FROM THE FILE":
860
870
     INPUT Y$[],1]
880
    IF YS="N" THEN 260
    IF YS#"Y" THEN BOD
890
     FOR R1=1 TO R0-1
900
910
     READ #1.R1
    IF TYP(-1)#1 THEN 960
920
930
     READ #1:MO
    IF MO#M1 THEN 960
940
950
     PRINT #1.R1
     NEXT R1
960
970
    T[M] = 0
     READ #1.R0
980
990
    GOTO 260
1000 PRINT "MESSAGE ENTERED PECENTLY - POSSIBLY NOT COMPLETE"
1010 GOTO 260
1020 P2=0
1030
      PRINT "THIS MESSAGE IS FOR":
1040 INPUT 15
     PRINT "AND IS FROM";
1050
1060
      INPUT F$
      PRINT "ENTER MESSAGE (ANY NUMBER OF LINES. 3 MINUTE TIME LIMIT PER"
1070
1080 PRINT "LINE). TYPE END FOR LAST LINE TO STOP INPUT."
1090
      F3=0
1100 PRINT "? ":
1110 ENTER DO.DI.MS
     IF D1#-256 THEN 1150
1120
1130 PRINT "TIME OUT - INPUT TERMINATED"
1140 GOTO 260
1150 IF M$="END" THEN 260
      IF F3 THEN 1360
1160
1170
      REM FIND AN AVAILABLE MESSAGE NUMBER
      MAT M=ZER
1180
1190
      FOR R1=1 TO R0-1
1500
      READ #1.R1
1210
      IF TYP(-1)#1 THEN 1240
1220
      RFAD #1:MO
1230
      M[M0]=1
1240
      NEXT R1
1250 FOR M1=1 TO 127
1260 IF NOT M[M1] THEN 1290
1270 NEXT M1
1280
      GOTO 1500
1290
      GOSUB 1540
1300 IF R2=0 THEN 1500
     PRINT #1.R2:M1.TS.FS.TIM(0).TIM(1).TIM(2).TIM(3).MS
1310
1320
      W1=10+FNW(LEN(T$))+FNW(LEN(F$))+FNW(LEN(M$))
1330
      F3=1
1340
     T[M]]=1
1350
      GOTO 1480
      IF W1+6+FNW(LEN(M$)) <= W0 THEN 1400
1360
1370
      GOSUR 1540
      IF R2=0 THEN 1500
1380
1390
      W l = 0
1400
      READ #1,R2
      GOTO TYP(-1) OF 1420,1440,1460.1460
1410
1420
      READ #1:60
1430
      GOTO 1410
1440 READ #1:6%
1450
      GOTO 1410
      PRINT #1:M1.TIM(0).TIM(1).M$
1460
1470
      W1=W1+6+FNW(LEN(M$))
1480
      READ #1.RO
1490
      GOTO 1100
      PRINT "FILE FULL - LAST LINE LOST - INPUT TERMINATED"
1500
      GOTO 260
1510
1520
      GOSUB 1630
1530
      GOTO 260
      REM FIND AN AVAILABLE RECORD
1540
      FOR R1=R2+1 TO R0-1
1550
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MESSAG, Page 5 June 1973 F102-36284A

1560 READ #1.R1 IF TYP(-1)#1 THEN 1610 1570 1580 NEXT R1 1590 R2=0 1600 RETURN 1610 R2=R1 RETURN 1620 REM PRINT LISTING OF AVAILABLE MESSAGES 1630 1640 MAT M=ZER 1650 F0=0 1660 FOR R1=1 TO R0-1 1670 READ #1,R1 1680 IF TYP(-1)#1 THEN 1730 1690 READ #1;MO 1700 IF M[M0] THEN 1730 1710 F0=1 1720 M[M0]=R1 1730 NEXT R1 IF FO THEN 1770 PRINT "THERE ARE NO MESSAGES." 1740 1750 1760 RETURN PRINT "THERE ARE MESSAGES FOR:" 1770 1780 FOR M1=1 TO 127 1790 IF NOT M[M1] THEN 1830 1800 READ #1,M[M1]:Z0,M\$ 1810 GOSUB 1850 1820 PRINT TAB(3-Z1);Z\$;". ";M\$ 1830 NEXT M1 1840 RETURN REM NUMBER FORMAT SUBROUTINE 1850 1860 IF ZO <= 1 THEN 1890 1870 Z1=INT(LOG(Z0)/LOG(10)) 1880 GOTO 1900 1890 Z1=0 Z\$="" 1900 1910 FOR Z2=Z1 TO 0 STEP -1 1920 Z3=INT(Z0/10+Z2) 1930 Z\$[LEN(Z\$)+1]=X\$[Z3+1,Z3+1] 1940 Z0=Z0-Z3+10+Z2 1950 NEXT Z2 1960 RETURN 1970 DATA 31,28,31,30,31,30,31,31,30,31,30,31 1980 END

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CONTRIBUTED PROGRAM **BASIC**

TITLE:	ASCII* C104-36256B CREATES AN ASCII FILE CONTAINING ALL 256 ASCII CHARACTERS.
DESCRIPTION:	The program "ASCII*" fills the file named "ASCII" with the 256 characters of the ASCII character set. These characters are contained in four 64 character strings, two in record one, and two in record two. The charac- ters are in ASCII order, from lowest to highest.
INSTRUCTIONS:	Open the file "ASCII" two records. The file should have 256 word records. Run the program. GET-ASCII* OPEN-ASCII,2 RUN ASCII* DONE If the file is in the library, it should then be sanctified if possible. The program"-ASCII", (HP36257) creates a list of the characters which are put in the file "ASCII".
SYSTEM SPECIFICATIONS:	2000C and Teletype
SPECIAL CONSIDERATIONS:	This program will work only on a 2000C system. When the file "ASCII" is opened in the library, be sure its records are 256 word records if you plan on using an Aardwolf & Company Writing Team program which uses "ASCII". The Aardvark and Company Writing Team has designed programs to take up an absolute minimum of computer storage and perform a maximum purpose. The team encourages people to send good programs to Aardvark. As a slight encouragement, the team will give anyone who sends a program which is accepted a free "subscription" to the program handbook and include the contributor as a member of the writing team.
ACKNOWLEDGEMENTS:	Aardvark and Company 2130 Bell Court Lakewood, Colorado 80215

ASCII*, Page 2 June 1973 C104-36256B

RUN

RUN

ASCII*

DONE

LISTING

ASCII*

1 REM **** HP BASIC PROGRAM LIBRARY ********************* REM 2 3 REM ASCII*: CREATES AN ASCII FILE CONTAINING ALL 256 ASCII 4 REM CHARACTERS 5 REM REM 36256 REV B 6/73 6 7 REM 8 REM **** CONTRIBUTED PROGRAM ************************ REM *** AARDWOLF & COMPANY WRITING TEAM *** PHILIP J. TUBB 10 REM *** ASCII* *** 0335 WORDS *** VERSION 7 *** 20 30 E\$="ASCII" 40 READ 01,02,03,J1 50 DATA 1,2,3,32 DIM A\$[64],8%[64],C%[64],D%[64],E%[5] 60 FILES *.ASCII 70 A\$=" !##\$%&!()*+,-,/0123456789:;<=>?" 80 90 85="@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]**" 100ASSIGN E5,01,8,"!!" 110 PRINT #01;A\$,B\$ 120 ASSIGN E\$,01,8,F\$ 130 READ #01.01:C\$.D\$ 140 B\$[J]]=D\$[J]] A\$[03,03]=C\$[03] 150 160 PRINT #01,01;A\$,B\$ 170 ASSIGN E\$,01,8,"0000" READ #01,01;C\$,D\$ 180 190 C\$[J1+01]=A\$ 200 B\$[J]+01]=D\$ 210 PRINT #02,01:C\$,8\$ ASSIGN E\$,01,8."@@@@@@@" 220 PRINT #01+02;85+C\$ 230 240 READ #01,01 250 READ #02,02;45,85 PRINT #02;"FOR MORE INFORMATION WRITE:""THE AARDWOLF AND 260 COMPANY WRITING TEAM""2130 BELL COURT""LAKEWOOD, COLO. 80215" 270 END

CONTRIBUTED PROGRAM BASIC

	ALPHA TO VARIABLE C	ONVERSION	ALFTOV F104-36296A
DESCRIPTION:	string into a numbe number, positive or	l convert a numeric value contained or r stored in a variable. Blanks are negative, integer, decimal, or even e converted. Conversion stops when d.	ignored, and any written with an
INSTRUCTIONS:	of the character in	st dimension A\$, which is the input : A\$ at which the conversion is to st eturned in the variable Z.	string. The index art is stored in
	Input Parameters:	A\$, the string containing the nume ZO, the index of A\$ to begin conve	ric value rsion
	Output Parameters:	Z, the value of the numeric quant ZO, the index of the first non-val the end of A\$	ity id character or
	Entry Point: 9010		
	Variables Used: Z\$ an	(15),(internally dimensioned), Zl, Z d Z9	2, Z3, Z4, Z5, Z8,
SYSTEM SPECIFICATIONS:	2000F and Teletype		
SPECIAL CONSIDERATIONS:		ubroutine is 433 words. This may be ecessary REM statements.	shortened to 282
	Overflow or underfl side the limits of	ow errors will occur if the numeric the machine.	quantity is out-
ACKNOWLEDGEMENTS:	Lawrence E. Turner Pacific Union Colle	, Jr. ege	

ALFTOV, Page 2 June 1973 F104-36296A

RUN

LIS TEST

10 DIM A\$[72] 20 INPUT A\$ 30 LET ZØ=5 GOSUB 9010 40 50 LET X=Z 60 LET Z0=Z0+1 70 GOSUB 9010 80 PRINT "VALUES ARE: ";X;Z 90 GOTO 20 APP-ALFTOV Ø+9999 END RUN TEST ?AAA=-45.6,78.9006E-7 VALUES ARE: -45.6 7.89006E-06 ?AAA=13,-56 VALUES ARE: 13 - 56 ?AAA=Ø 7 8 3- 45E+2 VALUES ARE: 78 -4500 2 DONE

LISTING

ALFTOV

9000 REM ##### SUBROUTINE ALFTOV ##### 9001 REM CONVERTS AN ALPHA NUMBER TO A VARIABLE 9002 REM 9003 REM 9004 REM INPUT: A\$, INPUT STRING **ZO. INDEX TO BEGIN SCAN** 9005 REM 9006 REM OUTPUT: Z. RETURNED VALUE ZO. INDEX AFTER LAST VALID CHARACTER 9007 REM 9008 REM 9009 DIM Z\$[15] 9010 REM 9011 LET Z=Z4=Z5=0 LET 21=22=23=1 9012 9013 LET Z\$="0123456789+-.E " 9015 FOR Z9=Z0 TO LEN(A\$) FOR Z8=1 TO 15 9016 9017 IF A\$[Z9,Z9]=Z\$[Z8,Z8] THEN 9020 9018 NEXT Z8 6010 9080 9019 9020 IF Z8=15 THEN 9070 9021 IF Z8>10 THEN 9040 GOTO Z2 OF 9025,9030,9035 9022 9025 LET Z=10+Z+Z8-1 9028 GOTO 9070 9030 LET Z5=Z5+1 GOTO 9025 9031 9035 LET Z4=10*Z4+Z8-1 9037 GOTO 9070 9039 REM 9040 GOTO Z8-10 OF 9045,9045,9055,9060 IF 72<3 AND Z>0 THEN 9080 9045 9046 IF Z2=3 THEN 9050 9047 LET Z1=23-2*Z8 9048 GOTO 9070 9050 IF Z4>0 THEN 9080 LET Z3=23-2*Z8 9051 9052 GOTO 9070 9055 IF Z2>1 THEN 9080 9056 LET Z2=2 9057 GOTO 9070

ALFTOV, Page 3 June 1973 F104-36296A

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9060 IF Z2=3 THEN 9080 9061 LET Z2=3 9070 NEXT Z9 9075 REM 9080 LET Z0=Z9 9081 IF ARS(Z3*Z4-Z5)<50 THEN 9085 9082 LET Z5=Z3*(Z4-50) 9085 LET Z=Z1*Z*10*(Z3*Z4-Z5) 9087 RETURN 9090 REM **** END ALFTOV ****

TITLE:	TIMER TIME OF THE DAY F104-36297A
DESCRIPTION:	This subroutine returns the time of day in a convenient alpha format.
	Computer Museum
INSTRUCTIONS	The time is returned in a string array T\$ internally dimensioned for 10 characters. Output Parameter: T\$, the time of day Entry Point: 9910 Variables Used: T\$(10), Z\$(10), Z1, Z2, Z3, and Z8
SYSTEM SPECIFICATIONS:	2000F and Teletype
SPECIAL CONSIDERATIONS:	The length of this subroutine is 390 words. This may be reduced to 285 words by deleting the REM statements. If this subroutine is used in conjunction with DATER, the DIM statement is line 9906 should be deleted. Other than this, the two subroutines are perfectly compatible.
ACKNOWLEDGEMENTS:	Lawrence E. Turner, Jr. Pacific Union College

TIMER, Page 2 June 1973 F104-36297A

RUN

LIS TEST 10 GOSUB 9910

20 PRINT T\$ 30 STOP APP-TIMER

9999 END

RUN TEST

11:31 AM

DONE

LISTING

TIMER 1 REM **** HP RASIC PROGRAM LIBRARY **************************** REM 2 REM TIMER: TIME OF THE DAY 3 REM 4 5 REM 36297 REV A 6/73 6 REM REM **** CONTRIBUTED PROGRAM ******************************** 7 9900 REM ***** SUBROUTINE TIMER ***** 9901 REM 9902 REM RETURNS THE CURRENT TIME OF DAY IN ALPHA FORMAT 9903 REM OUTPUT PARAMETER: T\$ 9904 REM 9905 DIM T\$[10] DIM 2\$[10] 9906 9907 REM 9908 *** ENTRY 9910 *** REM 9909 RĔM 9910 LET Z\$="0123456789" LET Z1=TIM(0) 9911 9912 LET Z2=TIM(1) 9915 IF Z1>0 THEN 9925 9916 IF Z2#0 THEN 9920 9917 LET T\$="12:00 MIDN" 9918 RETURN 9920 IF Z2#12 THEN 9925 9921 LET T\$="12:00 NOON" 9922 RETURN 9925 LET Z8=0 9926 IF Z2<12 THEN 9932 9927 IF Z2=12 THEN 9930 9928 LET Z2=Z2-12 9930 LET Z8=1 IF Z2>0 THEN 9935 9932 9933 LET Z2=12 9934 REM 9935 LET TS=" " LET Z3=INT(Z2/10) 9936 9937 IF Z3=0 THEN 9940 LET T\$="l" 9938 9940 LET Z3=Z2-Z3*10+1 LET T\$[2]=Z\$[Z3,Z3] 9941 9942 LET T\$[3]=":" 9945 LET Z3=INT(21/10) 9946 LET T\$[4]=Z\$[Z3+1+Z3+1] 9947 LET Z3=Z1-Z3*10+1 9948 LET T\$[5]=Z\$[Z3,Z3] LET T\$[6]=" AM " 9950 9951 IF Z8=0 THEN 9955 9952 LET T\$[6]=" PM 9955 RETURN 9956 REM **** END TIMER **** 9960 REM

TITLE:	DATER DATE AND DAY OF THE WEEK F104-36298A
DESCRIPTION:	This is a subroutine to return the current date and day of the week in two alpha strings.
	The current date is returned as: dd MON yy where dd is an integer day of the month MON is a three letter abbreviation of the month yy is the last two digits of the year
	The day of the week is returned as a three letter abbreviation. Output Parameters: N\$, the current date (internally dimensioned: N\$(9)) M\$, the current day of the week (internally dim- ensioned: M\$(36), logical length is 3) Entry Point: 9810 Variables Used: M\$(36), n\$(9), Z(12), Z\$(10), Z1, Z2, Z3, and Z8
SYSTEM SPECIFICATIONS:	2000F and Teletype
SPECIAL CONSIDERATIONS:	The length of the subroutine is 536 words. This may be shortened to 392 words by the deletion of the REM statements.
ACKNOWLEDGEMENTS:	Lawrence E. Turner, Jr. Pacific Union College

DATER, Page 2 June 1973 F104-36298A

RUN

LIS TEST 10 GOSUB 9810 20 PRINT N\$,M\$ 30 STOP APP-DATER 9999 END

RUN TEST

27 MAR 73 TUE

DONE

LISTING

DATER

9790 REM **** HP BASIC PROGRAM LIBRARY ****************** 9791 REM 9792 RF M DATER: DATE AND DAY OF THE WEEK SUBROUTINE 9793 REM 9794 REM 36298 REV A -- 6/73 9795 REM 9796 **** CONTRIBUTED PROGRAM ******************************* REM ***** SUBROUTINE DATER ***** 9800 REM 9801 REM 480S REM RETURNS THE CURRENT DATE AND DAY OF THE WEEK IN ALPHA FORMAT 9803 REM OUTPUT PARAMETERS: NS. DATE 9804 REM MS. DAY OF WEEK 9805 REM 9806 DIM M\$[36].N\$[9].Z[12].Z\$[10] 9807 REM 9808 REM *** ENTRY 9810 *** 9809 REM 9810 MAT Z=CUN MAT Z=(31)*Z 9811 LET Z[4]=Z[6]=Z[9]=Z[11]=30 9812 9813 TEL [[5]=58 9815 LET MS="JANFEBMARAPRMAYJUNJULAUGSEPOCTNOVDEC" 9817 LET Z\$="0123456789" 9820 REM LET Z1=T1M(3) 9821 9822 IF Z1/4=INT(Z1/4) THEN 9825 LET Z[2]=28 9823 9825 LET Z8=TIM(2) 9830 FOR Z2=1 TO 12 IF 28 <= 2[22] THEN 9840 9831 9832 TEL 18=28-5[55] 9835 NEXT Z2 9838 REM LET Z3=INT(Z8/10) 9840 LET N\$=" " 9841 9842 IF Z3=0 THEN 9845 LET NS=Z\$[Z3+1,Z3+1] 9843 9845 LET Z3=Z8-Z3*10+1 9846 LET N\$[2]=Z\$[23+23] LET N\$[3]=" " 9847 9848 LET N\$[4]=M\$[3*72-2+3*72] LET N%[7]=" " 9849 9850 LET Z3=INT(21/10) 9851 LET N\$[8]=Z\$[Z3+1,Z3+1] 9852 LET 23=21-23*10+1 9853 LET N\$[9]=2\$[23.23] 9855 REM 9860 LET MS="SUNMONTUEWEDTHUERISAT" LET Z3=TIM(2)+Z1+INT((Z1+1)/4) 9861 LET Z3=Z3-INT(Z3/7)*7 9862 9863 LET MS=MS[3*73+1+3*73+3] RETURN 9865 9868 REM 9870 REM **** END DATER ****

TITLE:	ALPHA ALPHANUMERIC SORT A107-36292A
DESCRIPTION:	Sorts strings of any length by converting them to numbers and sorting their values.
INSTRUCTIONS:	Each alphanumeric string is entered on a separate line. The matrix size can be adjusted if it is too large for the system or if more than 60 strings are being sorted. The first dimension is the number of strings, the second is the length in characters of the largest string.
SYSTEM SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	None
ACKNOWLEDGEMENTS:	David Brown Ridgewood Computer Club

June 1973 A107-36292A RUN ALPHA HOW MANY WORDS DO YOU WANT TO ALPHABETIZE?17 PUT EACH WORD ON A LINE. ?JONES ?SMITH **?KAYES** ?MOUNCE ?BROWN ?DITMARS ?FORD ?FEHRLE ?HAY ?HILTUNEN ?CHISHOLM ?DOUGHERTY ?HULLEY **?KALENA** ?SAXMAN ?WHITE ?HURLEY BROWN CHISHOLM DITMARS DOUGHERTY FEHRLE FORD HAY HILTUNEN HULLEY HURLEY JONES KALENA KAYES MOUNCE SAXMAN SMITH WHITE DONE ALPHA **** HP BASIC PROGRAM LIBRARY ********************* 1 REM S REM ALPHA: ALPHANUMERIC SORT З REM 4 REM 5 36292 REV A RFM 6/73 6 REM REM **** CONTRIBUTED PROGRAM ********************** 7 10 REM: DAVID BROWN PROGRAMMER 20 REM: ALPHABETIZES STRINGS BY CONVERSION TO PSEUDO EBCDIC CODE 30 REM: 40 DIM A[60,72].A\$[72].S\$[72]

30 REM: TO PSEUDO EBCDIC CODE 40 DIM A[60,72].A\$[72].S\$[72] 50 S\$="!#\$%&'()#+.-./0123456789::<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]*" 60 MAT A=ZER 70 PRINT "HOW MANY WORDS DO YOU WANT TO ALPHABETIZE": 80 INPUT L 90 PRINT "PUT EACH WORD ON A LINE." 100 FOR N=1 TO L 110 INPUT A\$ 120 FOR F=1 TO LEN(A\$) 130 FOR X=1 TO LEN(A\$) 130 FOR X=1 TO LEN(S\$) 140 IF A\$[F.F]#S\$[X,X] THEN 170

150 A[N,F]=X 160 GOTO]80

ALPHA, Page 2

ALPHA, Page 3 June 1973 A107-36292A

170 NEXT X 180 NEXT F 190 NEXT N 200 PRINT ""; 210 Z=1 220 FOR X=1 TO L 230 IF A[X + 1]=0 OR X=Z THEN 300 240 FOR M=1 TO LEN(S\$) 250 IF A[Z + M]=0 OR A[Z + M] < A[X + M] THEN 300 260 IF A[Z + M]=A[X + M] THEN 290 270 Z=X 280 GOTO 220 290 NEXT M 300 NEXT X 310 FOR P=1 TO LEN(S\$) 320 IF A[Z + P]=0 THEN 350 330 PRINT S\$[A[Z + P] + A[Z + P]]; 340 NEXT P 350 A[Z + 1]=0 360 PRINT 370 FOR Z=1 TO L 380 IF A[Z + 1]=0 THEN 400 390 GOTO 220 400 NEXT Z 410 END

TITLE:	NEWIDS CREATES NEW USER NUMBERS F108-36248A
DESCRIPTION:	These programs use 1 file, IDFILE, and generate new user numbers over a stipulated range with 6 character passwords, all printing or all non- printing. User numbers (numeric portion) can range from 100 to 999. User numbers ending in 00 (group masters) are not produced. This program package contains 4 separate programs:
	IDNOS - Generates new user numbers with passwords and places them in a file, IDFILE.
	NEWIDS - Reads IDFILE and punches a tape to be used on system con- sole for authorizing the new user numbers.
	KILIDS - Punches a tape to kill the user numbers.
	IDFORM - Prepares a form for assigning the user numbers to the users. Non-printing passwords are indicated by an ↑ at the end of the password.
INSTRUCTIONS:	Follow the instructions of each program. 1. OPEN - IDFILE,32 (max file size ever needed)
	2. GET-IDNOS and RUN
	3. GET the appropriate program and run - NEWIDS, KILIDS, or IDFORM.
SYSTEM SPECIFICATIONS:	2000F and Teletype
SPECIAL CONSIDERATIONS:	CTRL E and CTRL T may need to be removed from the non-printing character. set if: Teletype answer back responds to CTRL E. Teletype is equipped to respond to CTRL T (tape punch off) New user numbers should be authorized when system is idle or 5-10 spaces should be punched on the tape preceeding the NEW command. Don't forget about logon/logoff interruptions.
ACKNOWLEDGEMENTS:	Fred Stone Tuskegee Institute

NEWIDS, Page 2 June 1973 F108-36248A

RUN

R UN I DNOS

1 FOR PRINTING AND 2 FOR NON PRINTING PASSWORDS?2 ENTER FIRST AND LAST ID NUMBERS?100,110 ENTER ID LETTER?R

DONE

GET-NEWIDS · RUN NEWIDS

ENTER MAX TIME AND SPACE?50000,100 START PUNCH UNIT

NEW-R101,,50000,100 NEW-R102,,50000,100 NEW-R103,,50000,100 NEW-R104,,50000,100 NEW-R105,50000,100 NEW-R106,50000,100 NEW-R107,50000,100 NEW-R108,50000,100 NEW-R109,50000,100

DONE

.

GET-IDFORM RUN IDFORM

	D N	IAME	LOCAL ADDRESS
R101, KQD	WHR 1		
R102,RLI	URP T		-
R103,WLU	VBH т		-
R104,PEE	LIB †		
R105,WAF	ABA T		-
R106,EBD	VFH T		-
R107,FIK	DFZ T		-
R108, RDV	VHT T		-
R109,0PR	DIR 1		
R110,HVH	BFT t		-

IDNOS 1 REM **** HP BASIC PROGRAM LIBRARY ****************** 2 REM NEWIDS: CREATES NEW USER NUMBERS 3 REM 4 REM IUNOS+ PART 1 OF 4 5 REM REM 36248 REV A 6/73 6 7 REM REM **** CONTRIBUTED PROGRAM ************************ 8 10 FILES IDFILE 20 DIM A\$[6]+B\$[72]+C\$[26] CS="ABCDEFGHIJKLMNOPQRSTUVWXYZ" 30 PRINT "1 FOR PRINTING AND 2 FOR NON PRINTING PASSWORDS": 40 INPUT C1 50 GOTO C1 OF 130,90 60 70 PRINT "YOU MUST ENTER 1 OR 2" GOTO 40 80 90 RESTORE 470 100 READ 8% 110 D2=18 120 GOTO 180 130 PRINT "HOW MANY CHARACTERS ARE TO BE USED": 140 RESTORE 450 150 READ 8\$ INPUT D2 160 170 IF D2<1 OR D2>58 THEN 410 180 D=1000/D2-1 190 PRINT "ENTER FIRST AND LAST ID NUMBERS"; 200 INPUT F1+F2 210 IF F1<100 OR F2<100 OR F2<F1 THEN 430 220 PRINT "ENTER ID LETTER"; 230 INPUT LS 240 FOR I=1 TO 26 250 1F L\$=C\$[I,I] THEN 290 NEXT I 260 PRINT LS;" IS NOT VALID" 270 280 GOTO 220 290 FOR I=F1 TO F2 300 I1=INT(I/100) 310 I1=I1*100 320 IF I=I1 THEN 390 330 FOR N1=1 TO 6 340 L1=INT(RND(I)*1000/D) 350 IF L1<1 OR L1>D2 THEN 340 360 A\$[N1,N1]=8\$[L1,L1] 370 NEXT N1 380 PRINT #1:L\$,I,A\$, END NEXT I 390 400 STOP 410 PRINT "LIMIT CHARACTERS TO 58" 420 GOTO 130 PRINT "F1 MUST BE > F2 AND NEITHER < 100" 430

LISTING

DONE

GET-KILIDS RUN KILIDS

KIL-R101 KIL-R102 KIL-R103 KIL-R104 KIL-R105 KIL-R106 KIL-R107 KIL-R108 KIL-R109 KIL-R110

START PUNCH UNIT

NEWIDS, Page 3 June 1973 F108-36248A June 1973 F108-36248A 440 GOTO 190 450 DATA "ABCDEFGHIJKLMNOPQRSTUVWXYZ123456789!#\$%&*()*:=-@[\+;*]<>?/" 460 REM NEXT STAT ABDEFHIKLPQRTUVWYZ FOR CONTROL CHARACTERS 470 DATA "" 480 END

NEWIDS

NEWIDS, Page 4

REM **** HP BASIC PROGRAM LIBRARY ******************* 1 REM 2 3 REM NEWIDS: CREATES NEW USER NUMBERS 4 REM NEWIDS, PART 2 OF 4 5 REM REM 6 36248 REV A 6/73 7 REM 8 REM **** CONTRIBUTED PROGRAM ******************************* 10 FILES IDFILE 20 DIM A\$[11] 30 PRINT "ENTER MAX TIME AND SPACE"; INPUT T.S PRINT "START PUNCH UNIT" 40 50 60 PRINT " .. IF END #1 THEN 120 70 80 READ #1:L\$+I+A\$ 90 PRINT USING 100;L\$+I+A\$+T+S 100 IMAGE "NEW-".A. 3D.".".6A.".".5D.".".3D 110 GOTO 80 150 PRINT " •• 130 END

IDFORM

**** HP BASIC PROGRAM LIBRARY ******************************* 1 REM REM 2 NEWIDS: CREATES NEW USER NUMBERS 3 REM REM IDFORM. PART 3 OF 4 4 5 REM REM 36248 REV A 6/73 ь 7 REM REM 8 10 FILES IDFILE 20 DIM C\$[72],P\$[72] REM NEXT LINE CONTAINS 12 CTRL N 30 40 PRINT "" 50 READ P\$ 60 READ C\$ 70 DIM A\$[6] 80 IF END #1 THEN 320 90 L=0 100 PRINT "ID PS₩D NAME"; TAB (50) ; "LOCAL ADDRESS" 110 GOSUB 340 120 READ #1:LS,I,AS IF A\$[1,1]>" " THEN 230 130 140 FOR K2=1 TO 6 150 FOR K1=1 TO LEN(C\$) IF A\$[K2,K2]#C\$[K1,K1] THEN 180 160 170 A\$[K2,K2]=P\$[K1,K1] 180 NEXT K1 190 NEXT K2 500 PRINT USING 210;L\$,I,A\$ IMAGE A, 3D, ", ", 6A." +" 210 220 GOTO 250 230 PRINT USING 240;L\$,I,A\$ 240 IMAGE A, 3D, ", ", 6A 250 GOSUB 340 260 L=L+1 270 IF L#25 THEN 120 REM NEXT LINE CONTAINS 12 CTRL N 280 PRINT "" 290 300 GOTO 90 REM NEXT LINE CONTAINS 12 CTRL N 310 320 PRINT "" 330 STOP 340 FOR I1=1 TO 69

350 PRINT "-": 360 IF II=13 OR I1=48 THEN 360 370 GOTO 390 380 PRINT "I"; 390 NEXT II 400 PRINT "-" 410 RETURN 420 REM DATA FUR CONTROL CONVERSION IS NEXT 430 DATA "ABDEFHIKLPORTUVWYZ" 440 REM CTRL CHARACTERS OF ABOVE LINE ARE NEXT 450 DATA "" 460 END

KILIDS

REM **** HP BASIC PROGRAM LIBRARY *************************** 1 REM 5 REM NEWIDS: CREATES NEW USER NUMBERS ٤ KILIDS, PART 4 OF 4 4 REM 5 REM 36248 REV A 6/73 6 REM 7 REM 8 REM **** CONTRIBUTED PROGRAM *********************** 10 FILES IDFILE 20 DIM A\$[6] 30 PRINT "START PUNCH UNIT" 40 PRINT " 50 IF END #1 THEN 100 11 60 READ #1;L\$,I,A\$ 70 PRINT USING 80;L\$,I 80 IMAGE "KIL-",A,3D 90 GOTO 60 100 PRINT " 110 END ...

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TITLE:	J ONE PAGE JULIAN CALENDAR F108-362	JULI 279A
DESCRIPTION:	This program generates a Julian Calendar for any year. The calendar is useful to keep near a Time Share Computer to obtain the current Julian day.	
INSTRUCTIONS:	Run the program and enter complete year (such as 1973) where requested.	
SYSTEM SPECIFICATIONS:	2000F and Teletype	
SPECIAL CONSIDERATIONS:	None	
ACKNOWLEDGEMENTS:	Paul Wittman HP, Midwest Sales Region	

JULI, Page 2 June 1973 F108-36279A

RUN

RUN JULI

THIS PROGRAM WILL GENERATE A CALENDAR OF DATES VERSUS THE DAY OF THE YEAR WHAT YEAR DO YOU WANT?1973

CALENDAR FOR YEAR 1973

DAY	JAN	F EB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1	- 1	32	60	91*	121	1 52	182*	213	244	274	305	335
2	2	33	61	92	122	153	183	214	245*	275	306	336*
3	3	34	62	93	123	154*	184	215	2 46	276	307	337
4	4	35*	63*	94	124	155	185	216	247	277	308*	338
5	5	36	64	95	125	156	186	217*	248	278	309	339
6	6	37	65	96	126*	157	187	218	2 49	279	310	3 40
7	7*	38	66	97	127	158	188	219	250	280*	311	3 4 1
8	8	39	67	98*	128	159	189*	220	251	281	312	3 42
9	9	40	68	99	129	160	190	221	252*	282	313	3 43 *
10	10	41	69	100	130	161*	191	222	253	283	314	344
11	11	42 *	70*	101	131	162	192	223	254	284	315*	345
12	12	43	71	102	132	163	193	224*	255	285	316	346
13	13	44	72	103	133*	164	194	225	256	286	317	3 4 7
14	14*	45	73	104	134	165	195	226	257	287*	318	3 48
15	15	46	74	105*	135	166	196*	227	258	288	319	3 49
16	16	47	75	106	136	167	197	228	259*	289	320	350*
17	17	48	76	107	137	168*	198	229	260	290	321	351
18	18	49 *	77*	108	138	169	199	230	261	291	322*	3 52
19	19	50	78	109	139	170	200	231*	262	292	323	353
20	20	51	79	110	140*	171	201	232	263	293	324	354
21	21*	52	80	111	141	172	202	233	264	294*	32 5	355
22	22	53	81	112*	1 42	173	203*	234	265	295	326	356
23	23	54	82	113	1 43	174	204	235	266*	296	327	357*
24	24	55	83	114	144	175*	205	236	267	297	328	3 58
25	25	56*	84*	115	145	176	206	237	268	298	329*	3 59
26	26	57	85	116	1 46	177	207	238*	269	299	330	360
27	27	58	86	117	147*	178	208	239	270	300	331	361
28	28*	59	87	118	1 48	179	209	2 40	271	301*	332	362
29	29		88	119*	1 49	180	210*	2 41	272	302	333	363
30	30		89	120	150	181	211	2 42	273*	303	334	364*
31	31		90		151		212	2 43		304		365

SUNDAYS ARE SHOWN WITH AN *

DONE

LISTING

JUL I

REM **** HP BASIC PROGRAM LIBRARY ********************** 1 2 REM JULI: ONE PAGE JULIAN CALENDAR 3 REM 4 REM 5 REM 36279 REV A 6/73 6 REM 9 REM FOR USE WITH TIME SHARE SYSTEMS 10 REM WRITTEN BY PAUL WITTMAN ON 12/29/72 (364/72) 11 REM DIM Z(3) 12 PRINT "THIS PROGRAM WILL GENERATE A CALENDAR OF DATES VERSUS" 20 PRINT "THE DAY OF THE YEAR" 30 PRINT "WHAT YEAR DO YOU WANT"; 40 INPUT Y 45 GOSUB 3000 50 DIM M[13],C\$[10],D[13,31]

60 DATA 31,31,28,31.30.31,30,31,31,30,31,30,31 70 FOR C=1 TO 13 80 READ MIC] 90 NEXT C 91 FOR C=1 TO 31 92 D[1.C]=C 93 NEXT C 95 T=Y/100 97 FOR T1=1 TO 2 100 IF INT(100*T+.01)=INT(100*(INT(T)+.001)) THEN 110 102 T=Y/4 104 NEXT T1 106 GOTO 115 IF T1=1 THEN 115 110 111 M[3]=29 115 D1=0 120 FOR C=2 TO 13 130 FOR G=1 TO M[C] 140 D[C,G]=D1+G 150 NFXT G 160 FOR G=M[C]+1 TO 31 $170 D[C \cdot G] = 0$ 190 NEXT G 200 D1=D1+M[C] 210 NEXT C 220 C\$="1234567890" 230 DIM P\$[64] 240 GOSUB 1000 250 PRINT 260 PRINT 270 PRINT 280 PRINT 290 PRINT TAB(18)"CALENDAR FOR YEAR"Y 300 PRINT 310 PRINT DIM H\$[39] 311 312 DATA "DAYJANFEBMARAPRMAYJUNJULAUGSEPOCTNOVDEC" 313 READ HS 320 330 FOR H=1 TO 13 S=H*5-4 332 T=H*3-2 335 P\$[\$,\$+2]=H\$[T,T+2] 340 NEXT H 350 PRINT P\$ 360 PRINT 370 FOR C=1 TO 31 400 N=D[1,C] 410 GOSUB 2000 420 GOSUB 1000 440 IF Z[2]#0 THEN 455 450 P\$[1+1]=" " 451 GOTO 470 455 P\$[1,1]=C\$[Z[2],Z[2]] 470 IF Z[3]#0 THEN 490 480 P\$[2,2]="0" 485 GOTO 495 490 P\$[2,2]=C\$[2[3],2[3]] 495 FOR W=1 TO 12 500 N=D[W+1,C] 520 Wl=W*5+1 522 IF N=0 THEN 670 530 GOSUB 2000 540 IF Z[1]#0 THEN 560 P\$[W1,W1]=" " 550 555 GOTO 570 560 P\$[W1,W1]=C\$[Z[1],Z[1]] 570 IF Z[2]#0 OR Z[1]#0 THEN 590 580 P\$[W1+1,W1+1]=" " 585 GOTO 630 590 IF Z[2]#0 THEN 620 600 P\$[W1+1,W1+1]="0" 610 GOTO 630 620 P\$[w1+1,w1+1]=C\$[Z[2],Z[2]] 630 IF Z[3]#0 THEN 660 640 P\$[W1+2,W1+2]="0" 650 GOTO 662 P\$[W1+2,W1+2]=C\$[Z[3],Z[3]] 660 662 N=D[W+1,C]



JULI, Page 4 June 1973 F108-36279A 664 IF INT((N-D9)/7)#(N-D9)/7 THEN 670 666 P\$[W1+3,W1+3]="*" 670 NEXT W 675 PRINT P\$ 680 NEXT C 900 PRINT 910 PRINT 920 PRINT TAB(20)"SUNDAYS ARE SHOWN WITH AN *" 999 STOP 1000 FOR B=1 TO 64 1010 P\$[8,8]=" " 1020 NEXT B 1030 RETURN 2000 REM THIS SUB BRINGS BACK 3 NOS. = TO THE 3 DIGITS OF NUMBER 2010 REM ENTER WITH NUMBER N. LEAVE WITH NUMBERS 2(I) 2020 FOR Z1=3 TO 1 STEP -1 2030 N=N/10 2040 Z[Z1]=INT(10*(N-INT(N))+.001) 2050 NEXT Z1 2060 RETURN 3000 Y1=Y-1 3005 D9=37+INT(Y1/4)+Y1+INT(Y1/400)-INT(Y1/100) 3010 Q=7000 3020 IF D9-Q <= 0 THEN 3050 3030 D9=D9-Q 3040 GOTO 3020 3050 IF Q=7 THEN 3080 3060 Q=Q/10 3070 GOTO 3020 3080 D9=D9+1 3090 IF D9<8 THEN 3200 3100 D9=D9+7 3110 GOTO 3090 3200 D9=10-D9 3202 IF D9<8 THEN 3210 3204 D9=D9-7 3210 RETURN 9999 END

	CALNDR
TITLE:	PRINTS A CALENDAR F108-36288A
DESCRIPTION:	This program enables a user to print a calendar for any month or all months for any year.
INSTRUCTIONS:	No special instructions are needed. The user may answer "Y" or "N" for "Yes/No" questions. A response of
	"END" to a "Yes" or "No" takes the user to the previous question. A response of "END" to a "Yes" or "No" takes the user to the previous question. A response of "AID" explains any input that is required. A response of "STOP" automatically ends execution of the program.
SYSTEM SPECIFICATIONS:	2000F and Teletype
SPECIAL CONSIDERATIONS:	None
ACKNOWLEDGEMENTS:	Steve Mudrick Leasco Response Inc.

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CALNDR, Page 2 June 1973 F108-36288A

RUN

R UN C AL NDR

CALENDAR FOR WHAT YEAR?AID ENTER A YEAR AFTER 1581 AND BEFORE 8388608.

CALENDAR FOR WHAT YEAR?1973

ANY PARTICULAR MONTH (Y OR N)?N

CALENDAR FOR THE YEAR 1973

.

		JAI	AUA	۲Y					FE	BRU	ARY		MARCH							
s	м	Т	W	Т	F	s	s	м	Т	W	т	F	s	S	M	Т	W	Т	F	s
	1	2	3	4	5	6					1	2	3					1	2	3
7	8	9	10	11	12	13	4	5	6	7	8	9	10	4	5	6	7	8	9	10
14	15	16	17	18	19	20	11	12	13	14	15	16	17	11	12	13	14	15	16	17
21	22	23	24	25	26	27	18	19	20	21	22	23	24	18	19	20	21	22	23	24
28	29	30	31				25	26	27	28				25	26	27	28	29	30	31

		A	PRIL	-						MAY	ł			JUNE						
s	м	Т	W	Т	F	s	S	м	Т	W	Т	F	s	s	м	т	W	Т	F	s
1	2	3	4	5	6	7			1	2	3	4	5						1	2
8	9	10	11	12	13	14	6	7	8	9	10	11	12	3	4	5	6	7	8	9
15	16	17	18	19	20	21	13	14	15	16	17	18	19	10	11	12	13	14	15	16
22	23	24	25	26	27	28	20	21	22	23	24	25	26	17	18	19	20	21	22	23
29	3Ø						27	28	29	3Ø	31			24	25	26	27	28	29	30

		JL	JΓλ						AL	JGUS	SΤ			SEPTEMBER							
S	м	Т	Ŵ	T	F	s	s	м	Т	W	Т	F	s	s	м	Т	W	Т	F	s	
1	2	3	4	5	6	7				1	2	3	4							1	
8	9	10	11	12	13	14	5	6	7	8	9	10	11	2	3	4	5	6	7	8	
15	16	17	18	19	20	21	12	13	14	15	16	17	18	9	10	11	12	13	14	15	
22	23	24	25	26	27	28	19	20	21	22	23	24	25	16	17	18	19	20	21	22	
29	3Ø	31					26	27	28	29	3Ø	31		23	24	25	26	27	28	29	
														30							

		0C'	гові	ER					NO	VEME	BER			DECEMBER								
S	м	T	W	T	F	S	s	м	Т	W	Т	F	s	s	м	Т	W	T	F	s		
	1	2	3	4	5	6					1	2	3							1		
7	8	9	10	11	12	13	4	5	6	7	8	9	10	2	3	4	5	6	7	8		
14	15	16	17	18	19	20	11	12	13	14	15	16	17	9	10	11	12	13	14	15		
21	22	23	24	25	26	27	18	19	20	21	22	23	24	16	17	18	19	20	21	22		
28	29	30	31				25	26	27	28	29	30		23	24	25	26	27	28	29		
														30	31							

MORE (Y OR N) ?Y

CALENDAR FOR WHAT YEAR?2000 ANY PARTICULAR MONTH (Y OR N)?Y WHAT MONTH?2

FEBRUARY			2000			
s	м	Т	W	Т	F	s
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29				

MORE (Y OR N)?N

DONE

LISTING

CALNDR

1 REM		HP BASIC	PROGRAM	LIBRARY	*********
2 REI					
3 REI		CALNDR:	PRINTS	A CALEND	AR
4 RE!					
5 REI		36288 REV	/ A 6/	/73	
6 REI					
7 RE!					**********************************
1000		CALENDAR (_
1010		WRITTEN B			
1020					[12],E[42,12],J\$[72],M\$[72],C\$[72]
1030					[72],T\$[72],S\$[72],0\$[72],N\$[72]
1040	•				\$(72),D\$[72]
1050		ETS OUTPU	I SINING	TO SPACE	5
1060		1,72]=" "			
1070		1,72]=" "			
1080 1090	LET KO=	51=0 "012345670			
1100					
1110	FOR I=1	EADS LAST	DATOF	IONTH	
1120	READ BE				
1120	NEXT I	11			
1130	· - · -	20 21 20	21 20 2		1 20 21
_		,28,31,30	• 31 • 30 • 3	1,31,30,3	1,30,31
1150	PRINT				
1160	_	"SMT		- 5"	
1170		NPUT DATA			
1180		CALENDAR	OR WHAT	YEAR";	
1190	INPUT J				
1200 1210	LET IS=		(070		
1210		END" THEN			
1220	• • •	STOP" THE AID" THEN			
1230	1F J5≡ LFT Y=0		1830		
1240		TO LEN(J	f 1		
1250	FOR J=1		DI		
1270		•I]=H\$[J•		1 2 0 0	
1270	NEXT J	11-nal)+		1300	
1290	GOTO 13	50			
1300	LET Y=Y				•
1310	NEXT I	10+0-1			
1320	GOSUB 3	900			
1320		7(Y) OR Y		1350	
1220	TL LATIN	I NO VA I		1000	

CALNDR, Page 4 June 1973 F108-36288A GOTO 1370 1340 1350 PRINI " ENTRY IGNORED. INVALID YEAR." GOTO 1180 1360 1370 IF Y<1582 THEN 1830 IF Y>2+23-1 THEN 1830 1380 PRINT "ANY PARTICULAR MONTH (Y OR N)"; 1390 INPUT 8\$ 1400 1410 IF RS="END" THEN 1180 IF BS="STOP" THEN 4030 1420 1430 IF H\$[1.1]="Y" THEN 1470 1440 IF R\$[1,1]="N" THEN 1660 1450 PRINT " ANSWER IY! OR IYES! IN! OR INO!" 1460 GOTO 1390 1470 PRINT "WHAT MONTH": 1480 INPUT C% 1490 1F C%="STOP" THEN 4030 1500 IF C%="END" THEN 1390 1510 IF C%#"AID" THEN 1540 1520 PRINT " ENTER 11' FOR JANUARY, 12' FOR FEBRUARY, ETC." 1530 GOTO 1470 1540 LET 91=0 1550 FOR I=1 TO LEN(C%) 1560 FOR J=1 TO 10 1570 IF C\$[I,I]=H\$[J,J] THEN 1600 1580 NEXT J 1590 GOTO 1640 1600 LET 81=81*10+J-1 1610 NEXT I IF B1 <= 0 OR B1>12 OR B1#INT(B)) THEN 1640 1620 1630 GOTO 1660 1640 PRINT " ENTRY IGNORED, INVALID MONTH." GOTO 1470 1650 1660 IF B\$[1+1]="N" THEN 1810 1670 PRINT "" 1680 GOSUB 3510 1690 REM * SPACE COUNTER 1700 LET X3=0 1710 FOR S3=1 TO 5 1720 IF C\$[\$3,\$3]=" " THEN 1740 1730 GOTO 1760 1740 LET X3=X3+1 1750 NEXT S3 1760 PRINT TAB(19-X3);C\$;TAB(38-LEN(I\$)):I\$ 1770 PRINT 1780 PRINT TAB(18):G\$ 1790 GOTO 2120 1800 REM * PAGE SEPERATOR 1810 GOSUB 4040 IF Y >= 1582 THEN 1860 1820 PRINT " ENTER A YEAR AFTER 1581 AND BEFORE 8388608." 1830 1840 GOTO 1180 1850 REM * HEADINGS 1860 PRINT 1870 PRINT TAB(23);"CALENDAR FOR THE YEAR ";I\$ 1880 PRINT 1890 LET I=1 1900 PRINT 1910 PRINT 1920 PRINT REM # TAB VALUES 1930 1940 LET 8=5 1950 LET C=31 1960 LET D=55 1970 REM * KO= NO OF GROUPS OF 3 MONTHS PRINTED 1980 LET K0=K0+1 1990 GOTO KO OF 2010+2030+2050+2070 2000 REM * PRINTS MONTH HEADINGS 2010 PRINT TAB(B); J\$: TAB(C): F\$: TAB(D); M\$ 2020 GOTO 2080 2030 PRINT TAB(8);P\$:TAB(C);E\$;TAB(D);U\$ GOTO 2080 2040 2050 PRINT TAB(B);L\$;TAB(C);T\$;TAB(D);S\$ 2060 GOTO 2080 PRINT TAB(B):05:TAB(C):NS:TAB(D):D5 2070 2080 PRINT 2090 PRINT G\$; TAB(25); G\$; TAB(50); G\$ GOTO I OF 2120,2870,2880,2880 2100 2110 REM * CHECKS FOR LEAP YEARS

2120 LET H=7 2130 LET L=0 2140 LET L=INT((Y-1201)/400)-INT((Y-1501)/100)+INT((Y-1581)/4) 2150 LET I1=Y-INT(Y/100)*100 2160 JF J1 <> 0 THEN 2190 IF I1-INT(I1/4)*4=0 THEN 2210 2170 2180 GOTO 2290 2190 IF Y-INT(Y/4)*4=0 THEN 2210 2200 GOTO 2290 2210 FOR X=1600 TO Y STEP 400 2220 IF Y=X THEN 2260 2230 NEXT X 2240 GOSUB 3780 2250 IF S1=1 THEN 2290 2260 LET R=366 2510 FEL 8[5]=58 2280 GOTO 2300 2290 LET R=365 2300 LET M=365*(Y-1583)+L 2310 LET N=M-INT(M/7)*7 2320 REM * ROUTINE TO DETERMINE PROPER DATES 2330 LET H=H+N 2340 IF H <= 7 THEN 2360 2350 LET H=H-7 2360 GOTO 2370 2370 FOR S=1 TO 12 2380 FOR T=1 TO H-1 2390 LET E[T,S]=0 2400 NEXT T 2410 FOR T=H TO B[S]+H-1 2420 LET E[T+S]=T-H+1 2430 NEXT T 2440 FOR T=B[S]+H TO 42 2450 LET E[T+S]=0 2460 NEXT T 2470 LET H=H+B[S]-INT(B[S]/7)*7 2480 IF H <= 7 THEN 2500 2490 LET H=H-7 2500 NEXT S 2510 LET Q=0 2520 LET W=0 2530 FOR V=1 TO 12 2540 FOR U=1 TO 42 2550 LET W=W+1 2560 LET A[w]=E[U,V] 2570 NEXT U 2580 NEXT V 2590 IF B\$[1,1]="N" THEN 2880 2600 FOR X=0 TO 5 2610 LET I=-2 2620 LET J=0 2630 FOR V=1 TO 7 2640 LET I=I+3 2650 LET J=J+3 2660 LET A=A[V+7*X+42*81-42] 2670 LET A1=INT(A/10) 2680 LET 8=A-A1*10 2690 IF A=0 THEN 2740 2700 LET C\$[1,1]=H\$[A]+1,A]+1] 2710 LET C\$[2+2]=H\$[B+1+B+1] IF A<10 THEN 2770 2720 2730 GOTO 2750 2740 LET CS=" .. 2750 LET A\$[I,J]=C\$ 2760 GOTO 2800 LET A\$[I,1]=" " 2770 LET C\$[1,1]=" " 2780 2790 LET A\${[,J]=C\$ 2800 NEXT V 2810 PRINT TAB(18):A\$ 2820 NEXT X 2830 PRINT 2840 PRINT 2850 GOTO 3390 2860 REM 2870 REM 2880 FOR X=0 TO 5 2890 LET R=-2

CALNDR, Page 6 June 1973 F108-36288A 2900 LET S=0 2910 FOR U=0 TO 2 2920 FOR V=1+7*X TO 7+7*X 2930 LET R=R+3 2940 LET S=S+3 2950 REM * TO RIGHT JUSTIFY OUTPUT DATE 2960 LET 4=A[V+42*U] IF A=0 THEN 3050 2970 2980 LET A1=INT(A/10) 2990 LET B=A-A1*10 3000 LET C\$[1+]]=H\$[A]+]+A]+]] 3010 LET C\$[2,2]=H\$[8+1,8+1] IF CS="0" THEN 3050 0506 3030 IF A<10 THEN 3080 3040 GOTO 3060 3050 LET C%=" ... 3060 LET 2\$[R,S]=C\$ 3070 GOTO 3110 LET Z5[R,R]=" " 3080 LET C\$[1+1]=" " 3090 3100 LET 2%[R+S]=C% 3110 NEXT V 3120 NEXT U 3130 REM * TO PLACE INTO STRING FOR OUTPUT FOR G=1 TO 21 3140 LET Y\$[G+G]=Z\$[G+G] 3150 NEXT G 3160 FOR G=1 TO 4 3170 3180 TE1 A#[5]+C+5]+C]=. .. NEXT G 3190 FOR G=22 TO 42 3200 3210 LET Y5[G+4.G+4]=Z5[G.G] 3220 NFXT G 3230 FOR G=1 TO 4 LET Y\$[46+6+46+6]=" " 3240 3250 NEXT G FOR 6=43 TO 63 3260 LET Y\$[6+8+6+8]=2\$[6+6] 3270 3280 NEXT G 3290 PRINT YS 3300 NEXT X PRINT 3310 FOR X=1 TO 378 3320 3330 LET A[X]=A[X+126] 3340 NEXT X 3350 LET Q=Q+1 IF Q=4 THEN 3390 3360 LET I=(+) 3370 3380 GOTO 1910 3.390 PRINT "" PRINT "MORE (Y OR N)": 3400 3410 INPUT CS RESTORE 3420 IF C%[1+1]="Y" THEN 1060 3430 IF C%[1+1]="N" THEN 4030 3440 IF C%="END" THEN 4030 3450 IF CS="STOP" THEN 4030 3460 PRINT " ANSWER IY! OR IYES! IN! OR INO!" 3470 3480 GOTO 3400 3490 GOTO 3400 REM * TO DETERMINE WHAT MONTH 3500 3510 GOTO R1 OF 3530+3550+3570+3590+3610+3630+3650+3670+3690+3710+3730+3750 3520 RETURN 3530 LET CS=J% 3540 RETURN 3550 LET CS=FS 3560 RETURN LET CS=MS 3570 3580 RETURN 3590 LET CS=PS 3600 RETURN 3610 LET CS=ES RETURN 3620 3630 LET C\$=U\$ RETURN 3640 LET CS=LS 3650 RETURN 3660

3670

LET C%=1%

CALNDR, Page 7 June 1973 F108-36288A

3680 RETURN 3690 LET C\$=S\$ 3700 RETURN 3710 LET CS=0% 3720 RETURN LET CS=NS 3730 3740 RETURN 3750 LET C%=D% 3760 RETURN REM * DETERMINES IF CENTURY YEAR 3770 3780 LET 2%=1% LET K=LEN(Z\$) 3790 IF Z%[K-1.K-1]="0" THEN 3830 LET S1=0 3800 3810 3820 RETURN 3830 IF Z\$[K+K]="0" THEN 3860 3840 LET S1=0 3850 RETURN 3860 LET S1=1 3870 RETURN 3880 END 3890 PRINT 3900 LET JS=" JANUARY " 3910 LET FS="FEBRUARY " 3920 LET MS=" MARCH " 3930 LET PS=" APRIL " 3940 LET PS=" MAY " 3950 LET US=" JUNE " 3960 LET LS=" JULY " 3970 LET TS=" AUGUST " 3980 LET SS="SEPTEMBER" 3990 LET 0\$=" OCTOBER " 4000 LET NS="NOVEMBER " 4010 LET DS="DECEMBER " 4020 RETURN STOP 4030 PRINT "" 4040 4050 RETURN 4060 END

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.

TITLE:	A REPORT ON FILE CONTENTS AND STRUCTURE F110-36247A
DESCRIPTION:	This program prints a description of each record in a file which includes the amount of numbers and the amount of strings in the record, presence of an end-of-file mark, and the number of words of data in each record and in the entire file.
	The program provides a useful check on the contents of a file without the necessity of listing the entire file.
INSTRUCTIONS:	User must input the name of his file as the program requests it.
SYSTEM SPECIFICATIONS:	2000F and Teletype
SPECIAL CONSIDERATIONS:	This program may be adapted to a 2000A, 2000B, or 2000E system by deleting lines 1050-1110 and declaring the file in line 1010.
ACKNOWLEDGEMENTS:	

FILRPT, Page 2 June 1973 F110-36247A RUN RUN FILRPT FILENAME? GENPUR RECORD 1: 3 STRINGS, 17 WORDS. RECORD 2: 2 NUMBERS, 4 STRINGS, 39 WORDS. RECORD 3: 1 STRING, 8 WORDS. RECORD 4: Ø WORDS. RECORD 5: Ø WORDS. RECORD 6: Ø WORDS. RECORD 7: Ø WORDS. RECORD 8: Ø WORDS. RECORD 9: Ø WORDS. RECORD 10: 0 WORDS. TOTAL FILE LENGTH = 10 RECORDS, 64 WORDS. AVERAGE OF 6 WORDS PER RECORD. DONE RUN FILRPT FILENAME? NAMES RECORD 1: 3 STRINGS, 59 WORDS. RECORD 2: Ø WORDS. TOTAL FILE LENGTH = 2 RECORDS, 59 WORDS. AVERAGE OF 30 WORDS PER RECORD. DONE RUN FILRPT FILENAME? IREP RECORD 1: 16 NUMBERS, 32 WORDS. RECORD 2: 0 WORDS. RECORD 3: 3 STRINGS, 10 WORDS. RECORD 4: Ø WORDS. RECORD 5: Ø WORDS. RECORD 6: Ø WORDS. RECORD 7: 1 NUMBER, 2 WORDS. RECORD 8: 1 NUMBER, 2 WORDS. RECORD 9: 1 NUMBER, 2 WORDS. RECORD 10: 0 WORDS. RECORD 11: Ø WORDS. RECORD 12: Ø WORDS. RECORD 13: Ø WORDS. RECORD 14: Ø WORDS. RECORD 15: Ø WORDS. RECORD 16: Ø WORDS. RECORD 17: Ø WORDS. RECORD 18: Ø WORDS. RECORD 19: Ø WORDS. RECORD 20: 0 WORDS. TOTAL FILE LENGTH = 20 RECORDS, 48 WORDS. AVERAGE OF 2 WORDS PER RECORD.

DONE

RUN FILRPT

FILENAME? \$CHARS

RECORD 1: 2 STRINGS, EOF, 66 WORDS. TOTAL FILE LENGTH = 1 RECORD, 66 WORDS.

LISTING

FILRPT

FILRP	
1 REM	4 **** HP BASIC PROGRAM LIBRARY ****************************
2 REM	
3 REM	
4 REM	
5 REM	
6 REN	
7 REP	
1010	FILES *
1020	DIM A\$[72],D\$[10],F\$[7],T\$[72],Z\$[6],M[7]
1030	D\$="0123456789"
1040 1050	L9=0 PRINT "FILENAME? ";
1050	ENTER 255, T,F\$
1070	IF T=-256 THEN 1110
1080	PRINT "";
1090	ASSIGN F\$,1,T1
	IF T1<3 THEN 1120
1110	STOP
1120	IF END #1 THEN 1600
1130	PRINT ""
1140	FOR I=1 TO 32767
1150	F1=F2=F3=F9=0
1160	READ #1.I
1170	GOTO TYP(-1) OF 1180,1220,1260,1270
1180	READ #1#A
1190	F1=F1+1
1200	F9=F9+2
1210	GOTO 1170
1220	READ #1;AS
1230	F2=F2+1
1240	F9=F9+INT((LEN(A\$)+1)/2)+1
1250 1260	GOTO 1170 F3=1
1270	r 3-1 L9=L9+F9
1280	TS="RECORD "
1290	Z=I
1300	GOSUB 1810
1310	T\${8]=Z\$
1320	T\${LEN(T\$)+1]=": "
1330	IF F1=0 THEN 1410
1340	Z=F1
1350	GOSUB 1810
1360	T\${LEN(T\$)+1]=Z\$
1370	T\$[LEN(T\$)+1]=" NUMBER"
1380	IF F1=1 THEN 1400
	T\$[LEN(T\$)+]]="S"
	T\$[LEN(T\$)+1]=", "
1410	IF F2=0 THEN 1490
1420	
1430	GOSUB 1810
1440	T\${LEN(T\$)+1}=Z\$
1450	T\$[LEN(T\$)+1]=" STRING"
1460	IF F2=1 THEN 1480
1470	T\$[LEN(T\$)+1]="S"
1480	TS[LEN(T\$)+1]=", "
1490	IF F1+F2=0 OR F3=0 THEN 1510

```
FILRPT, Page 4
June 1973
F110-36247A
1500 T%[LEN(T$)+1]="EOF+ "
1510 Z=F9
1520
     GOSUB 1810
1530
     T$[LEN(T5)+1]=25
     T$[LEN(T$)+1]=" WORD"
1540
1550 IF F9=1 THEN 1570
1560
     T$[LEN(T$)+]]="S"
1570 T$[LEN(T$)+1]="."
1580 PRINT TS
1590
     NEXT I
1600
     Z=I-1
1610 GOSUB 1810
1620 TS="TOTAL FILE LENGTH = "
     1$[2]]=2$
1630
1640 T$[LEN(T$)+1]=" RECORD"
1650 IF I-1=1 THEN 1670
1660
      T$[LEN(T$)+1]="S"
     T$[LEN(T$)+1]="""
1670
1680
     2=L9
1690
     GOSUB 1810
1700 T$[LEN(T$)+1]=Z$
1710 T$[LEN(T$)+1]=" WORDS."
1720
     PRINT LIN(1);T$
1730
     IF I-1=1 THEN 1800
1740
     TS="AVERAGE OF "
1750
     Z=INT(L9/(I-1)+.5)
1760
     GOSUB 1810
1770
     T$[12]=2$
1780 T$[LEN(T$)+1]=" WORDS PER RECORD."
1790
     PRINT T$
1800
     STOP
1810 FOR K1=1 TO 7
1820 IF Z<10*K1 THEN 1840
1830
     NEXT K1
1840 FOR K2=K1 TO 1 STEP -1
1850
     M[K2] = INF(Z/10 + (K2-1))
     FOR K3=K2 TO K1-1
1860
      M[K2]=M[K2]-M[K3+1]*10+(K3+1-K2)
1870
1880
      NEXT K3
1890
      Z$[K1+1-K2]=D$[M[K2]+1+M[K2]+1]
1900
      NEXT K2
1910
      RETURN
1920 END
```

	DUMP FILE TO DATA STATEMENTS	DATA F212-36287A
DESCRIPTION:	This program dumps the contents of a file into BASIC "DATA" s It inputs a starting and step value for the statement numbers program "READ" is included as a sample program to illustrate file ("TEST") with data.	. The
INSTRUCTIONS:	The file "CHARS" (HP 36220) must be in the system library, co least the first 58 ASCII characters in order in one string. file may be filled using "READ", "FILOAD" (HP 36010) or a sim The DATA program prompts the user to enter the file name, and ing statement number (SS) and interval (I). The paper tape p turned on, and the paper tape is generated. The tape dump sh leader and no "X OFF" characters on the tape.	The user's milar format. I the start- bunch is then
SYSTEM SPECIFICATIONS:	2000F and Teletype	
SPECIAL CONSIDERATIONS:	The file CHARS can be filled by ASSIGN statement masks.	
ACKNOWLEDGEMENTS:	Bruce A. Robinson The Evergreen State College	

DATA, Page 2 June 1973 F212-36287A READ 10 FILES TEST 20 DIM A\$[72] 30 GOTO TYP10) OF 40,70,150 40 READ A 50 PRINT #11A 60 GOTO 30 70 READ A\$ 80 PRINT #11A\$ 90 GOTO 30 100 DATA 123,124,3H3+0.59,-293.45,-3.8E-12,"NOW IS THE " 110 DATA 0,00 MEN TO COME TO THE AID OF THEIR PARTY" 120 DATA 0,00 MEN TO COME TO THE AID OF THEIR PARTY" 120 DATA 0,00,01,2,3,44,-1,-2,-3,-4,"OVER AND OUT"

```
RUN
```

RUN FILE?TEST SS,I?500, TEST	
500 DATA	123.124.3A3.0.59293.453.80000E-12."NOW IS THE "
501 DATA	"FOR ALL GOOD MEN TO COME TO THE AID OF THEIR PARTY"
502 DATA	+3.73774E+21.+3.50000E+163.70000E-15.+1.00000E-13
503 DATA	"THIS STRING IS 72 CHARACTERS LONG 56789012345678901234567890123456789012"
504 DATA	0.0.0.1.2.3.41234."OVER AND OUT"

```
LISTING
```

```
UATA
```

1 REM **** HP BASIC PROGRAM LIBRARY *************************
2 REM
3 REM DATA: DUMPS FILE TO DATA STATEMENTS
4 REM
5 REM 36287 REV A 6/73
6 REM
7 REM **** CONTRIBUTED PROGRAM ********************************
1000 FILES *+SCHARS
1050 DIM A\${4],B\$[9],C\${10},D\$[8],E\$[7],F\${72},G\$[72]
1100 DEF FNA(x)=2+(x >= 10)+(x >= 100)+(x >= 1000)+(x >= 10000)+(x >= 100000.)
1150 READ #2;G\$
1200 A\$="#, D"
1250 B\$="#+A+ A+A"
1300 E5="#, D. D"
1350 D\$=" DATA "
1400 C\$=G\$[49•58]
1450 H = 6 (14 + 14)
1500 Is=6\$(35,35)
1550 FOR A=2 TO 72
1600 G\$[A]=G\$[1+1]
1650 NEXT A
1700 PRINT "FILE";
1750 INPUT F%
1800 ASSIGN F\$+1+H
1850 IF H<3 THEN 2000
1900 PRINT "FILE NOT ACCESSIBLE"
1950 GOTO 1700
2000 PRINT "SS,I":
2050 INPUT B+C 2100 PRINT G \$;
2150 PRINT 53
2200 PRINT G\$;
2250 D=E=73
2300 GOTO TYP(1) OF 2350,3700,5550
2350 READ #1;F
2400 IF ABS(F)>999998. OR (F AND ABS(F)<.000001) THEN 2500
2450 GOTO (F=INT(F))+1 OF 3000.2700
2500 GOSUB (E+13>72)+1 OF 5450,4950

DATA, Page 3 June 1973 F212-36287A

2550 E=E+13 2600 PRINT USING "#+SD+5DE";F 2650 GOTO 2300 2700 A = FNA(ABS(F)) + (F < 0)2750 GOSUB (E+A>72)+1 OF 5450+4950 2800 E=E+A 2850 4\$[3,3]=C\$[A,A] 2900 PRINT USING AS:F 2950 GOTO 2300 3000 A=FNA(ABS(F))+(F<0)3050 E\$[3,3]=C\$(A,A] 3100 H=ABS(F) 3150 FOR G=2 TO 7 3200 H=H*10 3250 IF H=INT(H) THEN 3350 3300 NEXT G 3350 E\$[6,6]=C\$[G,G] GOSUB (E+4+G>72)+1 OF 5450+4950 3400 GOSUB (8 3450 E=E+G+A 3500 PRINT USING ESTF 3550 E\$[3,3]=" " 3600 E\$[6,6]=" " 3650 GOTO 2300 3700 READ #1:F\$ 3750 A=LEN(F\$)+3 3800 GOSUB (E+A>72)+1 OF 5450+4950 3850 IF A<60 THEN 4300 3900 D=0 3950 PRINT I\$;F\$[1,29]; 4000 F%=F%[30] 4050 F\$[LEN(F\$)+1]=1\$ 4100 F\$[LEN(F\$)+1]=H\$ 4150 F\$[LEN(F\$)+1]="" 4200 A=LEN(F\$)+3 4250 E=E+29 4300 E=E+A 4350 G=INT((A-3)/10)+1 4400 B\$[5,5]=C\$[G,G] 4450 G=A-2-(G-1)*10 4500 B\$[6,6]=C\$[G,G] 4550 IF D THEN 4800 4600 B\$[3,4]=" " 4650 PRINT USING BS:FS 4700 B\$[3,4]="A," 4750 GOTO 4850 4800 PRINT USING 8\$:15,F\$.I\$ 4850 8\$[5,6]=" .. 4900 GOTO 2300 4950 H=FNA(8) 5000 A\$[3,3]=C\$[H,H] 5050 IF NOT D THEN 5150 PRINT ""; 5100 5150 PRINT USING AS:R 5200 D=1 5250 PRINT USING "#,8A";D\$ 5300 E=H+8 5350 B=B+C 5400 RETURN 5450 PRINT ","; 5500 RETURN IF NOT D THEN 5650 5550 5600 PRINT ""; 5650 PRINT G\$ 5700 END

TITLE:		ROMINT 36022B
DESCRIPTION:	This program will integrate a given function by the Romberg Method.	
INSTRUCTIONS:	Define the integrand in line 100 by a "DEF FNF(X)=" statement i.e	a
	100 DEF FNF(X)=X+2"	,
	The lower and upper limits of integration will be requested during execution. The output is the sequence of the first five approximate which should converge to the value of the integral. The number of a	ions approxi-
	mations may be increased by changing the value of N in line 107.	
SYSTEM SPECIFICATIONS:	2000A and Talatura	
SPECIFICATIONS:	2000A and Teletype	
SPECIAL		
CONSIDERATIONS:	Specifying an order of integration greater than 5 can result in excerning time and usually will not improve accuracy.	essive
ACKNOWLEDGEMENTS: I	B. Gateley Colorado College	

ROMINT, Page 2 June 1973 A310-36022B

RUN

RUN ROMINT

'RUN-100' TO AVOID INSTRUCTIONS.

THIS PROGRAM INTEGRATES A FUNCTION USING THE ROMBERG METHOD. SEE THE ACM ALGORITHM #60 FOR TECHNICAL DETAILS. TO USE, DEFINE THE INTEGRAND IN LINE 100 BY A 'DEF FNF(X)=...' STATEMENT - E.G., 100 DEF FNF(X)=X+2

THE LOWER AND UPPER LIMITS OF INTEGRATION WILL BE REQUESTED DURING EXECUTION. THE OUTPUT IS THE SEQUENCE OF THE FIRST FIVE APPROXIMATIONS (WHICH SHOULD CONVERGE TO THE VALUE OF THE INTEGRAL). THE NUMBER OF APPROXIMATIONS MAY BE INCREASED BY CHANGING THE VALUE OF N IN LINE 107.

LOWER LIMIT?Ø UPPER LIMIT?1

Ø Ø Ø DONE

LISTING

ROMINT

1 2

3

4

5

6

7

10

15

20

25

30

35

40 45 50

55

6Ú

101

104 105

106

REM

REM REM

RE M

REM

REM

REM

PRINT "

PRINT LIN(1)

102 PRINT "LOWER LIMIT";

PRINT "UPPER LIMIT";

100 DEF FNF(X)=X DIM 2(50)

INPUT R

103 INPUT A

APPROXIMATION VALUES:

• 5 • 5 • 5 • 5 • 5 DONE RUN-100 ROMINT LOWER LIMIT? -1 UPPER LIMIT?1 APPROXIMATION VALUES: Ø Ø

ROMINT:

36022 REV B

6/73

PRINT "'RUN-100' TO AVOID INSTRUCTIONS."LIN(1)

100 DEF FNF(X)=X+2"

PRINT LIN(1)"APPROXIMATION VALUES:"

**** HP BASIC PROGRAM LIBRARY ***************************

**** CONTRIBUTED PROGRAM **********************************

PRINT "THIS PROGRAM INTEGRATES A FUNCTION USING THE ROMBERG METHOD.

PRINT "IN LINE 100 BY A 'DEF FNF(X)=...' STATEMENT - E.G.,"

INTEGRATES A FUNCTION (ROMBERG METHOD)

REM *** ROMBERG INTEGRATION. HP VERSION MODIFIED BY B. GATELEY: 10/24/72 ***

PRINT "ACM ALGORITHM #60 FOR TECHNICAL DETAILS. TO USE. DEFINE THE INTEGRAND"

PRINT "THE LOWER AND UPPER LIMITS OF INTEGRATION WILL BE REQUESTED DURING" PRINT "EXECUTION. THE OUTPUT IS THE SEQUENCE OF THE FIRST FIVE APPROXIMATIONS" PRINT "(WHICH SHOULD CONVERGE TO THE VALUE OF THE INTEGRAL). THE NUMBER OF"

PRINT "APPROXIMATIONS MAY BE INCREASED BY CHANGING THE VALUE OF N IN LINE 107."

SEE THE"

```
107 N=5
108 Z1=8-A
109 LET Z8=1
110 LET Z(1)=(FNF(A)+FNF(B))/2
111 FOR Z5=1 TO N
112 LET Z6=0
113 Z7=Z1/(2*Z8)
114 FOR Z9=1 TO 2*Z8-1 STEP 2
115 LET Z6=Z6+FNF(A+Z7*Z9)
116 NEXT Z9
117 LET Z(Z5+1)=(Z6/Z8+Z(Z5))/2
118 LET Z6=1
119 FOR Z9=Z5 TO 1 STEP -1
120 LET Z6=4*Z6
121 LET Z(Z9]=Z(Z9+1)+(Z(Z9+1)-Z(Z9))/(Z6-1)
122 NEXT Z9
123 LET Z8=Z8*2
124 LET Z7=Z7/2
125 PRINT Z[1]*Z1
126 NEXT Z5
127 END
```

TITLE:	FISHER'S EXACT PROBABILITY TEST F407-36606A
DESCRIPTION:	This program analyzes discrete data from two independent small random samples which fall into one or another of two mutually exclusive classes. The printout includes a summary table with marginal frequencies and the probability of occurence by chance of the distribution under examination.
INSTRUCTIONS:	Instructions for the use of this program are given at run-time for the entry of data into a 2 x 2 table of the following format: ++ A B ++ C D ++ Reference: Siegel, Sidney NON-PARAMETRIC STATISTICS, McGraw-Hill; New York 1956, Page 96
SYSTEM SPECIFICATIONS:	2000F and Teletype
SPECIAL CONSIDERATIONS:	None
ACKNOWLEDGEMENTS:	Robert M. Smith University of Alabama School of Medicine

FISHER, Page 2 June 1973 F407-36606A

RUN

RUN FISHER

FISHER'S EXACT PROBABILITY TEST ENTER THE FREQUENCY IN CELL 'A' ?10 ENTER THE FREQUENCY IN CELL 'B' ?Ø ENTER THE FREQUENCY IN CELL 'C' ?4 ENTER THE FREQUENCY IN CELL 'D' ?5 SUMMARY TABLE -----+----+ Ø 10 10 +----+ 9 5 4 +-----14 5 19 P = 0.01084 DONE RUN FISHER FISHER'S EXACT PROBABILITY TEST ENTER THE FREQUENCY IN CELL 'A' ?1 ENTER THE FREQUENCY IN CELL 'B' ?6 ENTER THE FREQUENCY IN CELL 'C' ?4 ENTER THE FREQUENCY IN CELL 'D' ?1 SUMMARY TABLE _____ +-----+ 6 7 1 +----+ 4 1 5 +-----+ 7 5 12

P = 0.04419

DONE

FISHER, Page 3 June 1973 F407-36606A

RUN FISHER

FISHER'S EXACT PROBABILITY TEST ENTER THE FREQUENCY IN CELL 'A' ?0 ENTER THE FREQUENCY IN CELL 'B' ?7 ENTER THE FREQUENCY IN CELL 'C' ?5 ENTER THE FREQUENCY IN CELL 'D' ?0

SUMMARY TABLE

Ø	7	7
5	0	5
5	7	12

P = 0.00126

DONE

LISTING

FISHER

] REM **** HP BASIC PROGRAM LIBRARY ***********************
2 REM
3 REM FISHER: FISHER'S EXACT PROBABILITY TEST
4 REM
5 REM 36606 REV A 6/73
6 REM
7 REM **** CONTRIBUTED PROGRAM ***********************************
9000 PRINT "FISHER'S EXACT PROBABILITY TEST"
9010 PRINT "====================================
9020 PRINT "ENTER THE FREQUENCY IN CELL +A+"
9030 INPUT A
9040 PRINT "ENTER THE FREQUENCY IN CELL 'B'"
9050 INPUT B
9060 PRINT "ENTER THE FREQUENCY IN CELL 'C'"
9070 INPUT C 9080 PRINT "ENTER THE FREQUENCY IN CELL "D""
9090 INPUT D
9100 N=A+B+C+D
9110 D1=D2=D3=D4=D5=1
9120 N1=N2=N3=N4=N5=1
9130 FOR $I=1$ TO A+B
9140 N1=N1*I
9150 NEXT I
9160 FOR I=1 TO C+D
9170 N2=N2*I
9180 NEXT I
9190 FOR I=1 TO A+C
9200 N3=N3*I
9210 NEXT I
9220 FOR I=1 TO 8+D
9230 N4=N4*I
9240 NEXT I
9250 FOR I=1 TO A+B+C+D
9260 D1=D1*I
9270 NEXT I
9280 FOR I=1 TO A
9290 D2=D2*I 9300 NEXT I
9300 NEXT I 9310 FOR I=1 TO B
9320 D3=D3*I
9330 NEXT I

FISHER, Page 4 June 1973 F407-36606A 9340 FOR I=1 TO C 9350 D4=D4*I 9360 NEXT I 9370 FOR I=1 TO D 9380 D5=D5*1 9390 NEXT I 9400 PRINT 9410 PRINT " SUMMARY TARLE" 9420 PRINT " ==========" 9430 PRINT 9440 PRINT "+----+ 9450 PRINT USING 9460:A+B+B 9460 IMAGE " "+DD+" "+DD+" 9470 PRINT "+----+ PRINT USING 9460:C.D.C.D PRINT "+-----+" 9480 9490 9500 PRINT USING 9460:A+C+B+D+A+B+C+D 9510 PRINT 9520 P=N1*N2*N3*N4 9530 P=P/(D1*D2*D3*D4*D5) 9540 PRINT USING 9550:P 9550 IMAGE "P ="+XXXDD.DDDDD 9560 PRINT LIN(5) 9570 END

"•DD

TITLE:	THREE FACTORIAL ANALYSIS OF VARIANCE	ANOVA3 F410-36271A
DESCRIPTION:	This program computes an analysis of variance for an exper factors. Each factor may have up to 8 levels. The number for each cell must be the same.	iment with three of observations
	The printout consists of a table listing sum of squares, mu F-ratios, for Rows, Columns, Layers, and the various inter	
INSTRUCTIONS:	Enter data beginning in line 9000. The first four items mu of rows, then the number of columns, then the number of la the number of observations in each cell (n).	ust be the number yers, and finally
	Then enter the observations by cell, starting with Layer 1 the Layer 1, Row 1, Column 2; etc.	, Row 1, Column 1;
SYSTEM SPECIFICATIONS:	2000F and Teletype	
SPECIAL CONSIDERATIONS:	This program will handle up to an 8x8x8 analysis. To incre of levels allowed for any factor, change line 70 to read:	ease the number
	70 DIM X(R+1, (C+1)*(L+1)) , where R, C, L are the Columns, and Layers.	numbers of Rows,
ACKNOWLEDGEMENTS:	A. B. Jensen	
	MacMurray College	

ANOVA3, Page 2 June 1973 F410-36271A

RUN

ANOVA3

9000	DATA	2,3,2,6
9001	DATA	27,22,45,18,76,33
9002	DATA	31,37,52,45,86,66
9003	DATA	55,62,76,85,104,126
9004	DATA	55,40,81,50,36,70
9005	DATA	77,76,98,68,42,104
9006	DATA	132,104,96,70,89,142
9007	DATA	61,39,76,60,46,59
9008	DATA	61,71,82,92,103,105
9009	DATA	140,122,99,92,68,101
9010	DATA	88,92,95,103,51,73
9011	DATA	100,120,120,131,89,76
9012	DATA	142,150,96,105,80,125

RUN ANOVA3

SOURCE TABLE

	SUM OF SQUARES	DF	MEAN SQUARE	F
ROW COLUMN LAYER R*C R*L C*L R*C*L W/GROUP	7667.31 23630.1 9730.19 136.25 8.6875 751.625 223.75 28769.4	1 2 1 2 2 60	7667.31 11815. 9730.19 68.125 8.6875 375.812 111.875 479.491	15.9905 24.6408 20.2928 .142078 1.81182E-02 .783774 .233321
TOTAL	70917.3	71		

DONE

LISTING

ANOVA3

```
**** HP HASIC PROGRAM LIBRARY ***********************
1
   REM
5
  REM
                     THREE FACTOPIAL ANALYSIS OF VARIANCE
3
             ANOVA3:
  RFW
4
   REM
             36271 REV A 6/73
5
   REM
6
   REM
7
       **** CONTRIBUTED PROGRAM
                                *****
   REM
10 REM THREE-WAY ANALYSIS OF VARIANCE MAY/1972
20 REM GENERAL STATISTICS PROGRAM
30
    REM DATA STARTS AT 9000. #ROWS.COLUMNS.LAYERS.N/CELL
            WILL TAKE UP TO BXBX8
40 REM
50 PEM
            START AT L1.R1.C1: THEN L1.R1.C2, ETC.
60
    REM
70 DIM X[9,81]
80 READ R.C.L.N
90 N1=N#R#C#L
100 C1=K1=M1=01=P1=01=R1=S1=T1=0
110 MAT X=ZER[R+1,(C+1)*(L+1)]
120 F=(C+1)*L
130 FOR K=0 TO L-1
140 FOR I=1 TO R
150 FOR J=1 TO C
160 F2=K*(C+1)
170 FOR M=1 TO N
180 READ X
.190 C1=C1+X+2
500 X[I*E5+7]=X[I*E5+7]+X
210 NEXT M
220 X[I+F+J]=X[I+F+J]+X[I+F+J]
S30 K1=K1+X[1+E5+7]+5/N
```

240 NEXT J 250 NEXT I 260 NEXT K 270 FOR K=0 TO L 280 FOR I=1 TO R 290 FOR J=1 TO C 300 F2=K*(C+1) 310 X[R+1+F2+J]=X[R+1+F2+J]+X[I+F2+J] 320 X[I+F2+C+1]=X[I+F2+C+1]+X[I+F2+J] 330 X[R+1+F2+C+1]=X[R+1+F2+C+1]+X[I+F2+J] 340 NEXT J 350 NEXT I 360 NEXT K 370 FOR K=0 TO L 380 F2=K*(C+1) 390 FOR I=1 TO R+1 400 FOR J=1 TO C+1 420 NEXT J 440 NEXT I 460 NEXT K C2=X[R+1+F+C+1]+2/N1 470 480 T=C1-C2 490 B=K1-C2 510 W=T-B 520 FOR I=1 TO R 530 M1=M1+X[I+F+C+1]+2/(N1/R) 540 NEXT I 550 M1=M1-C2 560 FOR J=1 TO C 570 01=01+X[R+1+F+J]+2/(N1/C) 580 NEXT J 590 01=01-C2 600 FOR K=0 TO L-1 610 F2=K*(C+1) 620 P1=P1+X[R+1+F2+C+1]+2/(N1/L) 630 NEXT K 640 P1=P1-C2 650 FOR I=1 TO R 660 FOR J=1 TO C 670 Q1=Q1+X[I+J+F]+2/(N1/(R*C)) 680 NEXT J 690 NEXT I 700 Q1=Q1-M1-01-C2 710 FOR K=0 TO L-1 720 F2=K*(C+1) 730 FOR I=1 TO R 740 R1=R1+X[1,F2+C+1]+2/(N1/(L*R)) 750 NEXT I 760 FOR J=1 TO C 770 S1=S1+X(R+1,F2+J)+2/(N1/(C*L)) 780 NEXT J 790 NEXT K 800 R1=R1-P1-M1-C2 810 S1=S1-01-P1-C2 820 T1=8-M1-01-P1-Q1-R1-S1 830 D1=R-1 840 D2=C-1 850 D3=L-1 860 D4=01*D2 870 D5=D1*D3 880 D6=D2*D3 890 D7=D1*D2*D3 900 D8=R*C*L*(N-1) 910 D9=N1-1 920 Z1=M1 930 M1=M1/D1 940 M2=01/D2 950 M3=P1/D3 960 M4=Q1/D4 970 M5=R1/D5 980 M6=S1/D6 990 M7=T1/D7 1000 M8=W/D8 1010 F1=M1/M8 1020 F2=M2/M8 1030 F3=M3/M8 1040 F4=M4/M8 1050 F5=M5/M8

ANOVA3, Page 4 June 1973 F410-36271A

1060	F6=M6/M8
1070	F7=M7/M8
1080	PRINT "SOURCE TABLE"
1085	PRINT " SUM OF SQUARES DF MEAN SQUARE F"
1086	PRINT
1090	PRINT "ROW ";Z1,D1;M1.F1
1100	PRINT "COLUMN "01,02;M2.F2
1110	PRINT "LAYER "P1+D3+M3+F3
1120	PRINT "R#C "Q1+D4+M4+F4
1130	PRINT "R*L "R1+D5;M5+F5
1140	PRINT "C*L "S1+D6+M6+F6
1150	PRINT "R*C*L "T1+D7+M7+F7
1160	PRINT "W/GROUP "W.D8:MA
1170	PRINT ""
1180	PRINT "TOTAL "T+D9
1190	STOP
9000	DATA 2+3+2+6
9001	DATA 27,22.45,18,76.33
9002	DATA 31.37.52.45.86.66
9003	DATA 55.62.76.85.104.126
9004	DATA 55,40,61,50,36,70
9005	DATA 77.76.98.68.42.104
9006	DATA 132+104+96+70+89+142
9007	DATA 61+39+76+60+46+59
9008	DATA 61.71.82.92.103.105
9009	DATA 140+122+99+92+68+101
9010	DATA 88,92,95,103,51,73
9011	DATA 100.120,120,131,89,76
9012	DATA 142,150,96,105,80,125
9999	END

TITLE:	ANALYSIS OF COVARIANCE	ANCOV A410-36294A
DESCRIPTION:	This program computes an analysis of covariance table, F-rati adjusted means for groups of unequal size.	o and
INSTRUCTIONS:	<pre>Enter data in line 400 in the following manner: - first enter observation one for the first subject of g followed by observation two of the same subject. Observ the second through nth subjects of group one follows the subject. Each additional group follows the first group, time. For example: 400 DATA X(1), Y(1), X(2), Y(2), X(n₁), Y(n₁) 401 DATA X(1), Y(1), X(2), Y(2), X(n₂), Y(n₂) where: X(n₁) - the first observation of the last subject in gr Y(n₁) - the second observation of the last subject in gr Y(n₂) - the first observation of the last subject in gr Y(n₂) - the second observation of the last subject in gr Y(n₂) - y(n₂) - y(n</pre>	vations for e first , one at a
SYSTEM SPECIFICATIONS:	2000A, Mark Sense Card Reader	
SPECIAL CONSIDERATIONS:	For further reference, check STATISTICAL METHODS, by George W pp. 318-320. FOR INSTRUCTIONAL PURPOSES Suitable Courses: Tests and Measurements, Statistics and Stu Student Background Required: An understanding of the meaning The analysis of covariance program computes the difference be more groups of any size that were not matched groups before t of the experimental period.	udent Seminars. g of an F-ratio. etween two or
ACKNOWLEDGEMENTS:	Dr. John Ingold Goshen College	

ANCOV, Page 2 June 1973 F410-36294A

RUN

RUN ANCOV

ANALYSIS OF COVARIANCE

NO. GROUPS?4

GROUP	1	NO. OBSERV.?3
GROUP	2	NO• OBSERV•?4
GROUP	3	NO. OBSERV.?5
GROUP	4	NO. OBSERV.?6

	BETWEEN	THIN	TOTAL
DF	3	14	17
SUM SQRS X	8.86108	124.75	133.611
SUM XY	4.0835	106.083	110.167
SUM SORS Y	39+4502	125.05	164.5
ADJ SS Y	38+8237	34.8401	73.6639
ADJ DF	3	13	16
MEAN SOR	12.9412	2.68001	4.60399
F	4.8288		

MEAN	ADJ	ΥC	1	,	8.71391
MEAN	ADJ	ΥC	2)	9.65156
MEAN	ADJ	Y٢	3)	12.8142
MEAN	ADJ	ΥC	4)	11.0302

```
DONE
```

LISTING

ANCOV

REM **** HP BASIC PROGRAM LIBRARY ***************************** 1 2 REM ANALYSIS OF COVARIANCE 3 REM ANCOV: REM 4 5 REM 36294 REV A 6/73 6 REM 7 10 PRINT "ANALYSIS OF COVARIANCE";" NO. GROUPS": 12 REM INSERT DATA AT LINES 400; FIRST X, THEN Y FOR EACH GROUP INPUT G 15 16 PRINT 19 LET X2=Y2=C=N=M1=M2=B1=B2=B3=D1=E1=0 FOR I=1 TO G 20 PRINT "GROUP ":I:" NO. OBSERV.": 25 26 INPUT N[] Ff b5=x[1]=A(1)=C(1]=0 30 35 FOR J=1 TO N[1] 40 READ X.Y 45 LET X[I]=X[I]+X 50 LET Y[I]=Y[I]+Y 55 LET C[I]=C[I]+X*Y 60 TEL X5=X5+X+5 LET Y2=Y2+Y+2 65 70 LET C=C+X*Y LET P2=P2+X+2 75 90 NEXT J 85 LET N=N+N[I] 90 LET M]=M]+(X[I]) 95 LET M2=M2+Y[1] 100 LET 81=81+X[I]+2/N[I] 105 LET B2=B2+X[I]*Y[I]/N[I] 110 LET B3=B3+Y[I]+2/N[I] 115 LET E=C[I]-X[]]*Y[I]/N[I]

ANCOV, Page 3 June 1973 F410-36294A

150 FEL D=b5-x[1]+5/MEL] 125 LET 01=01+0 130 LET E1=E1+E 135 PRINT 140 NEXT I 145 LET T1=X2-M1+2/N 150 LET B1=B1-M1+2/N 155 LET 11=T1-B1 165 LET T3=Y2-M2+2/N 170 LET 83=83-M2+2/N 175 LET 13=T3-83 185 LET T2=C-M1*M2/N 190 LET B2=B2-M1*M2/N 195 LET I2=T2-B2 200 LET A2=T3-T2+2/T1 205 LET A1=13+12+2/11 210 LET A3=A2-A1 218 PRINT 219 PRINT THIN TOTAL 220 PRINT " BETWEEN 221 PRINT 225 PRINT " DF ".G-1.N-G.N-1 230 PRINT "SUM SQRS X",B1,I1,T1 235 PRINT "SUM XY "+82+12+72 240 PRINT "SUM SQRS Y"+B3+I3+T3 245 PRINT "ADJ SS Y ",A3,A1,A2 250 PRINT "ADJ DF ",G-1,N-G-".G-1.N-G-1.N-2 255 PRINT "MEAN SQR ", A3/(G-1), A1/(N-G-1), A2/(N-2) 256 PRINT 260 PRINT "F ".(A3/(G-1))/(A1/(N-G-1)) 265 LET A=E1/D1 270 PRINT 271 PRINT 280 FOR I=1 TO G 285 PRINT "MEAN ADJ Y(":I:")":Y[]]/N[]]-A*(X[]]/N[]]-M]/N) 290 NEXT I 400 DATA 4.6.8.9.14.11 401 DATA 5,5,7,7,12,13,9,12 402 DATA 10,13,8,12,11,16,4,9,7,11 403 DATA 11.11.12.17.8.10.10.13.7.9.10.11 1000 END

TITLE:	KRUSKAL - WALLIS ONE WAY ANALYSIS OF VARIANCE F410	STAT19 0-36607A
DESCRIPTION:	The Kruskal-Wallis one way analysis of variance by ranks is an exuseful non-parametric test for deciding whether K independent same from different populations. The Kruskal-Wallis technique texnull hypothesis that the K samples came from the same population identical populations with respect to averages.	mples sts the
	The data is present in a table having K columns (maximum of 10) column representing one set, or sample, from a total of N observe	each ations.
	Enter the data in lines 2000-9998. Data should be entered by same (or column) and each sample should be preceded by the number of vations in that sample. Type 'RUN' and answer the questions as appear. The computer will print out the value of H to be compare Chi-Square. If H is less than or equal to the value of Chi-Square the given degrees of freedom then the null hypothesis should be	obser- they ed to re at
SYSTEM SPECIFICATIONS:	2000F and Teletype	
SPECIAL CONSIDERATIONS:	There may only be up to 500 observations in 10 samples. (Maximum - 50 per sample).	
ACKNOWLEDGEMENTS:	Larry Robbins Babson College	

STAT19, Page 2 June 1973 F410-36607 RUN 2000 DATA 10,2,2.8,3.3,3.2,4.4,3.6,1.9,3.3,2.8,1.1 2010 DATA 8,3.5,2.8,3.2,3.5,2.3,2.4,2,1.6 2020 DATA 10,3.3,3.6,2.6,3.1,3.2,3.3,2.9,3.4,3.2,3.2 2030 DATA 8,3.2,3.3,3.2,2.9,3.3,2.5,2.6,2.8 2040 DATA 6,2.6,2.6,2.9,2,2,2.1 2050 DATA 4,3.1,2.9,3.1,2.5 2060 DATA 6,2.6,2.2,2.2,2.5,1.2,1.2 2070 DATA 4,2.5,2.4,3,1.5 9999 END RUN STAT19

TOTAL NUMBER OF OBSERVATIONS ?56 NUMBER OF SAMPLES ?8

YOUR ANSWER WILL TAKE A FEW MINUTES... PLEASE WAIT.....

DO YOU WANT TO SEE THE RANKED SCORES ??? YES

RANKED SCORES

1.0	2.0	3.0	4.0	5.0	6.0	7.0	8.0	
8.5	52.5	47.5	41.0	23.0	36.0	23.0	18.5	
27.5	27.5	54.5	47.5	23.0	31.5	12.5	15.5	
47.5	41.0	23.0	41.0	31.5	36.0	12.5	34.0	
41.0	52.5	36.0	31.5	8.5	18.5	18.5	4.0	
56.0	14.0	41.0	47.5	8.5	0.0	2.5	0.0	
54.5	15.5	47.5	18.5	11.0	0.0	2.5	0.0	
6.0	8.5	31.5	23.0	0.0	0.0	0.0	0.0	
47.5	5.0	51.0	27.5	0.0	0.0	0.0	0.0	
27.5	0.0	41.0	0.0	0.0	0.0	0.0	0.0	
1.0	0.0	41.0	0.0	0.0	0.0	0.0	0.0	
NO. OF	NO'S IN	COLUMN						
10.0	8.0	10.0	8.0	6.0	4.0	6.0	4.0	
SUM OF	NO'S IN	COLUMN						
317.0	216.5	414.0	277.5	105.5	122.0	71.5	72.0	

THE VALUE OF H TO BE COMPARED TO CHI SQUARE IS 18.4639 DEGREES OF FREEDOM ARE $\ 7$

DONE

LISTING

STAT19

**** HP BASIC PROGRAM LIBRARY ********************* 1 REM 2 REM KRUSKAL-WALLIS ONE WAY ANALYSIS OF VARIANCE REM STAT19: 3 REM 4 5 REM 36607 REV A 6/73 REM 6 **** CONTRIBUTED PROGRAM *************************** 7 REM

10 REM PROGRAM FOR KRUSKAL-WALLIS ONE-WAY ANALYSIS OF VARIANCE 20 REM BY LARRY ROBBINS --BABSON COLLEGE 30 T=T1=T2=T3=0 40 PRINT "TOTAL NUMBER OF OBSERVATIONS ": INPUT N 50 60 PRINT "NUMBER OF SAMPLES 70 INPUT K 80 DIM A[50+10]+B[50+10]+D[75]+E[75] 90 PRINT "" 100 PRINT " YOUR ANSWER WILL TAKE A FEW MINUTES..." 110 PRINT " PLEASE WAIT 120 PRINT "" 130 MAT A=ZER[50+K] 140 MAT B=ZER[52+K] 150 MAT D=ZER[N+1] 160 MAT E=ZER[N+1] 170 FOR X1=1 TO K 180 READ C 190 FOR X2=1 TO C 200 READ A[X2+X1] 210 NEXT X2 220 NEXT X1 230 X3=0 240 FOR X2=1 TO K 250 FOR X1=1 TO 50 260 IF A[X1+X2]=0 THEN 300 270 X3=X3+1 280 D[X3]=A[X1+X2] 290 NEXT X1 300 NEXT X2 310 FOR X4=1 TO N 320 IF D[X4]>D[X4+1] THEN 350 330 NEXT X4 340 GOTO 390 350 X5=D[X4] 360 D[X4]=D[X4+1] 370 D[X4+1]=X5 380 GOTO 310 390 FOR X1=1 TO N 400 D[X1]=D[X1+1] 410 E[X1]=X1 420 NEXT X1 430 D[N+1]=E[N+1]=0 440 X7=0 450 X7=X7+1 460 IF X7 >= N THEN 580 470 IF D[X7]=D[X7+1] THEN 490 480 GOTO 450 490 X8=X7 500 X8=X8+1 510 IF D[X8]=D[X8+1] THEN 500 520 X9=(X7+1)+((((X8-X7)+1)/2)+.5) 530 FOR J=X7 TO X8 540 E[J]=X9 550 NEXT J 560 X7=X8 570 GOTO 450 580 FOR X1=1 TO K 590 FOR X2=1 TO 50 600 IF A[X2,X1]=0 THEN 660 610 FOR X3=1 TO N+1 620 IF A[X2+X1]=D[X3] THEN 640 630 NEXT X3 640 B[X2,X1]=E[X3] 650 NEXT X2 660 NEXT X1 670 FOR X1=1 TO K 680 FOR X2=1 TO 50 690 IF B[X2,X1]=0 THEN 720 700 B[51,X1]=B[51,X1]+B[X2,X1] 710 NEXT X2 720 NEXT X1 730 X=0 T=0 740 750 X=X+1 760 IF X >= N THEN 910 IF D[X]=D[X+T] THEN 750 770 780 FOR X1=1 TO K

STAT19, Page 4 June 1973 F410-36607A 790 FOR X2=1 TO 50 800 IF A[X2+X1]=0 THEN 830 IF A[X2,X1]=D[X] THEN 850 810 850 NEX1 X5 830 NEXT X1 840 GOTO 870 850 GOTO 880 860 GOTO 820 870 IF T=1 THEN 740 880 T1=((T+3)-T) 890 T3=T3+T1 900 GOTO 740 910 IF T3=0 THEN 940 920 T2=1-((T3)/((N+3)-N)) 930 GOTO 950 940 T2=1-(0/((N+3)-N)) 950 B=0 960 FOR J=1 TO K 970 FOR G=1 TO 50 980 IF B[G,J]=0 THEN 1000 990 NEXT G 1000 B[50,J]=G-1 1010 NEXT J 1020 FOR J=1 TO K 1030 B=B+((B[51+J]+2)/B[50+J]) 1040 NEXT J 1050 H=(12/(N*(N+1)))*(B)-(3*(N+1)) 1060 H=H/T2 1070 PRINT "DO YOU WANT TO SEE THE RANKED SCORES???": 1080 DIM 4\$[5] INPUT AS IF AS="NO" THEN 1430 1090 1100 1110 PRINT " RANKED SCORES" 1120 Z=0 1130 FOR J=1 TO K 1140 Z=R[50,J] MAX Z 1150 NEXT J 1160 DIM C[1,20] 1170 MAT C=ZER[1,K] 1180 FOR X1=1 TO K 1190 C[1,X]]=X1 1200 NEXT X1 MAT PRINT USING "3D.1D3X";C 1210 1220 PRINT "------------1230 FOR X1=1 TO Z 1240 FOR X2=1 TO K 1250 C[1,X2]=B[X1,X2] 1260 NEXT X2 1270 MAT PRINT USING "3D.103X";C 1280 NEXT X1 1290 PRINT 1300 PRINT "NO. OF NO'S IN COLUMN" 1310 FOR X2=1 TO K 1320 C[1,X2]=8[50,X2] 1330 NEXT X2 1340 MAT PRINT USING "3D.1D3X":C 1350 PRINT 1360 PRINT "SUM OF NO'S IN COLUMN" 1370 FOR X2=1 TO K 1380 C[1.X2]=B[51,X2] 1390 NEXT X2 MAT PRINT USING "4D.1D2X";C 1400 1410 PRINT 1420 PRINT 1430 PRINT "THE VALUE OF H TO BE COMPARED TO CHI SQUARE IS";H 1440 PRINT "DEGREES OF FREEDOM ARE ";K-1 1450 END

TITLE:	ACTIVE FILTER DESIGN	ACTFIL F513-36293A
DESCRIPTION:	Designs Butterworth or Tchebyscheff active filters with roll 24, or 36 db per octave. (48 for Butterworth)	-offs of 12,
INSTRUCTIONS:	The user is asked to enter: 1. Type Butterworth or Tchebyscheff 2. High or low pass 3. Cut-off frequency in hertz 4. Db of attenuation per octave, and 5. The value of C for high pass or R for low pass If the user wishes a schematic, it is printed out on the gra terminal or teletype.	aphic display
SYSTEM SPECIFICATIONS:	Single Terminal BASIC, 2000F and Graphic Display Terminal or	Teletype
SPECIAL CONSIDERATIONS:	None	
ACKNOWLEDGEMENTS:	Brian L. Bardsley Woods Hole Oceanographic Institution	

ACTFIL, Page 2 June 1973 F513-36293A

RUN ACTFIL

THIS PROGRAM WILL DESIGN BUTTERWORTH OR TCHEBYSCHEFF ACTIVE FILTERS WITH A ROLL OFF OF 12,24,36,0R 48 DB PER OCTAVE FOR BUTTERWORTH OR 12,24,0R 36 DB FOR TCHEBYSCHEFF. IT DOES NOT ALLOW FOR THE ADDITION OF ANY GAIN IN THE FILTERS YOU WILL BE REQUIRED TO ENTER THE FOLLOWING INFORMATION: TCHEBYSCHEFF OR BUTTERWORTH HIGH OR LOW PASS CUT-OFF FREQUENCY DB OF ATTENUATION PER OCTAVE VALUE OF C FOR HIGH PASS OR R FOR LOW PASS BE SURE TO PUSH RETURN AFTER EVERY ENTRY IF YOURE READY, LETS BEGIN ENTER A 1 FOR TCHEBYSCHEFF, 2 FOR BUTTERWORTH: ?2 ENTER 1 FOR LOW PASS, 2 FOR HIGH PASS: ?2 ENTER CUT OFF FREQUENCY IN HERTZ: 1000 ENTER C IN MICROFARADS: ?.001 ENTER DB OF ATTENUATION PER OCTAVE: ?48 R1= 31066.9 R2= 816175. R3= 88471.4 R4= 286601. R5= 132404. R6= 191504. R7= 156178. R8= 162353. DO YOU WANT A SCHEMATIC? 1 IF YES, 2 IF NO:?1 IF YOU ARE USING THE TEKTRONIX, ENTER A 1. IF TTY, A 2:22 ----------XXXX------- - -R 1 I I R3 I I I R 5 I R7 I I I I I I I IN I I * I I 0----)(- - --)(* T С C I I I I ------ -----0 * I I OUT I * I I R2 T * R4 I I I R6 I I I I **R8** I * I I I I I I I I I - -- -

THIS REPRESENTS ONE 12 DB SECTION. FOR ONE SECTION, USE R1,R2. FOR 2 SECTIONS, USE R1,R2 FOR THE FIRST AND R3,R4 FOR THE SECOND. FOR 3,USE R1,R2 FOR THE FIRST-R3,R4 FOR THE SECOND-ETC.

THE VALUE OF C YOU SELECTED AT THE START OF THE DESIGN, IS USED FOR BOTH VALUES OF C IF YOU HAVE MORE TO DESIGN,ENTER 1. IF NOT, 2:?2

DONE

Computer

Museum

LISTING

ACTFIL REM **** HP BASIC PROGRAM LIBRARY **************************** 1 2 REM ACTIVE FILTER DESIGN 3 REM ACTFIL: REM 4 5 REM 36293 REV A 6/73 REM 6 REM **** CONTRIBUTED PROGRAM ***************************** 7 8 PRINT "THIS PROGRAM WILL DESIGN BUTTERWORTH OR TCHEBYSCHEFF ACTIVE" PRINT "FILTERS WITH A ROLL OFF OF 12,24,36.0R 48 DB PER OCTAVE FOR" 9 10 PRINT "BUTTERWORTH OR 12.24.0R 36 DB FOR TCHEBYSCHEFF. IT DOES NOT" PRINT "ALLOW FOR THE ADDITION OF ANY GAIN IN THE FILTERS" 11 PRINT "YOU WILL BE REQUIRED TO ENTER THE FOLLOWING INFORMATION:" 12 13 PRINT PRINT "TCHEBYSCHEFF OR BUTTERWORTH" 14 PRINT "HIGH OR LOW PASS" 15 PRINT "CUT-OFF FREQUENCY" 16 PRINT "DB OF ATTENUATION PER OCTAVE" 17 PRINT "VALUE OF C FOR HIGH PASS OR R FOR LOW PASS" 18 19 PRINT PRINT "BE SURE TO PUSH RETURN AFTER EVERY ENTRY" 20 21 PRINT 22 PRINT "IF YOURE READY, LETS BEGIN" 23 PRINT 24 PRINT 25 GOTO 35 PRINT "NOT A VALID ENTRY. TRY AGAIN" 30 PRINT "ENTER A 1 FOR TCHEBYSCHEFF, 2 FOR BUTTERWORTH:": 35 40 INPUT T IF T=1 THEN 695 IF T=2 THEN 60 45 50 55 GOTO 30 60 GOTO 70 PRINT "NOT A VALID ENTRY. TRY AGAIN" 65 PRINT "ENTER 1 FOR LOW PASS, 2 FOR HIGH PASS:": 70 75 INPUT P 80 IF P=1 THEN 95 IF P=2 THEN 395 85 90 GOTO 65 95 GOTO 105 100 PRINT "NOT A VALID ENTRY. TRY AGAIN" PRINT "ENTER CUT-OFF FREQUENCY IN HERTZ:"; 105 110 INPUT F PRINT "ENTER R IN OHMS:"; 115 120 INPUT R 125 GOTO 135 PRINT "NOT A VALID ENTRY. TRY AGAIN" 130 135 PRINT "ENTER DB OF ATTENUATION PER OCTAVE:": 140 INPUT A 145 IF A=12 THEN 170 150 IF A=24 THEN 195 155 IF A=36 THEN 240 160 IF A=48 THEN 305 165 GOTO 130 170 LET C2=.707/((6.28*F)*R) 175 LET C1=1/(R*(6.28*F)*.707) PRINT "C1=";C1 180 PRINT "C2=";C2 185 190 GOTO 1225 195 LET C2=.3827/((6.28*F)*R) 200 LET C1=1/(R*(6.28*F)*.3827) LET C4=.9239/((6.28*F)*R) 205 210 LET C3=1/(R*(6.28*F)*.9239) 215 PRINT "C1=";C1 220 PRINT "C2=";C2 225 PRINT "C3=";C3 230 PRINT "C4=";C4 235 GOTO 1225 LET C2=.2588/((6.28*F)*R) 240 245 LET C1=1/(R*(6.28*F)*.2588) 250 LET C4=.7071/((6.28*F)*R) 255 LET C3=1/(R*(6.28*F)*.7071) LET C6=.9659/((6.28*F)*R) 260 265 LET C5=1/(R*(6.28*F)*.9659)

ACTFIL, Page 4 June 1973 F513-36293A 270 PRINT "C1=":C1 PRINT "C2=":C2 275 280 PRINT "C3="+C3 285 PRINT "C4=":C4 290 PRINT "C5=":C5 295 PRINT "C6=";C6 300 GOTO 1225 305 LET C2=.1951/((6.28*F)*R) 310 LET C1=1/(R*(6.28*F)*.1951) 315 LET C4=.5556/((6.28*F)*R) 320 LET C3=1/(R*(6.28*F)*.5556) 325 LET C6=.8315/((6.28*F)*R) 330 LET C5=1/(R*(6.28*F)*.8315) 340 LET C8=.9808/((6.28*F)*R) 345 LET C7=1/(R*(6.28*F)*.9808) 350 PRINT "C1=";C1 355 PRINT "C2=";C2 360 PRINT "C3=";C3 365 PRINT "C4=";C4 370 PRINT "C5=";C5 375 PRINT "C6=";C6 380 PRINT "C7=";C7 385 PRINT "C8=";C8 390 GOTO 1225 395 PRINT "ENTER CUT OFF FREQUENCY IN HERTZ:"; 400 INPUT F PRINT "ENTER C IN MICROFARADS:": 405 410 INPUT C 415 LET C=C*.000001 420 GOTO 430 425 PRINT "NOT A VALID ENTRY. TRY AGAIN" 430 PRINT "ENTER DB OF ATTENUATION PER OCTAVE:"; 435 INPUT A 440 IF A=12 THEN 465 445 IF A=24 THEN 490 450 IF A=36 THEN 540 IF 4=48 THEN 605 455 460 GOTO 425 465 LET R1=(.707/(12.56*F*C))*2 470 LET R2=1/(R1*(C+2)*((6.28*F)+2)) PRINT "R1=":R1 475 480 PRINT "R2=";R2 485 GOTO 1225 490 LET R1=(.3827/(12.56*F*C))*2 495 LET R2=1/(R1*(C+2)*((6.28*F)+2)) 500 LET R3=(.9239/(12.56*F*C))*2 505 LET R4=1/(R3*(C+2)*((6.28*F)+2)) PRINT "R1=";R1 515 520 PRINT "R2=";R2 525 PRINT "R3=";R3 530 PRINT "R4=":R4 535 GOTO 1225 540 LET R1=(.2588/(12.56*F*C))*2 545 LET R2=1/(R1*(C+2)*((6.28*F)+2)) 550 LET R3=(.7071/(12.56*F*C))*2 555 LET R4=1/(R3*(C+2)*((6.28*F)+2)) 560 LET R5=(.9656/(12.56*F*C))*2 565 LET R6=1/(R5*(C+2)*((6.28*F)+2)) 570 PRINT "R1=":R1 575 PRINT "R2=":R2 PRINT "R3=";R3 580 585 PRINT "R4=":R4 PRINT "R5=";R5 590 595 PRINT "R6=";R6 600 GOTO 1225 605 LET R1=(.1951/(12.56*F*C))*2 610 LET R2=1/(R1*(C+2)*((6.28*F)+2)) 615 LET R3=(.5556/(12.56*F*C))*2 LET R4=1/(R3*(C+2)*((6.28*F)+2)) 620 625 LET R5=(.8315/(12.56*F*C))*2 630 LET R6=1/(R5*(C+2)*((6.28*F)+2)) LET R7=(.9808/(12.56*F*C))*2 635 640 LET R8=1/(R7*(C+2)*((6.28*F)+2)) PRINT "R1=";R1 645 PRINT "R2=";R2 650 PRINT "R3=";R3 655 PRINT "R4=";R4 660 665 PRINT "R5="#R5

670 PRINT "R6=";R6 PRINT "R7=";R7 675 680 PRINT "R8=";R8 685 GOTO 1225 PRINT "NOT A VALID ENTRY. TRY AGAIN" 690 695 PRINT "ENTER A 1 FOR LOW PASS. 2 FOR HIGH PASS:": 700 INPUT P IF P=1 THEN 720 IF P=2 THEN 1005 705 710 GOTO 690 715 720 PRINT "ENTER CUT-OFF FREQUENCY IN HERTZ:"; INPUT F 725 730 PRINT "ENTER R IN OHMS:"; 735 INPUT R 740 GOTO 750 745 PRINT "NOT A VALID ENTRY, TRY AGAIN" 750 PRINT "ENTER DB OF ATTENUATION PER OCTAVE:": 755 INPUT A 760 IF A=12 THEN 785 765 IF A=24 THEN 820 IF A=36 THEN 890 770 780 GOTO 745 785 LET B1=.579/(12.56*(F*1.231)*R) 790 LET B2=1/(6.28*(F*1.231)*R) 795 LET C2=B1+(B2*(SQR((.579+2)/4))) 800 LET C1=1/((R+2)*C2*((6.28*(F*1.231))+2)) 805 PRINT "C1=";C1 810 PRINT "C2=";C2 815 GOTO 1225 820 LET M1=.17/(12.56*(F*1.031)*R) 825 LET M2=1/(6.28*(F*1.031)*R) 830 LET C2=M1+(M2*(SQR((.17+2)/4))) 835 LET C1=1/((R+2)*C2*((6.28*(F*1.031))+2)) 840 LET N1=.709/(12.56*(F*.597)*R) 850 LET N2=1/(6.28*(F*.579)*R) 855 LET C4=N1+(N2*(SQR((.709+2)/4))) 860 LET C3=1/((R+2)*C4*((6.28*(F*1.231))+2)) 865 PRINT "C1=";C1 870 PRINT "C2=";C2 875 PRINT "C3=";C3 880 PRINT "C4=":C4 885 GOTO 1225 890 LET M1=.077/(12.56*(F*1.011)*R) 895 LET M2=1/(6.28*(F*1.011)*R) 900 LET C2=M1+(M2*(SQR((.077+2)/4))) 905 LET C1=1/((R+2)*C2*((6.28*(F*1.011))+2)) 910 LET N1=.276/(12.56*(F*.768)*R) 915 LET N2=1/(6.28*(F*.768)*R) 920 LET C4=N1+(N2*(SQR((.276+2)/4))) 925 LET C3=1/((R+2)*C4*((6.28*(F*.768))+2)) 930 LET P1=.732/(12.56*(F*.396)*R) 935 LET P2=1/(6.28*(F*.396)*R) 940 LET C6=P1+(P2*(SQR((.732+2)/4))) 945 LET C5=1/((R+2)*C6*((6.28*(F*.396))+2)) 950 PRINT "C1="\$C1 955 PRINT "C2=";C2 960 PRINT "C3=";C3 965 PRINT "C4=";C4 970 PRINT "C5="#C5 975 PRINT "C6=";C6 980 GOTO 1225 1005 PRINT "ENTER CUT-OFF FREQUENCY IN HERTZ:"; 1010 INPUT F 1015 PRINT "ENTER C IN MICROFARADS:"; 1020 INPUT C 1025 LET C=C*•000001 1030 PRINT "ENTER DB OF ATTENUATION:"; 1035 INPUT A 1040 IF A=12 THEN 1065 1045 IF A=24 THEN 1090 1050 IF A=36 THEN 1135 1060 GOTO 1030 LET R1=(.579/(2*(6.28*(F*.815))*C))*2 1065 1070 LET R2=1/(R1*(C+2)*((6.28*(F*.815))+2)) 1075 PRINT "R1=";R1 PRINT "R2="#R2 1080 1085 GOTO 1225 LET R1=(.17/(2*(6.28*(F*.97))*C))*2 1090

ACTFIL, Page 6 June 1973 F513-36293A 1095 LET R2=1/(R1*(C+2)*((6.28*(F*.97))+2)) 1100 LET R3=(.709/(2*(6.28*(F*1.675))*C))*2 LET R4=1/(R3*(C+2)*((6.28*(F*1.675))+2)) 1105 1110 PRINT "R1=":R1 1115 PRINT "R2=";R2 PRINT "R3=":R3 1150 PRINT "R4=":R4 1125 GOTO 1225 1130 1135 LET R1=(.077/(2*(6.28*(F*.989))*C))*2 LET R2=1/(R1*(C+2)*((6.28*(F*.989))+2)) 1140 1145 LET R3=(.276/(2*(6.28*(F*].31))*C))*2 1150 LET R4=1/(R3*(C+2)*((6.28*(F*1.31))+2)) LET R5=(.732/(2*(6.28*(F*2.52))*C))*2 1155 1160 LET R6=1/(R5*(C+2)*((6.28*(F*2.52))+2)) PRINT "Rl=";Rl 1165 PRINT "R2=";R2 1170 PRINT "R3=":R3 1175 PRINT "R4=":R4 1180 PRINT "R5=":R5 1185 PRINT "R6=":R6 1190 1195 GOTO 1225 PRINT "NOT A VALID ENTRY. TRY AGAIN" 1550 PRINT "DO YOU WANT A SCHEMATIC? 1 IF YES, 2 IF NO:": 1225 INPUT W 1226 1552 IF W=1 THEN 1900 1558 IF W=2 THEN 1300 GOTO 1225 1229 1590 PRINT "TRY AGAIN" 1300 PRINT "IF YOU HAVE MORE TO DESIGN. ENTER 1. IF NOT. 2:"; 1310 INPUT Z IF Z=1 THEN 35 1320 1330 IF Z=2 THEN 5000 1340 GOTO 1290 PRINT "IF YOU ARE USING THE TEKTRONIX. ENTER A 1. IF TTY.A 2:": 1900 1901 INPUT K IF K=2 THEN 1975 1902 IF K=1 THEN 1910 1903 1904 GOTO 1900 PRINT "GET A COPY OF THE CIRCUIT VALUES NOW, AFTER YOU HAVE YOUR" 1910 PRINT "COPY, PRESS ERASE THEN HOME ON THE TEKTRONIX. THIS WILL" 1915 PRINT "INSURE THAT THE ENTIRE SCHEMATIC IS PRINTED ON ONE" 1920 PRINT "PAGE. AFTER YOU HAVE PRESSED ERASE AND HOME, ENTER A" 1925 PRINT " 1 AND THE SCHEMATIC WILL BE PRINTED:"; 1930 1935 INPUT H 1940 IF H=1 THEN 1975 1945 IF H#1 THEN 1950 PRINT "TRY AGAIN" 1950 GOTO 1935 1960 IF P=1 THEN 2000 1975 IF P=2 THEN 3000 1976 REM ****LOW PASS PRINT ROUTINE******* 1999 PRINT " 2000 --)(2010 PRINT " C 1 I۳ PRINT " СЗ I '' 2020 I I" 2030 PRINT " С5 I '' PRINT " C7 2040 I I" 2050 PRINT " T I۳ 2060 PRINT " 88 I PRINT " I " 4 2070 T PRINT ". IN I۳ 2080 I * I۳ PRINT " 2090 Ι PRINT " I۳ 2100 0----XXXX-* ----PRINT " I '' 2110 R R I * PRINT " * I " 2120 Ι PRINT " * --0" 2130 ---) (---___ PRINT " ð Ι" 2140 I PRINT " 2150 C2 I " I I ** PRINT " 5190 I C4 - # PRINT " C6 * T II 2170 Ι I I '' PRINT " * 2180 Ι C8 I I " PRINT " * 2190 I I I۳ 2200 PRINT " I I ** I۳ 2210 PRINT " • I I PRINT " 5550 Ι" T I 2230 PRINT " --" PRINT " 2240 ... PRINT " 2250 .. ---PRINT " .. 2260 _

2270	PRINT			
5580	PRINT			
2540	PRINT "THIS REPRESEN			
2300	PRINT "USE C1 AND C2	FOR TWO SECT	LONS+ USE CI AND C	2 FORM
2310	PRINT "THE FIRSTC3	AND C4 FOR THE	E SECOND. FOR THRE	E•"
2320	PRINT "USE C1 AND C2	FOR THE FIRST	• ETC."	
2330	PRINT			
2340	PRINT			
2350	PRINT "THE VALUE OF A	R YOU SELECTED	AT THE START OF 1	HE "
2360	PRINT "FILTER DESIGN	IS USED FOR BO	TH VALUES OF R.	
2370	GOTO 1300			
2999	REM ****HIGH PASS PI	RINT ROUTINE***		
3000	PRINT "		XXXX	
3010	PRINT "	I	R1	Ι
3020	PRINT "	I	R3	I.u
3030	PRINT "	Ī	85	I **
3040	PRINT "	I	R7	I.u.
3050	PRINT "	Ī	*	I.u
3060	PRINT "	I	**	I.
3070	PRINT "	I	* *	1"
3080	PRINT " IN	I	• •	I "
3090	PRINT "	I	0 Q	I.u
3100) (* - *	I H
3110	PRINT " C	с С	I o o	
3120	PRINT "	C	I e e	I H
3130	PRINT "	XXXX	•	0"
3140	PRINT "	I	• •	I.
3150	PRINT "	I	* *	1 OUT"
3160	PRINT "	I P2	* + *	I" 001
3170	PRINT "	I R4	I & &	I"
3180	PRINT "	I R6	I & &	Ī
3190	PRINT "	I R8	I **	Ţ.
3200	PRINT "	I	I ++	1"
3210	PRINT "	I	I +	I"
3220	PRINT " -		I	1 [*
3230	PRINT "			!
3240	PRINT "	"		
3250	PRINT			
3260	PRINT			
3270	PRINT			
3340	PRINT " THIS REPRESE	NTS ONE 12 DB	SECTION."	
3350	PRINT "FOR ONE SECTI			
3360	PRINT "FOR 2 SECTION			R3+R4 FOR"
3370	PRINT "THE SECOND."			
3380	PRINT "FOR 3.USE R1.	R2 FOR THE FIR	ST-R3+R4 FOR THE	SECOND-ETC."
3400	PRINT " THE VALUE OF			
3410	PRINT " DESIGN. IS U	SED FOR BOTH V	ALUES OF C"	
3420	GOTO 1300			
5000	END			

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TITLE:	METRI CONVERTS ENGLISH TO METRIC, METRIC TO ENGLISH F514-36635	
DESCRIPTION:	This program converts 19 metric measurements into their equivalent Englis measurements and vice versa.	h
INSTRUCTIONS:	If the user responds "Y" or "YES" to the prompt, INSTRUCTIONS?, the program prints out a table of the 19 metric measurements, and assigns each conversion a number. The user then enters his choice. An entry of "20" to the "choice" prompt terminates execution of the program.	
SYSTEM SPECIFICATIONS:	2000F and Teletype	
SPECIAL CONSIDERATIONS:	None	
ACKNOWLEDGEMENTS:	Terry Von Gease HP, Data Systems	

* METRIC, Page 2 June 1973 F514-36635A

RUN

RUN METRIC

INSTRUCTIONS ?Y

+ TO CONVERT	FROM	то
- TO CONVERT	то	FROM
1		MILLIMETERS
2		METERS
3	YARDS	METERS
4		KILOMETERS
5		SQUARE CENTIMETERS
•		SQUARE METERS
•		SQUARE METERS
•		HECTARES
9		MILLILITERS
10		CUBIC METERS
11	CUBIC YARDS	CUBIC METERS
12	QUARTS	LITERS
13	GALLONS	LITERS
	OUNCES	GRAMS
15	POUNDS (MASS)	KILOGRAMS
16	POUNDS (FORCE)	NEWTONS
17	P•S•I•	KILOPASCALS
18	HORSEPOWER	KILOWATTS
19	BTU	KILOJOULE
20	END THE PROGRAM	
YOUR CHOICE	? 1	
ENTER THE VAL	LUE IN INCHES ?12	
12.0000	INCHES = 304.8000 M	ILLIMETERS
YOUR CHOICE	?-1	
ENTER THE VAL	UE IN MILLIMETERS ?30	4.8000
304-8000	MILLIMETERS = 12.0	000 INCHES

YOUR CHOICE ?16

ENTER THE VALUE IN POUNDS (FORCE) ?56

56.0000 POUNDS (FORCE) = 249.0880 NEWTONS

YOUR CHOICE ?-9

ENTER THE VALUE IN MILLILITERS ?10

10.0000 MILLILITERS = 0.6102 CUBIC INCHES

YOUR CHOICE ?20

DONE

LISTING

METRIC

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REM
       **** HP BASIC PROGRAM LIBRARY ****************************
ì
2
  REM
3
  REM
              METRIC:
                      CONVERTS ENGLISH TO METRIC. METRIC TO ENGLISH
4
  REM
              36635 REV A 6/73
5
  REM
  REM
6
       **** CONTRIBUTED PROGRAM ***********************
7 REM
10 DATA 25.4.3048.9144.1.609.6.4516.0929.836.405.16.387
20 DATA .0283,.765,.946,3.784,28.35,.454,4.448,6.895,.746,1.055
30 DIM A$[72],8$[72],C$[72]
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METRIC, Page 3 June 1973 F514-36635A

40 PRINT LIN(1)"INSTRUCTIONS ": 50 INPUT AS IF A\$[1,1]="N" THEN 260 60 DATA "INCHES", "MILLIMETERS", "FEET", "METERS", "YARDS", "METERS", "MILES" 70 DATA "KILOMETERS". "SQUARE INCHES". "SQUARE CENTIMETERS", "SQUARE FEET" 80 90 DATA "SQUARE METERS", "SQUARE YARDS", "SQUARE METERS", "ACRES", "HECTARES" 100 DATA "CUBIC INCHES", "MILLILITERS", "CUBIC FEET", "CUBIC METERS" DATA "CUBIC YARDS", "CUBIC METERS", "QUARTS", "LITERS", "GALLONS" 110 120 DATA "LITERS", "OUNCES", "GRAMS". "POUNDS (MASS)". "KILOGRAMS" 130 DATA "POUNDS (FORCE)", "NEWTONS". "P.S.I.", "KILOPASCALS" 140 DATA "HORSEPOWER", "KILOWATTS", "BTU", "KILOJOULE" 150 PRINT LIN(I)"+ TO CONVERT FROM"; TAB(35); "TO" 160 PRINT "- TO CONVERT TO"; TAB (35) : "FROM" 170 PRINT 180 RESTORE 70 190 FOR A=1 TO 19 READ A\$,8\$ 200 PRINT USING 220:A 210 220 IMAGE#,DDXX9X 230 PRINT A\$;TAB(35):85 240 NEXT A 250 PRINT "20 END THE PROGRAM" 260 PRINT LIN(1) "YOUR CHOICE ": 270 INPUT A 280 IF A=20 OR A=-20 THEN 560 290 IF A=0 OR A>19 OR A<-19 THEN 260 300 RESTORE 10 310 FOR B=1 TO ABS(A) 320 READ C 330 NEXT B RESTORE 70 FOR B=1 TO ABS(A) 340 350 360 READ AS,BS 370 NEXT B 380 IF A<0 THEN 490 390 PRINT LIN(1)"ENTER THE VALUE IN ":A\$;" "; 400 INPUT D 410 E=D*C PRINT 420 430 PRINT USING 440:D 440 IMAGE#,6D.4DX 450 PRINT A\$;" = "; 460 PRINT USING 440;E 470 PRINT B\$ 480 GOTO 260 490 500 C\$=A\$ A\$=8\$ 510 B\$=C\$ PRINT LIN(1) "ENTER THE VALUE IN ":AS:" "; 520 530 INPUT D 540 E=D/C 550 GOTO 420 560 END

TITLE:	CTC PAYROLL PROGRAMS	CTC4 A706-36213A
DESCRIPTION:	These CTC Payroll Programs are part of a total accounting sy by Computer Terminal Corporation for the HP 2000A. (See A71 Projection Programs, A708-36210 CTC Manufacturing Parts Cont A711-36214 CTC Accounts Receivable, A708-36211 CTC Inventory Finished Products.) Abstracts of the 33 payroll programs ar following page along with an index to the documentation.	7-36212 CTC crol, control for
	Order option DØØ	
SYSTEM SPECIFICATIONS:	2000A and Teletype	
SPECIAL CONSIDERATIONS:	This package was written for a 2000A with a non-standard dis structure has 200 physical records, per file. Teleprinter output is directed to a 132 column AB Dick print Non-printing control characters direct the cursor on the HP (The characters are ignored by a standard teletype.) These differences mean that the user will need to modify the run on a standard HP 2000A system. Although it will RUN with cation on an HP 2000C, its 64 word/record limitation makes of the system.	ter. 2600A CRT. e software to thout modifi-
PRICE	36213A, Option KO1 (Paper Tape) \$110.00 36213A, Option DOO (Documentation) 5.00	
ACKNOWLEDGEMENTS:	Jackie Shelton Computer Terminal Corporation	

TITLE:	CTC ACCOUNTS PAYABLE	CTC6 F709-36 638A
DESCRIPTION:	These CTC Accounts Payable programs are part of a total account written by Computer Terminal Corporation, now named Datapoint (See also A706-36213 CTC Payroll Program, A717-36212 CTC Proje grams, A711-36214 CTC Accounts Receivable, A708-36211 CTC Inve for Finished Products, and A708-36210 CTC Manufacturing Parts Abstracts of the 24 accounts payable programs are on the follo along with an index to the documentation.	Corporation. ection Pro- entory Control Control.)
INSTRUCTIONS:	Order option DØØ	
SYSTEM SPECIFICATIONS:	2000F and Teletype; also Datapoint 2200 Version II (optional)	
SPECIAL CONSIDERATIONS:	This package was written for a 2000A with a non-standard disc, been modified to run on a 2000F.	, but has
	Teleprinter output may be directed to a 132 column AB Dick, or lent printer.	equiva-
	Non-printing control characters direct the cursor on the HP 26 (The characters are ignored by a standard teletype.)	SOOA CRT.
	Programs APDTAP and APDSTP make use of a Datapoint 2200 Comput cassette tape facilities. They are included in this package a tional feature for any users who have this capability.	ter with as an op-
	These differences mean that the user will need to modify the s run on a standard HP 2000A system. Although it will RUN witho cation on an HP 2000C, or 2000C'/F, its 64 word/record limitat inefficient use of the system.	out modifi-
PRICE	36638A, Option KOl (Paper Tape) \$80.00 36638A, Option DOO (Documentation) 5.00	
ACKNOWLEDGEMENTS:	Jackie Shelton Datapoint Corporation	

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INDEX TO ACCOUNTS PAYABLE PROGRAMS

- I. INTRODUCTION
 - A. Brief Description of Programs
 - B. File Structure
 - Name/Address File
 - 2. Daily Input File
 - 3. Checks Held File
 - 4. Check History File
 - 5. Auxillary Data and Name Sort File
 - 6. Scratch Files
 - C. File Set Up Procedures
- II. Detailed Program Instructions
 - A. APNAME This program allows the user to enter new vendors into the name/address file or modify the name/address of a vendor already on file.
 - B. APNSRT This program sorts the vendor names into alphabetical order printing the vendor numbers in that order on the auxiliary data and sort file.
 - C. APNCAT With this program, the user can obtain (1) a formatted catalogue of vendor number order or alphabetically; or (2) a list of all vendor numbers not in use.
 - D. APCHIS This program prints the check history of all vendors who have one. User specifies the vendor number interval to be printed.
 - E. APCHPT This program allows the user to obtain (1) a quick display of all checks in the checks held file for a particular vendor or (2) a formatted print out of the checks held by vendor type and vendor number or (3) a grand total only of check amounts on the file.
 - F. APINPT/ APIPRT This program allows the user to input invoices for vendors on file, modify invoices already on the input file, print the input file (in order of entry), or clear all data from the input file. (Chains to APIPRT)
 - G. APCKRG This program prints the check register. Auto checks (checks printed by the computer) are listed first with a total amount at the end. Hand written checks follow with a total amount also. A total of both auto and hand checks is given at the end. The check numbers are assigned to each invoice with Program--APCKAS. When that program is finished, it automatically runs APCKRG. However, APCKRG can be run alone if the check numbers have been assigned.
 - H. APCKPT This program prints the auto checks found on the check register. Proper check forms need to be loaded into the printer. The two programs have slightly different formatting.
 - I. APDIST This program prints an account distribution determined from the account numbers of the invoices on the input file. Totals for each account number and a grand total are also given.
 - J. APADCH This program adds each check found on the check register to the checks held file. This should be run only after a correct check register has been obtained.
 - K. APPERG This program allows the user to delete checks from the checks held file. The user indicates if the checks to be deleted are voided or released and then enters the checks he wants purged. The program deletes the checks from the checks held file and adds them to the check history file if there is an appropriate history.
 - L. APCKAS This program assigns auto check numbers to the invoices on the input file. When all check numbers have been assigned, the program will go on to print the check register (Program--APCKRG).
 - M. APCH#P This program prints the checks held file in check number order.
 - N. APDTAP/ APDSTP This program prints an account distribution as in program APDIST. However, at the end of the distribution report, APDTAP chains to APDSTP which prints an 80 character string (general ledger entry) for each account number, grand total, and batch total of the distribution on a cassette tape in the front deck of a 2200 version II machine.
 - 0. APNLAB This program prints vendor name/addresses on tab labels in vendor number or alphabetical order, or prints a group of user specified vendor numbers.
 - P. APCHAG This program provides the user with an aging of the checks held file in order of vendor number.
 - Q. APCHGA This program ages the checks held **f**ile as in program APCHAG but prints the grand totals only.
 - R. APAGV/ APAGVP A combination of these two programs will provide the user with an aging of the checks held file as in APCHAG; however, this aging is sorted by vendor type also.

- S. APAGPG Ages the checks held file by vendor placing each vendor on a separate page. The user may specify an interval or group of vendor numbers he wishes to be aged.
- T. CTC6 This program may be used to initialize the files. Just GET and RUN CTC6 to perform the initialization.

CONTRIBUTED PROGRAM **BASIC**

TITLE:	CTC PROJECTION PROGRAMS	CTC3 A717-36212B
DESCRIPTION:	These CTC Projection Programs are part of a total accounting by Computer Terminal Corporation for the HP 2000A. (See A706 roll Program, A708-36210 CTC Manufacturing Parts Control, A71 Accounts Receivable, and A708-36211 CTC Inventory Control for Projects.) Abstracts of the 10 projection programs are on th page along with an index to the documentation.	-36213 CTC Pay- 1-36214 CTC Finished
INSTRUCTIONS:	Order option DØØ.	
SYSTEM SPECIFICATIONS:	2000A and Teletype	
SPECIAL CONSIDERATIONS:	This package was written for a 2000A with a non-standard disc structure has 200 physical records per file. Teleprinter output is directed to a 132 column AB Dick printe Non-printing control characters direct the cursor on the HP 2 (The characters are ignored by a standard teletype.) These differences mean that the user will need to modify the run on a standard HP 2000A system. Although it will RUN with tion on an HP 2000C, its 64 word/record limitation makes inef of the system. 36212B, Option KO1 (Paper Tape) \$30.00 36212B, Option D00 (Documentation) 5.00	r. 600A CRT. software to out modifica-
ACKNOWLEDGEMENTS:	Jackie Shelton Computer Terminal Corporation	

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INDEX TO PROJECTION PROGRAMS

I. INTRODUCTION

- A. Brief Description of Programs
- B. File Structure
 - 1. Basic Input File (IN1)
 - Intermediate File (IN2)
 Income Statement File (R1)
 - Income Statement File
 Cash Flow File (R2)
 - 5. Balance Sheet File (R3)
 - barance sheet if ite (ks)
- II. DETAILED INSTRUCTIONS TO PROGRAMS
 - A. INMAIN This program provides complete maintenance of the input file (IN2). The user can (1) create the input file, (2) modify any item of the input file, (3) obtain a listing of the input file, or (4) destroy the input file (set all values to zero).
 - B. IN2CAL This program calculates the intermediate file (IN2).
 - C. INST1 This program sets up the income statement file (R1). The user enters manual inputs needed which he can also modify. The user can indicate the month interval over which the program should calculate (1 to 48).
 - D. RIPRT This program sets up the income statement. User indicates the projected year to be printed and if he wants the listing by month or quarter.
 - E. PJPLAC The program shows the projected placement of each product by sale type; i.e., the number of units projected for each product. Totals are given at the end of each product. A separate listing of totals only is given at the end of the program.
 - F. CSHFLO This program sets up the projected cash flow file (R2). Manual inputs for initial and monthly items are needed which can be modified also. User indicates the month interval to be set up (1 to 48).
 - G. R2PRT This program prints the cash flow statement. User indicates the projected year to be printed and if he wants the listing by month or quarter.
 - H. BSHEET This program sets up the balance sheet file (R3). User can enter and modify begining balances. He also specifies the monthly interval (1 to 48) over which the file is to be set up.
 - I. R3PRT This program prints the balance sheet. User indicates projected year to be printed and if he wants the listing by month or quarter.
 - J. EXPROJ Allows the user to expand the data on the basic data file (IN1) and the monthly constants on the income statement file (R1) from a base year and month through year 4, month 12. This is done on a yearly % which eliminates the user manually inputting each quantity and constant.

III. APPENDIX

- A. Sales Types and Abbreviations Used (Listed in Order Stored)
- B. Product Model Numbers (Listed in Order Stored)
- C. Description of Intermediate File Calculations
- D. Income Statement Format and Calculations
- E. Income Statement Constants
- F. Cash Flow Format and Calculations
- G. Cash Flow Constants
- H. Balance Sheet Format and Calculations
- I. Balance Sheet Constants

CONTRIBUTED PROGRAM **BASIC**

	COLLEGE REGISTRATION DEMO	COLREG F720-36282A			
DESCRIPTION:	COLREG is a comprehensive demo package that illustrates an on-line, multi-terminal college registration. The pa 10 programs: CLEAR, FILE, PREREG, REPS, AVAIL, REG, SOF and COPY.	ickage consists of			
INSTRUCTIONS:	It is estimated that 1 million characters are needed for This estimate is for student and course information only for program storage.	 each 1,000 students. and does not account 			
	The operation here assumes that the college registrar will manually plan a list of available courses and associated instructors. This list is entered into the system as well as sent to all students. The students then plan their individual programs at home and then at registration day they enter their programs into the system on one of 32 terminals. This system then checks for validity, class conflict, etc. as students enter their courses. Upon successful completion, the student is given an on-the-spot report of his program. In addition, class reports for the instructors can be obtained at the end of registration.				
	During the year the individual instructors may enter grand and provide reports for all student grades.	ades for his students			
	The time per student at registration seems to be about terminal system could handle 384 students/hour.	5 minutes, so a 32			
	Continued on following page.				
SYSTEM SPECIFICATIONS: SPECIAL	2000F and Teletype				
CONSIDERATIONS:	1. Maximum number of students - 32				
	2. Maximum number of courses one student can take - 9	1			
	3. Maximum number of credits a student may take - 17				
	4. Maximum number of courses available - 9				
	5. Maximum number of sections within a course - 6				
	6. Maximum number of hours per week a section may hav	e - 5			
	 Sections must be scheduled at same start time and available day. 	length on each			
	8. Two programs that write on files may not run simul	taneously.			
	9. No deletes are provided for students, courses, or	sections.			
	10. May not change the original quota for any section.				
PRICE	Not available on paper tape. To order a magnetic tape BASIC programs, order HP Part No. 02000-90029 for 2000 02000-90060 for 2000F, Price \$25.00.	of all contributed C, or HP Part No.			
ACKNOWLEDGEMENTS:	George Tibaldi/Dave Denman HP, Eastern Sales Region				

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INSTRUCTIONS: continued	
NAME OF PROGRAM	FUNCTION
CLEAR	Clears student and course files
FILE	To enter available courses and sections
PREREG	To enter student names and addresses. Prior to registration (if required)
REPS	Lists students' name and addresses
AVAIL	Lists courses and sections available
REG	To register students (can be used to list any students programs)
SOFAR	To list courses, sections and students registered SOFAR
GRAD	To enter midterm or final grades
CLASS	To provide a class report for each instructor
СОРҮ	Restores (copies) two back-up files to student and course

OPEN-STUDNT, 128
 OPEN-COURSE, 128
 OPEN-WORK, 3
 OPEN-WORK1, 10
 OPEN-WORK2, 10

2. RUN "CLEAR" to clean student and course file

3. RUN "FILE" to enter an available curriculum

4. RUN "AVAIL" to get a report of all courses and sections entered with "FILE"

- May RUN "PREREG" to enter names and addresses of students. This saves time at actual registration ("REG") in that names, etc. are already entered.
- 6. RUN "REG" to enter courses for students. This student should use this program with a copy of the report from "AVAIL" in his hand.
- 7. May RUN "SOFAR" at any time to see the number of students enrolled SOFAR
- 8. May RUN "CLASS" at any time to see the actual students enrolled in each class. This program thus provides class reports for all courses to be given to each instructor
- 9. At midterm and final time, each instructor would run "GRAD" to enter the grades for his students
- 10. After all midterm or final grades are entered, run "CLASS" again to see entered grades

11. RUN "REPS" at any time to see students in file

The following list of programs may be run at any time with out altering any files since they read only:

REPS, AVAIL, SOFAR, CLASS or REG (with just typing "END" in response to "COURSE-SEC")

For demo purposes, the following procedures are useful:

A. RUN "CLEAR"

- B. RUN "FILE" for 7 courses and 3 to 4 sections per course
- C. RUN "PREREG" for about 10 students
- D. Using a file copy program, ("COPY") save both student and course files. In this way this state can easily be recreated from back-up files (CSAVE and SSAVE).

The file copy program, COPY, included in this program package has been set up to perform these steps. ... user may just RUN COPY to restore the state. The sample RUNs which follow illustrate the building of the files rather than using COPY which has already set up the files.

```
RUN
```

```
GET-CLEAR
RUN
                                CLEARS STUDENT AND COURSE FILE
CLEAR
DONE
GET-REPS
RUN
                                FILES ARE EMPTY
REPS
ALL OR STUDENT # ?
?ALL
NOT IN FILES
DONE
GET-PREREG
RUN
PREREG
RESPOND WITH ANSWER OR END
STUDENT #??229-56-5036
LAST NAME ?? BANISCH
FIRST NAME ?? JIM
MIDDLE INITIAL??Z
PHONE ?? 265-7000
SEX??M
CITY??C+KING OF PRUSSIA
STATE ?? PENNSYLVANIA
BAD INPUT, RETYPE FROM ITEM 1
                                              PREREGISTER STUDENTS
??PENN.
STREET ADDRESS??1021 EIGHTH ST.
STUDENT #??149-24:686
LAST NAME??FRANK
FIRST NAME ?? LEE
MIDDLE INITIAL??Z
PHONE??667-4000
SEX??M
CITY ?? CHERRY HILL
STATE ?? NEW JERSEY
BAD INPUT, RETYPE FROM ITEM 1
??N.J.
STREET ADDRESS??1060 N. KINGS HIGHWAY
STUDENT #??136-26-1841
LAST NAME ?? BOLCIK
FIRST NAME ?? BOB
MIDDLE INITIAL??Z
PHONE ?? 948-6370
SEX??M
CITY??ROCKVILLE
STATE ?? MD .
STREET ADDRESS??2 CHOKE CHERRY LANE
STUDENT #??065-32:2709
LAST NAME ?? TIBALDI
FIRST NAME??GEORGE
MIDDLE INITIAL??A
PHONE ?? 265-5000
SEX??M
CITY??PARAMUS
STATE ?? N.J.
STREET ADDRESS??120 W. CENTURY RD.
STUDENT #??012-28-2705
LAST NAME ?? KELLEY
FIRST NAME ?? KEN
```

COLREG, Page 4 June 1973 F720-36282A MIDDLE INITIAL??Z PHONE??948-6370 SEX??M CITY??ROCKVILLE STATE ??MD . STREET ADDRESS??2 CHOKE CHERRY LANE STUDENT #??END DONE GET-REPS RUN REPS ALL OR STUDENT # ? ?ALL 229-56-5036 BANISCH JIM Z 1021 EIGHTH ST. KING OF PRUSSIA, PENN. 265-7000 SEX M LISTS ALL STUDENTS PREREGISTERED 149-24:686 FRANK LEE Z 1060 N. KINGS HIGHWAY CHERRY HILL, N.J. 667-4000 SEX M 136-26-1841 BOLCIK BOB Z 2 CHOKE CHERRY LANE ROCKVILLE, MD. SEX M 948-6370 065-32:2709 TIBALDI GEORGE A 120 W. CENTURY RD. PARAMUS, N.J. 265-5000 SEX M 012-28-2705 KELLEY KEN Z 2 CHOKE CHERRY LANE ROCKVILLE, MD. 948-6370 SEX M END OF FILE DONE GET-FILE RUN FILE TITLE ?ENG1 ENTER COURSES CREDITS ?3 SECTIONS ?3 SECTION # ?2 START TIME ?10 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5

INSTRUCTOR ?SMITH

QUOTA ?5

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SECTION # ?1 START TIME ?9 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?4 DAY 3 ?5 INSTRUCTOR ?DRAPER QUOTA ?4 SECTION # ?3 START TIME ?3 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?BROWN QUOTA ?4 DONE ?? NO TITLE ?HIST1 CREDITS ?3 SECTIONS ?4 SECTION # ?1 START TIME ?9 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?WATTS QUOTA ?4 SECTION # ?2 START TIME ?11 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?WATTS QUOTA ?4 SECTION # ?3 START TIME ?1 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?4 DAY 3 ?5 INSTRUCTOR ?DRAPER QUOTA ?3

COLREG, Page 6 June 1973 F720-36282A SECTION # ?4 START TIME ?4 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?MARK QUOTA ?3 DONE??NO TITLE ?ECØ1 CREDITS ?3 SECTIONS ?4 SECTION # ?1 START TIME ?10 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?I-HARRIS QUOTA ?3 SECTION # ?2 START TIME ?11 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?2 DAY 3 ?5 INSTRUCTOR ?MARTIN QUOTA ?4 SECTION # ?3 START TIME ?3 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?HARRIS QUOTA ?3 SECTION # ?4 START TIME ?4 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?2 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?BONNER QUOTA ?4 DONE??NO TITLE ?BIØ1 CREDITS ?4 SECTIONS ?4

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SECTION # ?1 START TIME ?9 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?2 INSTRUCTOR ?MC CLEAN QUOTA ?4

SECTION # ?2 START TIME ?9 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?4 INSTRUCTOR ?MARIN GUOTA ?3

SECTION # ?3 START TIME ?1 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?4 INSTRUCTOR ?KNOPP QUOTA ?4

SECTION # ?4 START TIME ?1 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?5 INSTRUCTOR ?MC CLEAN QUOTA ?4 DONE??NO TITLE ?CHEM1 CREDITS ?4 SECTIONS ?3

SECTION # ?1 START TIME ?9 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?2 INSTRUCTOR ?TOTIE QUOTA ?4

SECTION # ?2 START TIME ?9 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?4 INSTRUCTOR ?MATHEWS QUOTA ?3 COLREG, Page 8 June 1973 F720-36282A SECTION # ?3 START TIME ?1 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?3 INSTRUCTOR ?TOTIE QUOTA ?4 DONE ??NO TITLE ?CHEM1 DUPLICATE COURSE NAME SECTION ADDITION (Y OR N) ?N TITLE ?PHY1 CREDITS ?4 SECTIONS ?4 SECTION # ?1 START TIME ?9 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?1 INSTRUCTOR ?KING QUOTA ?4 SECTION # ?2 START TIME ?9 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?2 ?2 INSTRUCTOR ?FULLER QUOTA ?3 SECTION # ?3 START TIME ?9 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?4 INSTRUCTOR ?KING QUOTA ?4 SECTION # ?4 START TIME ?1 LENGTH ?4 TIMES/WEEK ?1 DAY 1 ?4 INSTRUCTOR ?FOSTER QUOTA ?4 DONE ??NO TITLE ?PHYED1 CREDITS ?3 SECTIONS ?4 SECTION # ?1 START TIME ?9 LENGTH ?2 TIMES/WEEK ?2 DAY 1 DAY 2 ?2 ?4 INSTRUCTOR ?PARRISH QUOTA ?5

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SECTION # ?2 START TIME ?9 LENGTH ?2 TIMES/WEEK ?2 DAY 1 ?1 DAY 2 ?3 INSTRUCTOR ?PEREIRA QUOTA ?5

SECTION # ?3 START TIME ?2 LENGTH ?2 TIMES/WEEK ?2 DAY 1 ?4 DAY 2 ?5 INSTRUCTOR ?MEYER QUOTA ?5

SECTION # ?4 START TIME ?1 LENGTH ?2 TIMES/WEEK ?2 DAY 1 ?1 DAY 2 ?2 INSTRUCTOR ?MACKENZIE GUOTA ?5 DONE??YES

DONE

GET-AVAIL RUN AVAIL

PRINTS OUT LIST OF ENTERED COURSES

COURSE	SEC	CRDS	INSTRUCTOR	TIME
ENG1	2	з	SMITH	10-11MOWDFR
ENG1	1	3	DRAPER	9-10MOTHFR
ENG1	3	3	BROWN	3-4MOWDFR
HISTI	1.	3	WATTS	9-10MOWDFR
HIST1	2		WATTS	11-12MOWDFR
HISTI	3	3 3 3	DRAPER	1-2MOTHFR
HIST1	4	3	MARK	4-5MOWDFR
ECØ1	1	3	HARRIS	10-11MOWDFR
ECØ1	2	3	MARTIN	11-12MOTUFR
ECØ1	3	3	HARRIS	3-4MOWDFR
ECØ1	4	3 3	BONNER	4-5TUWDFR
B 1 Ø 1	1	4	MC CLEAN	9-1TU
BIØ1	2	4	MARIN	9-1TH
B101	3	4	KNOPP	1-5TH
BIØ1	4	4	MC CLEAN	1-5FR
CHEM1	1	4	TOTIE	9-1TU
CHEMI	2	4	MATHEWS	9-1TH
CHEM1	3	4	TOTIE	1-5WD
				• • • • •
PHY1	1	4	KING	9-1M0
PHY1	2	4	FULLER	9-1TU
PHY1	з	4	KING	9-1 TH
PHY1	4	4	FOSTER	1-5TH



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PHYEDI	1	3	PARRISH	9-11TUTH
PHYED1	2	3	PEREIRA	9-11MOWD
PHYED1	3	3	MEYER	2 - 4THFR
PHYED1	. 4	3	MACKENZIE	1-3MOTU

DONE

GET-REG RUN REG RESPOND WITH ANSWER OR END STUDENT # ??229-56-5036 REGISTRATION OF A STUDENT WHO HAD PREREGISTERED COURSE-SECTION ?HIST1-3 CREDITS ENTERED SOFAR= 3 COURSE-SECTION ?ENG1-1 CREDITS ENTERED SOFAR= 6 COURSE-SECTION ?HIST-1 COURSE OR SECTION NON EXISTENT STUDENT PICKS COURSES FROM "AVAIL" PRINTOUT COURSE-SECTION ?HIST1-1 ALREADY HAVE HISTI COURSE-SECTION ?EC01-1 COURSE OR SECTION NON EXISTENT COURSE-SECTION ?ECØ1-1 CREDITS ENTERED SOFAR= 9 COURSE-SECTION ?CHEM1-3 CREDITS ENTERED SOFAR= 13 COURSE-SECTION ?PHYED1-2 TIME CONFLICT WITH ENGI COURSE-SECTION ?PHYED1-1 TIME CONFLICT WITH ENGI COURSE-SECTION ?PHYED1-4 TIME CONFLICT WITH HISTI COURSE-SECTION ?PHYED1-3 CREDITS ENTERED SOFAR= 16 COURSE-SECTION ?END

STUDENT'S PROGRAM OF CLASSES 229-56-5036 BANISCH JIM Z COURSE SEC CRDS INSTRUCTOR TIME HISTI з з DRAPER 1-2MOTHFR DRAPER ENG1 3 9-10MOTHFR 1 ECØ1 HARRIS 10-11MOWDFR 1 3 CHEM1 з TOTIE 1-5WD 4 PHYED 1 3 MEYER 2-4THFR з TOTAL CREDITS= 16 STUDENT # ??END DONE GET-FILE RUN FILE TITLE ?PHYED1 DUPLICATE COURSE NAME SECTION ADDITION (Y OR N) ?Y SECTION # ?8 START TIME ?1 ADDS A NEW SECTION OF PHYS.ED. BECAUSE OF NEED LENGTH ?2 EVIDENT ON REGISTRATION DAY TIMES/WEEK ?2 DAY 1 ?3 DAY 2 ?4 INSTRUCTOR ?PIXLER QUOTA ?2 DONE??YES DONE GET-FILE RUN FILE TITLE ?MATH1 CREDITS ?3 SECTIONS ?2 ENTERS A NEW COURSE WITH 2 SECTIONS SECTION # ?1 START TIME ?9 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?4 INSTRUCTOR ?GOODMAN QUOTA ?5 SECTION # ?2 START TIME ?11 LENGTH ?1 TIMES/WEEK ?3 DAY 1 ?1 DAY 2 ?3 DAY 3 ?5 INSTRUCTOR ?BLAIR QUOTA ?5 DONE ?? YES

GET-SOFAR RUN SOFAR

COURSE	SEC	CRDS	INSTRUCTOR	QUOTA	SOFAR
ENG1	2	3	SMITH	5	ø
ENG1	1	3	DRAPER	4	1
ENG1	3	3	BROWN	4	ø
HISTI	1	3	WATTS	4	ø
HISTI	2	3	WATTS	4	Ø
HISTI	3	3	DRAPER	3	1
	3 4	3	MARK	3	Ø
HISTI	4	3	MARK	3	Ø
ECØ1	1	3	HARRIS	3	1
ECØ1	2	3	MARTIN	4	ø
ECØ1	3	3	HARRIS	3	ø
ECØ1	4	3	BONNER	4	0
B101	1	4	MC CLEAN	4	Ø
B101	ż	4	MARIN	3	ø
B101	3	4	KNOPP	4	ø
B101	4	4	MC CLEAN	4	ø
DIGI	4	4	MC CLEAN	4	b
CHEM1	1	4	TOTIE	4	Ø
CHEM1	2	4	MATHEWS	3	Ø
CHEM1	3	4	TOTIE	4	1
PHY1	1	4	KING	4	ø
PHY1	2	4	FULLER	3	Ø
PHY1	3	4	KING	4	Ø
PHY1	4	4	FOSTER	4	Ø
					-
PHYED1	1	3	PARRISH	5	Ø
PHYED1	2	3	PEREIRA	5	ø
PHYED1	3	3	MEYER	5	1
PHYED1	4	3	MACKENZIE	5	0
PHYED1	8	3	PIXLER	2	0
MATH1	1	3	GOODMAN	5	0
MATHI	1 2	3	BLAIR	5	
PIA I A I	2	3	DLMIK	5	0

TOTAL REGISTERED SOFAR = 5

			イ		
DONE	NUMBER	OF	SEATS,	NOT	STUDENTS

NOTE NEW COURSES WE ADDED

GET-REG RUN REG RESPOND WITH ANSWER OR END STUDENT # ??111-22-3333 LAST NAME??STAUBER FIRST NAME ?? LEE MIDDLE INITIAL??Z REGISTERS A STUDENT WHOSE NAME WAS NOT PREREGISTERED PHONE??345-6980 SEX??M CITY??CA. STATE ?? CA. STREET ADDRESS??123 FORBES ST. COURSE-SECTION ?MATH1-2 CREDITS ENTERED SOFAR= 3 COURSE-SECTION ?PHYED1-8

CREDITS ENTERED SOFAR= 6

COURSE-SECTION ?HIST1-3 TIME CONFLICT WITH PHYED1

COURSE-SECTION ?ENG1-1 CREDITS ENTERED SOFAR= 9

COURSE-SECTION ?END

111-22-3333 STAUBER LEE Z

COURSE	SEC	CRDS	INSTRUCTOR	TIME
MATH1	2	з	BLAIR	11-12MOWDFR
PHYED1	8	3	PIXLER	1-3WDTH
ENG1	1	3	DRAPER	9-10MOTHFR

TOTAL CREDITS= 9

STUDENT # ??END

DONE

GET-CLASS RUN CLASS AFTER REGISTRATION, 'CLASS' PROVIDES TEACHER WITH ENROLLMENT IN HIS OWN CLASS

MT F

ALL, COURSE, OR COURSE-SECTION ? ?ENG1-1

ENG1-1 CR= 3 9-10MOTHFR DRAPER COUNT= 2

STUDENT # NAME 229-56-5036 BANISCH JIM Z 111-22-3333 STAUBER LEE Z

DONE

GET-GRADE RUN GRADE

ENTER COURSE TITLE?ENG1 ENTER SECTION#?1 MID-TERM OR FINAL (M OR F)?M ENTER MARK FOR JIM BANISCH?F ENTER MARK FOR LEE STAUBER?A

THE TEACHER MAY ENTER GRADES FOR HIS CLASS

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GET-CA+LASS RUN CLASS

ALL, COURSE, OR COURSE-SECTION ? ?ENG1-1

RUN 'CLASS' AGAIN TO SHOW ENROLLMENT AND GRADES

ENG1-1 CR= 3	9-10MOTHFR	DRAPER COUNT= 2	
STUDENT #	NAME		MT F
229-56-5036 111-22-3333	BANISCH JIM Z Stauber Lee Z		F A

DONE

LISTING

CLEAR

1 REM **** HP BASIC PROGRAM LIBRARY ************************
2 REM
3 REM CLEAR: COLLEGE REGISTRATION DEMO
4 REM
5 REM 36282 REV A PART 1 OF 10 6/73
6 REM
7 REM **** CONTRIBUTED PROGRAM ************************************
10 REM CLEAR STUDENT AND COURSE FILES
20 FILES STUDNT, COURSE
30 K=1
40 FOR I=1 TO 32
50 PRINT #1+K;" "+" ", END
60 PRINT #1,K+2;0, END
70 K=K+4
80 NEXT I
100 K=1
110 FOR I=1 TO 9
120 PRINT #2,K;" ", END
130 J=K+1
140 FOR M=1 TO 6
150 PRINT #2,J;" ", END
160 J=J+2
170 NEXT M
175 K=K+13
180 NEXT I
190 END
FILE

1 REM **** HP BASIC PROGRAM LIBRARY ************************* 2 3 REM REM FILE: COLLEGE REGISTRATION DEMO 4 REM 5 REM 36282 REV A PART 2 OF 10 6/73 6 REM REM **** CONTRIBUTED PROGRAM **************** 7 ********* 10 FILES STUDNT, COURSE 20 DIM A\$(10],8\$(20],D\$(20],F\$(10],6\$(20],H\$(11],Q\$(5],S\$(15) 30 DIM J\$[2] 40 DIM K\$[20] 50 DIM E\$[2]

60 DIM D[5]+E[5] 70 C2=0 80 5\$="123456789101112" 90 FS="MOTUWDTHFR" 100 L=0 110 FOR N=1 TO 5 120 E[N]=N+L 130 L=L+1 140 NEXT N 150 HS="ABCDEFGHIJK" 160 PRINT "TITLE ": 170 INPUT AS 180 Z\$=A\$ 190 GOSUB 9200 200 IF Z=0 THEN 260 210 PRINT "DUPLICATE COURSE NAME" 220 PRINT "SECTION ADDITION (Y OR N) ": 230 INPUT I\$ 240 IF IS="Y" THEN 1090 250 GOTO 160 260 Z\$=" " GOSUB 9200 270 280 PRINT "CREDITS ": 290 INPUT Cl 300 PRINT "SECTIONS ": 310 INPUT S1 320 IF S1 <= 6 THEN 350 330 PRINT "ONLY 6 SECTIONS ALLOWED" 340 GOTO 300 350 READ #2+2 360 PRINT #2;A\$.C1.S1. END 370 Z=Z+1 380 FOR S=1 TO S1 390 FOR I=1 TO 5 400 PRINT 410 NEXT I PRINT "SECTION # "; 420 430 INPUT E\$ 440 PRINT "START TIME "; 450 INPUT S2 460 PRINT "LENGTH "; 470 INPUT L 480 PRINT "TIMES/WEEK "; INPUT L1 490 500 FOR I=1 TO L1 510 PRINT "DAY ":I: 520 INPUT D(I) NEXT I 530 PRINT "INSTRUCTOR "; 540 550 INPUT D\$ 560 PRINT "QUOTA "; 570 INPUT Q1 580 IF Q1 <= 8 THEN 610 590 PRINT "ONLY 8 STUDENTS ALLOWED" 600 GOTO 560 610 S9=S2 620 IF S2<10 THEN 700 630 IF S2=10 THEN 680 IF S2=12 THEN 670 640 650 S2=12 GOTO 680 660 670 S2=14 680 S3=S2+1 690 GOTO 710 700 S3=S2 710 G\$=S\$[S2+S3] 720 G\$[LEN(G\$)+1]="-" 730 S4=S9+L 740 IF S4 <= 12 THEN 760 750 S4=S4-12 IF \$4<10 THEN 840 760 IF \$4=10 THEN 820 770 IF S4=12 THEN 810 780 790 S4=12 800 GOTO 820 810 S4=14 820 S3=S4+1 830 GOTO 850

```
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840 $3=$4
850 G$[LEN(G$)+1]=S$[S4+S3]
     FOR I=1 TO L1
860
     G$[LEN(G$)+1]=F$[E[D[I]]+E[D[I]]+1]
870
880
     NEXT I
     FOR I=1 TO L1
890
900
     S5=S9
910 FOR J=1 TO L
920 K$[LEN(K$)+1]=H$[55+55]
930
     K$[LEN(K$)+1]=H$[D[I]+D[I]]
940 S5=S9+J
950 NEXT J
960 NEXT I
970 PRINT #2,Z
980 PRINT #2;E$,G$,K$,D$,Q1.C2, END
990 Z=Z+2
1000 K$=M$
1010 IF IS="Y" THEN 1030
1020 NEXT S
1030 PRINT "DONE?";
1040 INPUT Q$
1050 IF Q$#"NO" THEN 1070
1060 GOTO 160
1070
      STOP
1080 END
1090 READ #2;A$,C1,S1
1100 IF S1<6 THEN 1130
1110 PRINT "NO MORE SECTIONS CAN BE ADDED"
1120 STOP
1130
      s2=s1+1
1140 PRINT #2,Z;A$.C1.52. END
1150 PRINT "SECTION # ";
1160
      INPUT E$
1170
      71=7
1180 Z=Z+1
1190 FOR I=1 TO S1
1200 READ #2,Z;J$
1210 IF J$#E$ THEN 1250
1220 PRINT "DUPLICATE SECTION # "
1230 Z=Z1
1240 GOTO 1150
1250
      Z=Z+2
1260 NEXT I
1270 GOTO 440
9000
      REM GET STUDENT OR COURSE FILE.
9030 DIM W$[20],X$[12],Y$[20],Z$[10]
9031 IF END #1 THEN 9038
9032 X1=1
9033 FOR X2=1 TO 32
9034 READ #1,X1;WS
9035 IF WS=XS THEN 9040
9036
      X1 = X1 + 4
9037 NEXT X2
9038 X=0
9039
      RETURN
9040 READ #1,X1
9045 X=X1
9046 RETURN
9200 IF END #2 THEN 9207
9201 X1=1
9202 FOR X2=1 TO 9
9203 READ #2,X1;W$
9204 IF WS=ZS THEN 9209
9205 X1=X1+13
9206 NEXT X2
9207
      Z=0
9208 RETURN
9209 READ #2,X1
9210
       Z=X1
9211
       RETURN
9212 END
```

REM **** HP BASIC PROGRAM LIBRARY ************************ 1 REM 2 REM PREREG: COLLEGE REGISTRATION DEMO ٦ 4 REM 5 REM 36282 REV A PART 3 OF 10 6/73 REM 6 7 8 REM FILES STUDNT 10 REM PRE REGESTRATION - ENTER STUDENT NAMES 20 DIM A\$[12],B\$[20].C\$[20],D\$[1].E\$[12],F\$[1] DIM G\$[30],H\$[8],I\$[30] 30 35 DIM Q\$[3] 40 PRINT "RESPOND WITH ANSWER OR END" 50 PRINT PRINT "STUDENT #?"; 60 70 INPUT AS 75 IF AS="END" THEN 700 80 X\$=A\$ 90 GOSUB 9000 100 IF X#0 THEN 500 110 X\$=" " 120 GOSUB 9000 130 IF X=0 THEN 600 140 PRINT "LAST NAME?": INPUT B\$ 150 160 PRINT "FIRST NAME?"; 170 INPUT CS 180 PRINT "MIDDLE INITIAL?"; 190 INPUT D\$ 200 PRINT "PHONE?"; INPUT ES 210 220 PRINT "SEX?"; 230 INPUT F\$ PRINT "CITY?"; 240 250 INPUT GS PRINT "STATE?": 260 265 INPUT HS PRINT "STREET ADDRESS?"; 270 280 INPUT IS 300 PRINT #1;A\$,B\$,C\$,D\$,E\$,F\$,G\$,H\$,I\$, END 310 GOTO 60 500 PRINT "STUDENT IN FILES DO YOU WISH TO CHANGE DATA?" 510 INPUT QS IF QS="YES" THEN 140 520 IF QS="NO" THEN 60 530 GOTO 500 540 600 PRINT "NO MORE STUDENTS ALLOWED" 700 STOP 9000 REM GET STUDENT OR COURSE FILE. 9030 DIM W\$[20],X\$[12],Y\$[20],Z\$[10] 9031 IF END #1 THEN 9038 9032 X1=1 9033 FOR X2=1 TO 32 9034 READ #1+X1;W\$ 9035 IF W\$=X\$ THEN 9040 9036 9037 X1=X1+4 NEXT X2 9038 X = 09039 RETURN 9040 READ #1+X1 9045 X=X1 9046 RETURN 9200 IF END #2 THEN 9207 9201 X1=1 9202 FOR X2=1 TO 9 9203 READ #2+X1;WS 9204 IF W\$=Z\$ THEN 9209 9205 X1=X1+13 NEXT X2 9206 9207 Z=0 9208 RETURN 9209 READ #2,X1 9210 Z=X1 9211 RETURN 9212 END

PREREG

COLREG, Page 18 June 1973 F720-36282A

REPS

REM **** HP BASIC PROGRAM LIBRARY ****************** 1 REM 2 COLLEGE REGISTRATION DEMO REPS: REM 3 REM 4 36282 REV A PART 4 OF 10 5 REM 6/73 6 REM REM **** CONTRIBUTED PROGRAM *********************************** 7 10 FILES STUDNT 15 DIM V\$[12] 20 DIM A\$[12],8\$[20],C\$[20],E\$[12],G\$[30],H\$[8],I\$[30] 22 F=0 24 PRINT "ALL OR STUDENT # ?" 26 INPUT V\$ 30 IF END #1 THEN 140 35 Z=1 40 READ #1,Z;A\$ 41 IF A\$=" " THEN 110 42 IF VS="ALL" THEN 44 IF V\$#A\$ THEN 110 43 44 F=1 45 READ #1;8\$,C\$,D\$,E\$,F\$,G\$,H\$,I\$ PRINT A\$;" ";B\$;" ":C\$;" ";D\$ 50 PRINT 15;" ":G\$;",";H\$ 60 70 PRINT E\$;" SEX "FS 80 FOR I=1 TO 3 90 PRINT 100 NEXT I 110 Z=Z+4 130 GOTO 40 140 FOR I=1 TO 5 150 PRINT 160 NEXT I IF F=1 THEN 170 162 164 PRINT "NOT IN FILES" 166 STOP 170 PRINT "END OF FILE" 180 END AVAIL **** HP BASIC PROGRAM LIBRARY *************************** RFM 1 2 REM COLLEGE REGISTRATION DEMO REM AVAIL: 3 REM 4 5 REM 36282 REV A PART 5 OF 10 6/73 6 REM 7 REM **** CONTRIBUTED PROGRAM ********************************** 10 REM COURSES AND SECTIONS AVAILABLE REPORT 20 FILES COURSE 30 DIM N\$[10],0\$[20],P\$[20],Q\$[20],R\$[20] 40 IF END #1 THEN 280 60 PRINT PRINT "COURSE"; TAB (13); "SEC"; TAB (18); "CRDS"; TAB (24); 70 PRINT "INSTRUCTOR"; TAB (47); "TIME" 75 80 PRINT 90 K1=1 FOR I=1 TO 9 100 110 READ #1,K1:N\$ IF NS=" " THEN 240 120 130 READ #1;N3 140 $M_{1}=K_{1}+1$ 150 FOR J=1 TO 6 READ #1,M1;0\$ IF 0\$=" " THEN 210 160 170 180 READ #1;P\$,Q\$,R\$,N5,N6 190 PRINT N\$; TAB(13); 0\$; TAB(18); N3; TAB(24); R\$; TAB(47); P\$ 210 M1=M1+2 220 NEXT J 230 PRINT 240 K1=K1+13 250 NEXT I 260 PRINT 270 PRINT 280 END

REG

HP BASIC PROGRAM LIBRARY *********************** ì REM **** 2 REM 3 REM REG: COLLEGE REGISTRATION DEMO 4 REM 36282 REV A PART 6 OF 10 6/73 5 REM 6 REM 7 REM 8 M9=17 9 FILES STUDNT, COURSE, WORK, STUDNT, COURSE 10 REM ACTUAL REGESTRATION 20 DIM A\$[12]+B\$[20]+C\$[20]+D\$[1]+E\$[12]+F\$[1] 30 DIM G\$[30],H\$[8],I\$[30] 35 DIM J\$[10],K\$[2],L\$[2],M\$[2],N\$[10].0\$[2] 36 DIM P\$[20],Q\$[20],R\$[20],S\$[12].T\$[2].U\$[2] 40 PRINT "RESPOND WITH ANSWER OR END" PRINT 50 60 PRINT 61 PRINT PRINT "STUDENT # ?"; 62 70 INPUT AS 75 IF AS="END" THEN 8510 80 X\$=A\$ 90 GOSUB 9000 100 IF X#0 THEN 500 110 X\$=" " 120 GOSUB 9000 130 IF X=0 THEN 8600 140 PRINT "LAST NAME?": INPUT B\$ 150 160 PRINT "FIRST NAME?"; INPUT C\$ PRINT "MIDDLE INITIAL?"; 170 180 190 INPUT D\$ 200 PRINT "PHONE?"; 210 INPUT E\$ 220 PRINT "SEX?"; INPUT F\$ 230 240 PRINT "CITY?": 250 INPUT G\$ 260 PRINT "STATE?"; 265 INPUT H\$ PRINT "STREET ADDRESS?"; 270 280 INPUT IS 300 PRINT #1:A\$,B\$,C\$,D\$,E\$,F\$,G\$,H\$,I\$, END 500 REM NAME, ADD , ETC ARE NOW STORED AWAY 502 REM AS=STUD # & X=SECTOR 510 READ #1+X+2 520 READ #1;N1 PRINT #3,1; END 530 540 C1=0 IF N1=0 THEN 800 FOR I=1 TO N1 550 560 570 READ #1;2\$,K\$,L\$,M\$,N2 580 GOSUB 9200 590 IF Z=0 THEN 8500 600 READ #2125,N3,N4 610 IF N2#N3 THEN 8500 620 IF N4=0 THEN 8500 630 J=Z+1 640 FOR K=1 TO N4 650 READ #2, J;0\$, P\$,Q\$ 660 IF K\$=0\$ THEN 700 670 J=J+2 680 NEXT K 690 GOTO 8500 700 C1=C1+N2 710 PRINT #3#2\$,Q\$, END 720 NEXT I 800 PRINT PRINT "COURSE-SECTION" 801 802 INPUT GS IF GS="END" THEN 7000 805 820 FOR I=1 TO 13 830 IF G\$[I,I]="-" THEN 900 NEXT I 840 PRINT "ERROR" 850

COLREG, Page 20 June 1973 F720-36282A 860 GOTO 800 900 J\$=G\$[1,I-1] 910 K\$=G\$[I+1] 920 Z\$=J\$ 930 GOSUB 9200 940 REM ZS=COURSE KS=SECTION Z=SECTOR 950 IF Z=0 THEN 8000 960 IF END #3 THEN 1010 970 READ #3,1 980 READ #3:N\$,Q\$ 990 IF N\$=2\$ THEN 8100 1000 GOTO 980 1010 READ #2;N\$,N3.N4 1020 IF C1+N3>M9 THEN 8200 1030 K1=Z+1 1040 IF N4=0 THEN 8200 1050 FOR I=1 TO N4 1060 READ #2,K1 1070 READ #2;0\$,P\$,Q\$,R\$,N5,N6 1080 IF 0\$=K\$ THEN 1130 1090 K1=K1+S 1100 NEXT I 1110 GOTO 8000 1120 REM 1130 IF N5=N6 THEN 8300 1140 IF END #3 THEN 1250 1150 READ #3,1 1160 READ #3;N\$,8\$ 1170 IF LEN(8\$)=0 THEN 8500 1180 FOR I=1 TO LEN(8%) STEP 2 FOR J=1 TO LEN(QS) STEP 2 1190 IF Q\$[J,J+1]=B\$[I,I+1] THEN 8400 1200 1210 NEXT J 1220 NEXT I 1230 GOTO 1160 REM ALL OK NOW TO REG IN COURSE 1240 1250 PRINT #3;2\$,0\$, END 1260 1270 N6=N6+1 C1=C1+N3 1280 READ #5+K1 1290 PRINT #5;0\$,P\$,Q\$,R\$,N5,N6 1300 IF N6-1=0 THEN 1350 1310 FOR I=1 TO N6-1 1320 READ #2:55.T5.US PRINT #5;5\$,T\$,U\$ 1330 1340 NEXT I 1350 PRINT #5;A\$," "," ", END 1351 READ #5,1 1352 READ #2,1 1400 IF END #1 THEN 1500 1410 READ #1.X+2:N1 1420 N1=N1+1 1430 PRINT #4,X+2;N1 1440 IF N1-1=0 THEN 1500 1450 FOR I=1 TO N1-1 1460 READ #1; J\$, K\$, L\$, M\$, N2 1470 PRINT #4; J\$, K\$, L\$, M\$, N2 1480 NEXT I 1500 PRINT #4;Z\$+0\$+" "," ",N3+ END 1501 .READ #4+1 1502 READ #1.1 1600 PRINT "CREDITS ENTERED SOFAR= ";C1 1610 GOTO 800 7000 READ #1,X;A\$,8\$,C\$,D\$ 7010 PRINT 7011 PRINT 2107 PRINT 7020 PRINT A\$;" ";8\$;" ";C\$;" ";D\$ 7030 PRINT 7040 READ #1, X+2;N1 7050 IF N1=0 THEN 7170 7052 PRINT "COURSE"; TAB(13); "SEC"; TAB(18); "CRDS"; TAB(24); PRINT "INSTRUCTOR"; TAB (47); "TIME" 7053 7054 PRINT 7060 C1 = 07070 FOR I=1 TO N1 READ #11725,K\$+L\$+M\$,N2 7080 GOSUB 9200 7090

```
7100 IF Z=0 THEN 8500
7110
     READ #2;N$+N3+N4
7112
     K4=Z+1
     FOR J=1 TO N4
7114
7115 READ #2.K4:05.P5.05.R5
     IF 05=K5 THEN 7130
7116
7117
      K4=K4+2
     NEXT J
7118
     PRINT N$; TAB(13); 0$; TAB(18); N3; TAB(24); R5; TAB(47); P5
7130
7140
      C1=C1+N3
7150
      NEXT I
      PRINT
7160
7170
      PRINT "TOTAL CREDITS= ":C1
7171
      PRINT
      PRINT
7172
7180
      GOTO 60
      PRINT "COURSE OR SECTION NON EXISTENT"
8000
      GOTO 800
PRINI "ALHEADY HAVE ":25
9010
8100
8110 GOTO 800
      IF C1=M9 THEN 8230
8200
8210 PRINT "TOO MANY CREDITS"
8220
     GOTO 800
      PRINT "AT MAX CREDITS NOW"
8230
8240
      GOTO 7000
      PRINT "SECTION FULL"
8300
      REM COULD PRINT AVAILABLE
8310
8320
      GOTO 800
     PRINT "TIME CONFLICT WITH ":NS
8400
8410
      GOTO 800
8500
      PRINT "TROUBLE"
8510
      STOP
8600
      PRINT "NO ROOM FOR STUDENT"
8610
      STOP
9000
      REM GET STUDENT OR COURSE FILE.
9030 DIM W$[20]+X$[12]+Y$[20]+Z$[10]
9031
      IF END #1 THEN 9038
9032
      X1=1
     FOR X2=1 TO 32
9033
9034
      READ #1+X1;W$
9035
      IF W$=X$ THEN 9040
9036
      X1 = X1 + 4
9037
      NEXT X2
9038
      X = 0
9039
      RETURN
9040
      READ #1,X1
9045
      X=X ]
9046
      RETURN
9200 IF END #2 THEN 9207
9201
      ×1=1
9202
      FOR X2=1 TO 9
9203 READ #2+X1;W%
9204
      IF W$=2$ THEN 9209
9205
      X1=X1+13
9206
      NEXT X2
 9207
      Z=0
9208
      RETURN
9209
       READ #2,X1
9210
      Z=X1
      RETURN
9211
9212
      END
```

SOFAR

1 REM **** HP BASIC PROGRAM LIBRARY ************************ REM 2 3 REM SOFAR: COLLEGE REGISTRATION DEMO 4 REM 5 6/73 REM 36282 REV A PART 7 OF 10 6 REM REM **** CONTRIBUTED PROGRAM ********* ************** 7 10 REM STUDENTS REGISTERED SO FAR REPORT 20 FILES COURSE DIM N\$[10],0\$[20],P\$[20],Q\$[20],R\$[20] 30 40 IF END #1 THEN 280 50 E1=0

COLREG, Page 22 June 1973 F720-36282A 60 PRINT PRINT "COURSE"; TAB(13); "SEC"; TAB(18); "CRDS"; TAB(24); 70 15 PRINT "INSTRUCTOR"; TAB (47); "QUOTA"; TAB (53); "SOFAR" 80 PRINT 90 K1=1 100 FOR 1=1 TO 9 READ #1.K1:NS IF NS=" " THEN 240 110 120 130 READ #1:N3 140 M1=K1+1 150 FOR J=1 TU 6 160 READ #1.M1;05 170 IF 0\$=" " THEN 210 READ #1;P\$,Q\$.R\$,N5,N6 180 190 PRINT N\$; TAB(13); 0\$; TAB(18); N3; TAB(24); R\$; TAB(47); N5; TAB(53); N6 200 E1 = E1 + N6210 M1=M1+2 220 NEXT J 230 PRINT 240 K1=K1+13 250 NEXT I PRINT "TOTAL REGISTERED SOFAR =";E1 260 270 PRINT 280 END

GRAD

1 REM **** HP BASIC PROGRAM LIBRARY **************************** REM 2 3 RFM GRAD: COLLEGE REGISTRATION DEMO 4 REM 5 REM 36282 REV A PART 8 OF 10 6/73 6 REM 7 REM **** CONTRIBUTED PROGRAM ****************************** FILES STUDNT, COURSE, WORK1, WORK2 10 20 DIM 0\$[2],P\$[20],Q\$[20],R\$[20] 30 DIM A\$[12],8\$[20],C\$[20],D\$[2],J\$[10],K\$[2],M\$[2] 35 DIM E\$[2],T\$[2],U\$[2] 36 DIM L\$(2) 40 DIM NS[10] DIM F\$(12],H\$(20) 45 50 PRINT "ENTER COURSE TITLE"; 60 INPUT Z\$ PRINT "ENTER SECTION#"; 70 80 INPUT ES 90 PRINT "MID-TERM OR FINAL (M OR F)"; INPUT V\$ 100 110 GOSUB 9200 IF Z#0 THEN 150 120 PRINT "COURSE NON EXISTANT" 130 140 STOP 150 READ #2;N\$,N3,N4 160 Z=Z+1IF N4=0 THEN 220 165 170 FOR I=1 TO N4 180 READ #2,Z;0\$ 190 IF 0\$=E\$ THEN 240 200 Z=Z+2 NEXT I 210 220 PRINT "SECTION NON EXISTANT" 230 STOP 240 READ #2; P\$, Q\$, R\$, N5, N6 IF N6=0 THEN 280 FOR L=1 TO N6 245 246 250 READ #2;X\$,T\$,U\$ GOSUB 9000 260 270 IF X#0 THEN 300 280 PRINT "STUDENT NOT IN FILE" 290 STOP READ #1;A\$,B\$,C\$ 300 PRINT "ENTER MARK FOR "\$C\$;" "\$B\$; 310 320 INPUT D\$ 330 X=X+2 340 READ #1,X;N1 345 IF N1=0 THEN 400 FOR I=1 TO N1 350

READ #1: J\$.K\$.L8 .M5 .N2 360 370 IF JS=ZS THEN 420 380 PRINT #4; J\$, K\$.L5.M\$, N2. END 390 NEXT I 400 PRINT "COURSE NOT IN STUDENT FILE" 410 STOP 420 I9=I IF VS="F" THEN 460 425 430 L\$=D\$ 440 T\$=D\$ 450 GOTO 480 460 M\$=D\$ 470 U\$=D\$ 480 PRINT #4; J\$, K\$, L\$, M\$, N2, END 490 PRINT #3;X\$,T\$.U\$, END 500 FOR I=1 TO N1-I9 510 READ #1; J\$, K\$, L\$, M\$, N2 PRINT #4; J\$, K\$, L\$, M\$, N2, END 520 NEXT I 530 540 READ #4,1 550 READ #1,X 560 PRINT #1;N1, END 570 FOR I=1 TO N1 READ #41J\$,K\$.L\$,M\$,N2 580 590 PRINT #1: J\$.K\$.L\$.M\$.N2 . END 600 NEXT I 610 NEXT L 620 READ #3,1 630 READ #2,Z PRINT #2:05.P5.Q5.R5.N5.N6. END 635 640 FOR I=1 TO N6 READ #3;X\$,T\$.U\$ 650 660 PRINT #2;X\$,T\$,U\$, END NEXT I 670 680 STOP 690 END 9000 REM GET STUDENT OR COURSE FILE. 9030 DIM W\$[20],X\$[12],Y\$[20],Z\$[10] 9031 IF END #1 THEN 9038 9032 X1=1 9033 FOR X2=1 TO 32 9034 READ #1,X1;W5 9035 IF WS=X\$ THEN 9040 9036 X1=X1+4 9037 NEXT X2 9038 X = 09039 RETURN 9040 READ #1,X1 9045 X=X1 9046 RETURN 9200 IF END #2 THEN 9207 9201 X1=1 9202 FOR X2=1 TO 9 9203 READ #2,X1;W\$ 9204 IF W\$=2\$ THEN 9209 9205 X1=X1+13 9206 NEXT X2 9207 Z=0 9208 RETURN 9209 READ #2,X1 9210 Z=X1 9211 **RETURN** 9212 END CLASS **** HP BASIC PROGRAM LIBRARY ****** 1 REM REM 2 COLLEGE REGISTRATION DEMO CLASS: REM З 4 REM 5 REM 36282 REV A PART 9 OF 10 6/73 6 REM

```
COLREG, Page 24
June 1973
F720-36282A
    DIM A$[12].8$[20].C$[20].0$[1]
40
50
    DIM S$[12],T$[2],U$[2],G$[30],J$[10],K$[2]
60
    F = 0
70 PRINT "ALL, COURSE, OR COURSE-SECTION ?"
80 INPUT G$
90 IF GS="ALL" THEN 180
100 FOR I=1 TO 13
110 IF G$[I,I]="-" THEN 160
120
    NEXT I
130
     J$=G$
     K$="-"
140
150
     GOTO 180
160
     J%=G%[1,I-1]
170
     K$=G$[I+1]
180 IF END #1 THEN 670
     PRINT
190
200
     PRINT
210
     K1=1
220
     FOR I=1 TO 9
    READ #2,K1;N$
IF N$=" " THEN 590
230
240
250
    IF GS="ALL" THEN 270
    IF J$#N$ THEN 590
260
270
     READ #2:N3
280
     M1=K1+1
290
     FOR J=1 TO 6
300
     READ #2,M1:05
    IF 0$=" " THEN 570
310
320 IF G$="ALL" THEN 350
    IF K$="~" THEN 350
330
340
     IF K$#0$ THEN 570
350
    F = 1
360
     READ #2;P$,Q$,R$.N5.N6
370
     PRINT
     PRINT
380
390
     PRINT
400
     PRINT
     PRINT
410
420
     PRINT
     PRINT
430
     PRINT N$;"-":0$;" CR=":N3:" ":P5:" ":R5:" COUNT=":N6
440
450
     IF N6=0 THEN 570
     PRINT
460
470
     PRINT "STUDENT #";TAB(15);"NAME";TAB(60);"MT";TAB(65);"F"
480
     PRINT
     FOR L=1 TO N6
READ #2;5$,T$.U$
490
500
510
     X$=S$
520
     GOSUB 9000
530
     IF X=0 THEN 680
540
     READ #1;A$,B$.C$.D$
550
     PRINT A$; TAB(15); R$; "; C$: "; D$; TAB(60); T$; TAB(65); U$
560
     NEXT L
570
     M1=M1+2
580
     NEXT J
590
     K_1 = K_1 + 13
600
     NEXT I
610
     IF F=1 THEN 630
     PRINT "NOT IN FILES"
620
     PRINT
630
     PRINT
640
650
     PRINT
660
     PRINT
     STOP
670
680
     PRINT "TROUBLE"
690 END
9000 REM GET STUDENT OR COURSE FILE.
9030
      DIM W$[20], X$[12], Y$[20], Z$[10]
      IF END #1 THEN 9038
9031
9032
     X1=1
9033
      FOR X2=1 TO 32
9034
      READ #1+X1;W$
     IF W$=X$ THEN 9040
9035
9036
      X_1 = X_1 + 4
9037
      NEXT X2
9038
      X=0
9039
      RETURN
9040
      READ #1+X1
```

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```
9045 X=X1

9046 RETURN

9200 IF END #2 THEN 9207

9201 X1=1

9202 FOR X2=1 TO 9

9203 READ #2,X1:W%

9204 IF W$=Z$ THEN 9209

9205 X1=X1+13

9206 NEXT X2

9207 Z=0

9208 RETURN

9209 READ #2,X1

9210 Z=X1

9211 RETURN

9212 END
```

COPY

1 REM **** HP BASIC PROGRAM LIRRARY ********************** 2 REM COPY: COLLEGE REGISTRATION DEMO 3 REM 4 REM 5 REM 36282 REV A PART 10 OF I0 6/73 6 REM 7 REM **** CONTRIBUTED PROGRAM ******************************** 8 REM THIS PROGRAM RESTORES THE STUDENT AND COURSE FILE 9 FROM THE BACKUP FILES OF SSAVE AND CSAVE REM 10 FILES SSAVE, STUDNT, CSAVE, COURSE 20 DIM A\$[72] 25 FOR A=1 TO 3 STEP 2 27 B=A+1 30 IF END #A THEN 170 40 IF END #8 THEN 180 50 FOR I=1 TO 32000 60 READ #A.I 70 PRINT #B+I 80 GOTO TYP (-A) OF 90.120.150.160 90 READ #A:X 100 PRINT #8;X 110 GOTO 80 120 READ #A;A\$ 130 PRINT #B;A\$ 140 GOTO 80 150 PRINT #8; END 160 NEXT I 170 NEXT A 175 STOP 180 PRINT "SECOND FILE TOO SMALL" 190 END

CONTRIBUTED PROGRAM **BASIC**

		DRAG
TITLE:	SIMULATES A DRAG RACE	A903-36601A
DESCRIPTION:	This program allows the user to design a dragster to his own and then race it against a dragster designed by another user race it against a "standard" dragster design stored in the co one-quarter mile race is simulated with the computer printing time, speed and distance for both vehicles.	. He may also omputer. A
INSTRUCTIONS:	Instructions are contained within the program itself. Users quired to answer questions with "yes" or "no" or are asked to a numeric value. There are no files used.	are re- o enter
SYSTEM SPECIFICATIONS:	2000A and Teletype	
SPECIAL CONSIDERATIONS:	None	
ACKNOWLEDGEMENTS:	Thomas G. Cleaver	

University of Louisville

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DRAG, Page 2 June 1973 A903-36601A

RUN

RUN DRAG

WELCOME TO THE DRAG STRIP. WOULD YOU LIKE INSTRUCTIONS ?YES YOU MAY RACE AGAINST ONE OF YOUR FRIENDS OR YOU MAY RACE AGAINST MY DRAGSTER. YOU WILL BE ASKED TO DESIGN YOUR OWN MACHINE, SPECIFYING HORSEPOWER, REAR END RATIO (X:1), TIRE WIDTH IN INCHES AND TIRE DIAMETER IN FEET. DO YOU WANT TO RACE AGAINST ME?YES I WILL HAVE CAR#1. DESIGN CAR#2: HORSEPOWER= ?500 REAR END RATIO=?4 TIRE WIDTH= ?15 TIRE DIAMETER= ?3

G0!

ELAPSEI) (CAR#1	CA	R#2
TIME	SPEED	DISTANCE	SPEED	DISTANCE
(SEC)	(MPH)	(FT)	(MPH)	(FT)
CAR# 2	STOPS	BURNING RUBE	ER	
1.	22.0707	16.3821	20.2038	14.9338
2	43.5753	64.7826	40.2131	59.4559
3	64.0015	143.982	55.4805	132.817
4	82.9393	252.079	77.6997	233.693
5	100.107	386.668	94.6339	360.364
6	115.356	545.025	110.124	510.816
CAR# 1	STOPS	BURNING RUBE	ER	
7	128.639	724.299	124.088	682.863
8	139.186	921.156	136.426	874.221
9	146.922	1131.33	146.855	1082.27
9.860	47 151	1.81 132	0 154.445	1272.53
	WINNER	२		

DO YOU WANT TO TRY AGAIN ?YES DO YOU WANT TO RACE AGAINST ME?NO DESIGN CAR#1: HORSEPOWER = ?600 REAR END RATIO=?4.5 TIRE WIDTH= ?17 TIRE DIAMETER= ?3 DESIGN CAR#2: HORSEPOWER= ?500 REAR END RATIO=?4 TIRE WIDTH= ?2.6 TIRE DIAMETER= ?2.6

GO!

ELAPSED		CAR#1		CAR#2	
TIME	SPEED	DISTA	NCE	SPEED	DISTANCE
(SEC)	(MPH)	(FT)	(MPH)	(FT)
1	20.7443	15.3	889	14.376	10.6551
2	41.0949	60.9		28.6336	42.3217
3	60.6856	135.	855	42.6575	94.7399
4	79.2044	238.	724	56.3401	167.487
5	96.4112	367.	806	69.5843	259.987
6	112.145	521.	05	82.3064	371.536
7	126.322	696.	221	94.4372	501.313
8	138.929	891 •	022	105.923	648.409
CAR#	1 STOPS	5 BURNING	RUBBER		
9	149.833	1103	•13	116.726	811.85
9.96002 15		57.772	1320	126.53	1 983 • 187
WINNER					

LISTING

DRAG **** HP BASIC PROGRAM LIBRARY ********************* REM 1 REM 2 DRAG: SIMULATES A DRAG RACE 4 REM 4 REM REM 36601 REV A 6/73 5 6 REM PEM **** CONTRIBUTED PROGRAM *********************************** 7 10 DIM 1%[3],P[2],E[2],W[2],S[2],X[2],M[2],C[2],B[2],Y[2] 20 DIM 0[5] PRINT "WELCOME TO THE DRAG STRIP." 30 PRINT "WOULD YOU LIKE INSTRUCTIONS", 40 50 INPUT IS IF IS="NO" THEN 110 60 PRINT "YOU MAY RACE AGAINST ONE OF YOUR FRIENDS OR YOU MAY RACE" 70 PRINT "AGAINST MY DRAGSTER. YOU WILL BE ASKED TO DESIGN YOUR" 80 90 PRINT "OWN MACHINE. SPECIFYING HORSEPOWER. REAR END RATIO (X:1)." 100 PRINT "TIRE WIDTH IN INCHES AND TIRE DIAMETER IN FEET." PRINT "DO YOU WANT TO RACE AGAINST ME", 110 INPUT IS 120 IF IS="NO" THEN 200 130 140 PRINT "I WILL HAVE CAR#1." 150 P[1]=600 160 E[1]=5.9 170 W[]]=22 180 D[]]=3.9 190 GOTO 290 PRINT "DESIGN CAR#1:" 200 PRINT "HORSEPOWER=", 210 220 INPUT P(1) 230 PRINT "REAR END RATIO=", 240 INPUT E[1] 250 PRINT "TIRE WIDTH=", INPUT W[1] 260 PRINT "TIRE DIAMETER=". 270 280 INPUT D[1] PRINT "DESIGN CAR#2:" 290 300 PRINT "HORSEPOWER=", 310 INPUT P[2] PRINT "REAR END RATIO="+ 320 330 INPUT E[2] PRINT "TIRE WIDTH=", 340 INPUT W[2] 350 PRINT "TIRE DIAMETER="+ 360 370 INPUT D[2] 380 PRINT 390 PRINT "GO!" 400 K1 = 500410 K2=1.6 420 K3=2 K4=.0006 430 440 K5=.00006 450 K6=.2 460 K7=4 470 K8=.00015 480 Q[1]=Q[2]=0 490 S[1]=S[2]=0 500 x[1] = x[2] = 0510 REM:M IS MASS 520 FOR J=1 TO 2 M[J]=(K1+K2*P[J]+K3*W[J]*D[J]+K7*D[J]+2)/32.2 530 540 REM:C IS DRAG FROM WIND 550 C[J]=K4*M[J]+(2/3)+K8*W[J]*D[J] REM:B IS THE MAX ACCELERATION WITHOUT BURNING 560 570 B[J]=15+28*W[J]*D[J]/((W[J]+6)*(D[J]+1)) 580 REM:Y IS THE SCALE FACTOR FOR RPM VS POWER 590 Y[J]=3.7-.0033*P[J] 600 NEXT J 610 PRINT PRINT 620 PRINT "ELAPSED"; TAB(15); "CAR#1"; TAB(39); "CAR#2" 630 640 PRINT "TIME SPEED DISTANCE SPEED DISTANCE" 650 PRINT "(SEC) (MPH) (FT)" (MPH) (FT)660 PRINT

```
DRAG, Page 4
June 1973
A903-36601A
670 FOR T=0 TO 100 STEP 1
680 FOR T1=1 TO 100 STEP 1
690
    FOR J=1 TO 2
700 REMIR IS RPM
710 R=60*S[J]*E[J]/(3.)4159*D[J])
051
    REM:LO IS ENGINE TORQUE
730
    L0=(P[J]/42.5)*(50+.0078*(R/Y[J])-4.E-10*(R/Y[J])*3)
740 REM:L1 IS TORQUE FROM FRICTION
750 L1=P[J]*(K5*R+K6)
760 REM:L2 IS REAR AXEL TORQUE
770 L2=E[J]*(L0-L1)
780 REM F IS FORCE ON ROAD FROM TIRES
790 F=2*L2/D[J]
800 REM:TEST FOR BURN
810 IF F>M[J]*8[J] THEN 880
820 REM:A=ACCELERATION
830
    IF Q[J] <> 0 THEN 860
840 PRINT "CAR#": J: "STOPS BURNING RUBBER"
850 G[J]=1
860
    A = (F - C[J] * S[J] + 2) / M[J]
870 GOTO 900
880 A=B[J]-C[J]*S[J]+2/M[J]
890 REM:S=SPEED IN FT/SEC
900
    S[J]=S[J]+A*•01
910 REM:X=DISTANCE IN FT
    X[J]=X[J]+S[J]*•01
056
930
    NEXT J
940 REM:TEST FOR FINISH
    IF X[1]<5280/4 AND X[2]<5280/4 THEN 1160
950
960
     IF X[1]>X[2] THEN 1080
    T3=(X[2]-5280/4)/S[2]
970
980
    T=T+T1/100-T3
990
    X[2]=5280/4
1000 x[1]=x[1]-S[1]*T3
      PRINT T;S[1]*3600/5280;X[1]:S[2]*3600/5280;X[2]
1010
      PRINT TAB(40);"WINNER"
1020
1030
      PRINT
1040
      PRINT "DO YOU WANT TO TRY AGAIN".
      INPUT IS
1050
      IF IS="YES" THEN 110
1060
      STOP
1070
1080
      T3=(X[1]-5280/4)/S[1]
1090
      T=T+T1/100-T3
1100
      X[1]=5280/4
1110
      X[2]=X[2]-S[2]*T3
      PRINT T;S[1]*3600/5280;X[1];S[2]*3600/5280;X[2]
1120
      PRINT TAB(10):"W1NNER"
1130
1140
      PRINT
1150
      GOTO 1040
1160
      NEXT T1
1170
      PRINT T+1:S[1]*3600/5280;X[1];S[2]*3600/5280;X[2]
1180
      NEXT T
1190
      STOP
1200 END
```

CONTRIBUTED PROGRAM **BASIC**

TITLE:	GENERATES LARGE LETTERS	PR INT F904-36299A
DESCRIPTION:	This program prints large block letters. Four different size selected (2, 3.5, 5, or 7-inch characters).	s may be
INSTRUCTIONS:	Type a 'l' to the question 'INFORMATION' to receive instructi the machine types 'SIZE' type a number from 1 to 4 for charac above sizes. When the machine types 'WHAT IS YOUR MESSAGE' i message from 1 to 72 characters. For quotes use a control K. machine types 'METHOD' type 1 for characters printed in the c they represent, and 2 for characters printed in a character o	ters of the nput a When the
SYSTEM SPECIFICATIONS:	2000F and Teletype	
SPECIAL CONSIDERATIONS:	None	
ACKNOWLEDGEMENTS:	Randy Gilbertson Stillwater Senior High School	

PRINT, Page 2 June 1973 F904-36299A

RUN PRINT

INFORMATION?1 THIS PROGRAM PRINTS CHARACTERS OF HEIGHT 2, 3.5, 5, OR 7 INCHES. WHEN THE MACHINE TYPES 'SIZE?' TYPE A NUMBER FROM 1 TO 4 FOR CHARACTERS OF THE ABOVE SIZES. WHEN THE MACHINE TYPES 'WHAT IS YOUR MESSAGE?' INPUT A MESSAGE FROM 1 TO 72 CHARACTERS. FOR QUOTES USE A CONTROL K. WHEN THE MACHINE TYPES 'METHOD?' TYPE (1) CHARACTERS PRINTED IN THE CHARACTER THEY REPRESENT (2) PRINTED IN A CHARACTER OF YOUR CHOICE. SIZE?1 WHAT IS YOUR MESSAGE? H-P METHOD?1

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РРРРРРРРРРРРРРР

 PP
 PP

 PP
 PP

 PP
 PP

 PPPPPPPPPPPP

DONE RUN PRINT

INFORMATION?Ø SIZE?2 WHAT IS YOUR MESSAGE? TSB METHOD?2 INPUT 2 OF YOUR CHARACTERS?HP

CONTRIBUTED PROGRAM BASIC

TITLE:	QUBIC PLAYS 3-DIMENSIONAL TIC-TAC-TOE A903-36106A
DESCRIPTION:	The game is Tic-Tac-Toe in a 4 by 4 cube.
INSTRUCTIONS:	Each move is indicated by a three digit number, with each digit between 1 and 4 inclusive. The digits indicate the level, row, and column, respectively, of the indicated place. After each pair of moves the computer will print the game board with X's indicating the computer's positions and 0's indicating the player's positions. To use, simply type run.
SYSTEM SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	None
ACKNOWLEDGEMENTS:	

QUBIC, page 2 December 1970 A903-36106A

RUN

GET-QUBIC RUN QUBIC

THIS IS THE GAME OF QUBIC

DO YOU WANT INSTRUCTIONS?YES

THE GAME IS TIC-TAC-TOE IN A 4 X 4 X 4 CUBE. EACH MOVE IS INDICATED BY A 3 DIGIT NUMBER, WITH EACH DIGIT BETWEEN 1 AND 4 INCLUSIVE. THE DIGITS INDICATE THE LEVEL, ROW, AND COLUMN, RESPECTIVELY, OF THE OCCUPIED PLACE.

AFTER EACH PAIR OF MOVES I WILL PRINT THE GAME BOARD WITH X'S INDICATING MY POSITIONS AND O'S INDICATING YOUR POSITIONS.

AFTER I WIN, I WILL PRINT THE BOARD SHOWING THE FINAL POSITIONS.

YOUR MOVE?134 MACHINE MOVES TO 414

0.... X...X

YOUR MOVE?413 MACHINE MOVES TO 114

0...X X.0X

YOUR MOVE? DONE 7 6 5' -1 6 4 (1) 3 11 3 4 5 3

Var Pay & Car

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LISTING

QUBIC

D

```
REM PLAYS 3-DIMENSIONAL TIC-TAC-TOE
    9002
    9003
         DIM A$[72]
         19=8
    9004
    90/85
         PRINT "WATHIS IS THE GAME OF QUBICH"
 n
         PRINT "DO YOU WANT INSTRUCTIONS";
    9006
    9007
          INPUT AS
          IF A$="NO" THEN 9025
    9008
          IF AS="YES" THEN 9012
    9009
          PRINT "PLEASE TYPE 'YES' OR 'NO!";
 ħ
    9010
          GOTO 9007
    9Ø11
    9012
         PRINT
    9013
         PRINT "THE GAME IS TIC-TAC-TOE IN A 4 X 4 X 4 CUBE."
          PRINT "EACH MOVE IS INDICATED BY A 3 DIGIT NUMBER, WITH EACH"
    9014
    9015
         PRINT "DIGIT BETWEEN 1 AND 4 INCLUSIVE. THE DIGITS INDICATE THE"
         PRINT "LEVEL, ROW, AND COLUMN, RESPECTIVELY, OF THE OCCUPIED PLACE."
    9016
          PRINT "MAFTER EACH PAIR OF MOVES I WILL PRINT THE GAME BOARD WITH"
    9ø17
         PRINT "X'S INDICATING MY POSITIONS AND O'S INDICATING YOUR POS-"
    9018
          PRINT "ITIONS."
    9019
          PRINT "WWAFTER I WIN, I WILL PRINT THE BOARD SHOWING THE FINAL"
    9,920
          PRINT "POSITIONS."
    9ø21
          DIM X[64],L[76],M[76,4],Y[16]
    9022
    9023
          DEF FNL(I)=X[M(I,1)]+X[M(I,2]]+X[M(I,3]]+X[M(I,4]]
          DEF FNM(M)=M+11Ø+6+INT((M-1)/4)+6Ø+INT((M-1)/16)
    9024
    9025
        MAT READ Y.M
    9026
         MAT X=ZER
D
    9027
          PRINT "MADO YOU WANT TO MOVE FIRST";
    9028
          INPUT AS
          IF A$="YES" THEN 9034
    9829
          IF AS="NO" THEN 9/050
    9030
          PRINT "PLEASE TYPE 'YES' OR 'NO'"!
0
    9031
    9032
          GOTO 90/28
          GOSUB 9204
    9ø33
          PRINT "YOUR MOVE";
    9034
    9ø35
          INPUT J1
    9ø36
          GOSUB 9200
    9ø⁄37
          UNDE K1=INT (J1/100)
    9ø38 ₩ J2=(J1-K1+100)
    9039
          1885 K2=INT(J2/10)
          K3=J1~K1*1999~K2*19
    9040
    9041
          IF J1>444 OR J1<111 OR J1 <> INT(J1) THEN 9843
    9042
          IF K1 <= 4 AND K2 <= 4 AND K3 <= 4 THEN 9045
    9043
          PRINT "ILLEGAL MOVE, TRY AGAIN"
    9044
          GOTO 9035
    9045
          M=16+K1+4+K2+K3-20
          IF X[M]=0 THEN 9049
    9ø46
          PRINT "THAT SQUARE IS USED, TRY AGAIN"
    9047
    9048
          GOTO 9034
    9049
          1957 X[M]=1
    9ø5ø
         GOSUB 9134
    9ø51
          1355 S=T=0
    9052
          FOR I=1 TO 76
    9ø53
          IF L[I] <> 4 THEN 9,061
D
          PRINT "CONGRATULATIONS!"
    9054
          PRINT "YOU WIN AS FOLLOWS";
    9055
    9056
          PRINT FNM(M[1,1]);FNM(M[1,2]);FNM(M[1,3]);FNM(M[1,4]);
    9057
          PRINT
          PRINT "FINAL POSITION:"
    9058
    9059
          GOSUB 9294
    9060
          GOTO 9123
    9ø61
          IF L[I] <> 15 THEN 9,063
    9062
          S=I
         IF L(I) <> 3 THEN 9065
    9063
    9064
          DET T=I
    9065
          NEXT I
          IF S=0 THEN 9075
    9066
    9067
          Lasa I=S
    9068
          FOR J=1 TO 4
    9869
          M=M[I,J]
         IF X[M]> & THEN 9,074
    9070
    9071
          HERE XIM1=5
    9072
          PRINT "MACHINE MOVES TO"FNM(M)", AND WINS AS FOLLOWS";
    9073
          GOTO 9,056
    9074
          NEXT J
    9075
         IF T=0 THEN 91,07
```

December 1970 A903-36106A 9076 I=T 9077 FOR J=1 TO 4 9078 MEN M=M[I,J] IF X[M]>0 THEN 9083 9079 9686 X[M]=5 90⁄81 PRINT "NICE TRY -- MACHINE MOVES TO"FNM (M) 9082 GOTO 9,8'33 90/83 NEXT J 9084 FOR I=1 TO 76 9ø85 L=FNL(I) 90⁄86 IF INT(L) <> 2 THEN 9892 9087 IF L>2 THEN 9178 90/88 FOR J=1 TO 4 90⁄89 IF X[M[I,J]]>@ THEN 9,091 9898 X[M[I,J]]=.125 9091 NEXT J NEXT I 9892 9ø93 GOSUB 9134 FOR I=1 TO 76 9094 9ø95 IF L[I]=.5 THEN 9188 9896 IF L[1]=1.375 THEN 9188 9897 NEXT I 9098 GOTO 9146 9899 FOR Z=1 TO 16 91.00 IF X[Y[Z]]=# THEN 9103 9161 NEXT Z 9102 GOTO 9138 9103 M=Y[Z] 1987 X[M]=5 91.04 20 91,05 PRINT "MACHINE MOVES TO"FNM(M) 9106 GOTO 9/33 9197 FOR I=1 TO 76 9198 L=FNL(I) 9109 IF INT(L) <> 10 THEN 9115 911ø IF L>10 THEN 9178 9111 FOR J=1 TO 4 9112 IF X[M[I,J]]>@ THEN 9114 9113 X[M[I,J]]=.125 NEXT J 9114 9115 NEXT I 9116 GOSUB 9134 9117 FOR I=1 TO 76 IF L[I]=.5 THEN 9188 9118 9119 IF L[1]=5.375 THEN 9188 NEXT I 9128 9121 GOSUB 92,00 GOTO 9/84 9122 Z9=Z9+1 IF Z9=2 THEN 9218 9123 9124 PRINT "WOULD YOU LIKE ANOTHER GAME"; 9125 9126 INPUT A\$ IF AS="YES" THEN 9026 IF AS="NO" THEN 9131 9127 9128 9129 PRINT "PLEASE TYPE 'YES' OR 'NO!"; 9130 GOTO 9126 9131 STOP 9132 REM 9133 REM 9134 FOR S=1 TO 76 HANT L[S]=FNL(S) 9135 9136 NEXT S 9137 RETURN FOR M=1 TO 64 9138 9139 IF X[M]>0 THEN 9143 9140 ### X[M]=5 0 2 PRINT "MACHINE LIKES"FNM(M) 9141 9142 GOTO 9033 9143 NEXT M PRINT "THE GAME IS A DRAW" 9144 9145 GOTO 9123 9146 FOR K=1 TO 72 STEP 4 9147 P=INT(L[K])+INT(L[K+1])+INT(L[K+2])+INT(L[K+3]) IF P=4 OR P=9 THEN 9152 9148 9149 NEXT K 9150 GOSUB 9200 9151 GOTO 9999 9152 LEF S=.125

QUBIC, page 4

9153 FOR I=K TO K+3 9154 GOTO 9189 9155 NEXT I 5=0 9156 GOTO 9153 9157 DATA 1,49,52,4,13,61,64,16,22,39,23,38,26,42,27,43 9158 DATA 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,28 9159 DATA 21,22,23,24,25,26,27,28,29,30,31,32,33,34,35,36,37,38 9160 DATA 39,40,41,42,43,44,45,46,47,48,49,50,51,52,53,54,55,56 9161 9162 DATA 57,58,59,60,61,62,63,64 DATA 1,17,33,49,2,18,34,50,3,19,35,51,4,20,36,52 9163 DATA 5,21,37,53,6,22,38,54,7,23,39,55,8,24,48,56 9164 DATA 9,25,41,57,10,26,42,58,11,27,43,59,12,28,44,60 9165 DATA 13,29,45,61,14,38,46,62,15,31,47,63,16,32,48,64 9166 DATA 1,5,9,13,17,21,25,29,33,37,41,45,49,53,57,61 9167 DATA 2,6,10,14,18,22,26,30,34,38,42,46,50,54,58,62 9168 DATA 3,7,11,15,19,23,27,31,35,39,43,47,51,55,59,63 9169 DATA 4,8,12,16,20,24,28,32,36,40,44,48,52,56,60,64 917ø DATA 1+6+11+16+17+22+27+32+33+38+43+48+49+54+59+64 9171 DATA 13,19,7,4,29,26,23,28,45,42,39,36,61,58,55,52 9172 DATA 1,21,41,61,2,22,42,62,3,23,43,63,4,24,44,64 9173 DATA 49,37,25,13,50,38,26,14,51,39,27,15,52,40,28,16 9174 DATA 1,18,35,52,5,22,39,56,9,26,43,68,13,38,47,64 9175 DATA 49,34,19,4,53,38,23,8,57,42,27,12,61,46,31,16 9176 9177 DATA 1,22,43,64,16,27,38,49,4,23,42,61,13,26,39,52 9178 FOR J=1 TO 4 IF X[M[I,J]] <> .125 THEN 9187 9179 91.8Ø ₩# X[M[I+J]]=5 9181 IF L<5 THEN 9184 PRINT "LET'S SEE YOU GET OUT OF THIS: MACHINE MOVES TO"; 9182 9183 GOTO 9185 9184 PRINT "YOU FOX! JUST IN THE NICK OF TIME, MACHINE MOVES TO"; 9185 PRINT FNM(M(I+J)) 9186 GOTO 9033 9187 NEXT J 9188 S= 125 9189 IF I-INT(I/4)#4>1 THEN 9192 919ø 1688 A=1 9191 GOTO 9193 9192 A=2 9193 FOR J=A TO 5-A STEP 5-2*A 9194 IF X[M[I,J]]=S THEN 9197 9195 NEXT J 9196 GOTO 9155 9197 X[M[I,J]]=5 9198 PRINT "MACHINE TAKES"; 9199 GOTO 9185 9280 FOR I=1 TO 64 92Ø1 X(I)=INT(X(I)) 9202 NEXT I 9203 RETURN 9204 A\$="0.X" 9205 PRINT MALE 9206 FOR I1=1 TO 13 STEP 4 9207 FOR J1=I1 TO I1+48 STEP 16 9208 FOR K1=J1 TO J1+3 9209 LET L=ABS(X[K1]-2) 921Ø PRINT AS(L,L); 9211 NEXT K1 9212 PRINT " 9213 NEXT J1 9214 PRINT " " 9215 NEXT II 9216 PRINT . 9217 RETURN STOP 9218 9219 END

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CONTRIBUTED PROGRAM BASIC

	PLOTS A GIVEN FUNCTION ON THE TELETYPE	PLOT A904-36104A
DESCRIPTION:	A program to plot a given function on the terminal. It che and maximum Y values over the domain, excluding the undefin calculates the Y axis spacing, and plots the function.	cks for minumum ed points,
	Computer Museum	
INSTRUCTIONS:	Define the function in line 8900 by: DEF FNF(X) =	
	Example: 8900 DEF FNF(X) = 25*COS(X)*SIN(X+2/2)/(X+2+1)	
	Type RUN and the program will request the following informa	tion:
	 left X end point right X end point desired X increment points on the X-axis for which the function is u example, the denominator becomes zero) 	ndefined (for
	The output will give:	
	 minimum Y maximum Y Y-axis spacing the plot with the Y-axis horizontal and the X-ax the paper. 	is vertical on
SYSTEM SPECIFICATIONS:	2000A and Teletype.	
SPECIAL CONSIDERATIONS:	The program will not handle functions where Y is a constant range.	over the entire
	Error halts and messages: "THIS IS THE CONSTANT FUNCTION" - The value of the function its range and the program cannot plot it.	is constant over
	"DIVIDE BY ZERO" The function has an undefined point dicated in the input.	which was not in-
ACKNOWLEDGEMENTS:		

PLOT, page 2 December 1970 A904-36104A

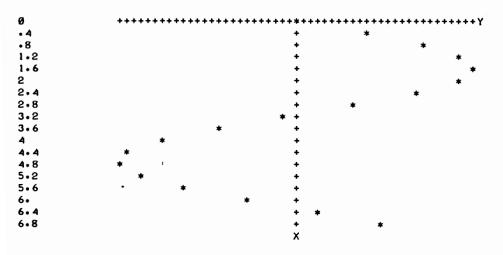
RUN

GET-\$PLOT 8900 DEF FNF(X)=SIN(X) RUN PLOT

PLEASE INPUT THE FOLLOWING PARAMETERS:

LEFT X-ENDPOINT?Ø RIGHT X-ENDPOINT?7 X-SPACING?•4 THE NUMBER OF UNDEFINED POINTS (IF NONE, ENTER Ø)?Ø

THE MINIMUM VALUE OF THE FUNCTION IS-.996165 THE MAXIMUM VALUE OF THE FUNCTION IS .999574 THE SPACING ON THE Y-AXIS IS 3.99148E-02



DONE

LISTING

PLOT

```
8900
     DEF FNF(X)=SIN(X)
9000 REM ***** PLOT ***** MATHEMATICS PROGRAM
9001 REM ***** VERSION 1 ***** 7/31/69 ****
                       **** MATHEMATICS PROGRAM ****
9002 REM PLOTS A FUNCTION ON THE TTY.
9003 LET R1=0
     LET L1=0
9004
9005 LET Q1=0
9006 PRINT "NNPLEASE INPUT THE FOLLOWING PARAMETERS:"
9007
     PRINT "NLEFT X-ENDPOINT";
9008
     INPUT A
9009 PRINT "RIGHT X-ENDPOINT";
9010 INPUT B
9011
     PRINT "X-SPACING";
9012
     INPUT D
9013 PRINT "THE NUMBER OF UNDEFINED POINTS (IF NONE, ENTER 0)";
9014
     INPUT N9
9015 IF N9=0 THEN 9018
9016 PRINT "ENTER THE UNDEFINED POINTS SEPARATED BY COMMAS"
9017
     MAT INPUT Z[N9]
9018 DEF FNG(X)=INT((Y7-L1)/D1+.5)+15
9019 LET L2=R2=FNF(A)
9020 FOR X=A TO B STEP D
     FOR I=1 TO N9
9021
9022 IF X=Z[1] THEN 9028
9023 NEXT I
9024
      IF FNF(X)>L2 THEN 9026
9025 LET L2=FNF(X)
9026 IF FNF(X) < R2 THEN 9028
9027
     LET R2=FNF(X)
9028 NEXT X
9029 IF L2<0 THEN 9032
9030
     LET R1=R2
9031
      GOTO 9036
9032 IF R2>0 THEN 9034
9033 GOTO 9035
     LET R1=R2
9034
9035 LET L1=L2
9036 LET D1=(R1-L1)/50
9037
      IF L1<R1 THEN 9040
9038 PRINT "THIS IS THE FUNCTION Y=CONSTANT."
9039
      STOP
9040 PRINT "NNTHE MINIMUM VALUE OF THE FUNCTION IS";L2
9041 PRINT "NTHE MAXIMUM VALUE OF THE FUNCTION IS" #2
9042 PRINT "NTHE SPACING ON THE Y-AXIS IS";D1
9043
      PRINT "NNNNN"
9044 LET F=INT(-L1/D1+.5)+15
9045 IF A <= 0 THEN 9056
9046 IF A/D>6 THEN 9056
9047 LET Q1=1
9048 IF L1=0 THEN 9050
9049
     PRINT TAB(F);"+"
9050
      PRINT
9051
     GOTO 9075
9052 FOR I=1 TO INT(A/D-.5)
9053 PRINT TAB(F) # + "
9054
      NEXT I
9055 LET 01=0
     FOR X=A TO B STEP D
9056
9057 IF D<.0001 THEN 9060
9058 IF ABS(X) >.00001 THEN 9060
9059
      LET X=0
9060 PRINT X,
9061 FOR P=1 TO N9
9062 IF X#Z[P] THEN 9072
9063 IF X#0 THEN 9070
9064 FOR I2=1 TO 50
9065 PRINT "+";
9066
     NEXT I2
9067 LET Q=1
9068 PRINT "Y"
9069
      GOTO 9103
 9070 PRINT TAB(F) ;"+"
9071
      GOTO 9103
9072
      NEXT P
9073 IF X#(X+D)>0 THEN 9093
```

December 1970 A904-36104A 9074 IF X -D/2 THEN 9093 9075 FOR I=0 TO 50 9076 IF Q1>0 THEN 9079 9077 LET Y7=FNF(X) 9078 IF FNG(X)=I+15 THEN 9082 9079 IF I+15=F THEN 9084 9080 PRINT "+"; 9081 GOTO 9085 9082 PRINT "*"; 9083 GOTO 9085 9084 PRINT "0"; 9085 NEXT I 9086 IF I+15#F THEN 9088 9087 PRINT "+"; 9088 PRINT "Y" 9089 LET Q=1 9090 IF (Q1+1)=1 THEN 9103 9090 IF (Q1+1)=1 THEN 9103 9091 IF (Q1+1)=2 THEN 9052 9092 IF (Q1+1)=3 THEN 9112 9093 IF X*(X-D)>0 THEN 9095 9094 IF X <= D/2 THEN 9075 9095 LET Y7=FNF(X) 9096 IF FNG(X)>F THEN 9102 9097 IF FNG(X)=F THEN 9100 9098 PRINT TAB(FNG(X));"+";TAB(F);"+" 9099 GOTO 9103 9100 PRINT TAB(F) ; "+" 9101 GOTO 9103 9102 PRINT TAB PRINT TAB(F) ; "+"; TAB(FNG(X)) ; "+" 9103 NEXT X 9104 IF X >= 0 THEN 9113 9105 IF -X/D>6 THEN 9113 9106 FOR I=1 TO INT(-X/D-.5) 9107 PRINT TAB(F);"+" 9108 NEXT I 9109 LET Q1=2 9110 PRINT 9111 GOTO 9075 9112 PRINT TAB(F);"+" 9113 PRINT TAB(F);"X" 9114 IF Q=0 THEN 9116 9115 STOP 9116 PRINT 9117 PRINT 9118 PRINT 9119 FOR I=0 TO 50 9120 PRINT "+"; NEXT I PRINT "Y" 9121 9122 9123 PRINT 9124 PRINT 9125 PRINT " SINCE THE REAL Y-AXIS IS OFF THE GRAPH." 9126 STOP 9999 END

PLOT, page 4

CONTRIBUTED PROGRAM BASIC

TITLE:	A GAME OF CELLULAR GENERATION GROWTH	LIFE A903- 36138A
DESCRIPTION:	This is John Conway's Game of Life. Articles further descr may be found in the mathematical games section of Scientifi issues of October 70, November 70, and February 71. The ga cellular generation growth. Each cell is one printed chara is surrounded by eight other cells, in three directions: di zontally, vertically. In each generation cells die and gro A cell dies from over population if it is surrounded by mor cells. It will also die of isolation if it has less than 2 ing it. New cells can be formed only in empty positions if has 3 cells around it. The maximum grid size is a 60 x 60 generation is printed as specified at the beginning of the cell is one printed character. The digit printed (a living last digit of the generation it was born in. For example: born in generations what was born during each generation is removed from the grid and replaced with a blank (not pri be noted that the rate of growth in any direction is limite any direction per generation.	ic American ame involves acter. A cell agonally, hori- ow simultaneously. re than 3 living cells surround- f and only if it matrix. Each program. Each g cell) is the if a cell was ving you to tell, n. A dead cell inted). It might
INSTRUCTIONS:	The maximum grid size is 60 x 60 cells. Any life pattern e will either lose accuracy or terminate the program dependin large horizontally or vertically. The program requires that opened: "Open-A,62" "OPEN-B,62" At the start of the prog- asked information about the printing of each generation (in The row of the life pattern is simply the row in which cert living. In entering a life pattern type a "l" for a living will be assumed to be empty cells. Enter your cells in quo left blanks will be ignored). Type "DONE" in response to the terminate your input. ERRORS: it is possible for a life pattern to grow off to co grid. Error notices will be given before the number of the this should occur. Adjustment errors of this type will sim pattern the specified direction automatically, thus always pattern within the grid. Note, if you input your pattern so one, the program will move your pattern down two rows thus upward growth, similarly to both the left and right sides of When requesting the interval of print and start of print th ation will ALWAYS be printed thus allowing you to check to inputted pattern was correct.	ng if it is too at two files be gram you will be aterval and start). tain cells are g cell, blanks btes (otherwise the row number to one side of the e generation if mply move the keeping the starting a row allowing for an of the grid. he first gener-
SYSTEM SPECIFICATIONS:	2000A and Teletype	
SPECIAL CONSIDERATIONS:	REFERENCE: John Conway's Game of Life. Articles further da may be found in the mathematical games section of Scientifi of October 1970, November 1970, and February 1971.	escribing his game c American issues
ACKNOWLEDGEMENTS:	Richard Suslick N.O.S.C.O.M.P.	

LIFE, page 2 November 1971 A903-36138A			
RUN			
OPEN-A,62 OPEN-B,62 RUN LIFE			
THIS IS	LIFE	WELCOME	
WHAT IS THE # OF WHAT IS THE INTE	IRST GENER T GENERATI THE FIRST RVAL OF PI	RATION?YES ON TO BE COMPUTED?10 GENERATION TO BE PRINTED?1 RINTED GENERATIONS YOU WANT? ROW OF LIFE PATTERN?26 1 111" 1 111"	
GENERATION # 1			
ROW 26	111 11		
ROW 27 Row 28	111 11 111 11		
ROW 29			
ROW 30	111 11	1 111	
GENERATION # 2			
ROW 25	2 2		
ROW 26 Row 27	111		
ROW 28	111	-	
ROW 29 Row 30	1 1	1	
ROW 31	2 2		
GENERATION # 3			
ROW 25	22	2	
ROW 26	13 3	31	
ROW 27 ROW 28	23	32	
ROW 29	33	3	
GENERATION # 4			
ROW 25	42	24	
ROW 26	4 3	3 4	
ROW 27 Row 28	234 4	432 4	
GENERATION # 5			
ROW 25 ROW 26	42 4 5	24 5 4	
ROW 27	24	4 2	
ROV 28	545	545	
GENERATION # 6			
ROW 25	42	24	
ROW 26 Row 27	45 6246	5 4 64 26	
ROW 28 ROW 29	55	5 5	
100 27	6	6	

GENERATION # 7

ROW	25	42	24
ROW	26	74 5	5 47
ROW	27	62 46	64 26
ROW	28	75 57	75 57
ROW	29	6	6

GENERATION # 8

ROW	25	842		24	18
ROW	26	7	5	5	7
ROW	27	8	8	8	8
ROW	28	7	7	7	7
ROW	29	8	68	86	58

GENERATION # 9

ROW 24	9	9
ROW 25	842	248
ROW 26	79995	59997
ROW 27	89 98	89 98
ROW 28	79997	79997
ROV 29	868	868
ROW 30	9	9

GENERATION # 10

ROV	24	Ø	090		090	
ROW	25	Ø	Ø	ø	ø	
ROW	26	ø	ø	ø	ø	
ROW	27	8	8	8	8	
ROV	28	ø	ø	ø	ø	
ROW	29	ø	ø	Ø	ø	
ROW	30	Ø	90	Ø	90	

DONE

LISTING

LIFE
T REM #### HP TIME-SHARED BASTO RROGRAM LIBRARY ###################################
2-aREM
3 REM LIFE: A GAME OF CELLULAR GENERATION GROWTH
5~~BEH: 36138~1490310 REVEA
6-REM"
7 REN DOG CONTRIBUTED PROGRAM CONTRACTOR AND A CARD AND A CARD A
10 FILES A.B
20 DIM A\$[62],B\$[62],C\$[62],X\$[62]
30 PRINT CONF
40 PRINT "THIS IS LIFEWELCOMEWELCOME
60 M4=M5=S4=0 70 GOTO 1410
80 A\$="
90 FOR R=1 TO 62
110 PRINT #2, R; A\$
120 NEXT R
130 PRINT "WHAT IS THE # OF THE FIRST ROW OF LIFE PATTERN";
140 INPUT R
150 Fl=R-1
16Ø PRINT "ROW"R;TAB(8);
170 INPUT B\$
180 IF BS="DONE" THEN 280
190 IF R>60 THEN 280
200 IF LEN(B\$)=62 THEN 230
210 Q=62-LEN(B\$)
220 B\$(LEN(B\$)+1,62]=A\$(1,Q)
230 C\$[1,1]=" " 240 C\$[2,62]=B\$[1,61]
C40 C3[C10C]=D3[110]

```
LIFE, page 4
November 1971
A903-36138A
250
     PRINT #2,RJC$
260
     R=R+1
270
     GOTO 160
280
     Ll=R
     PRINT THE
290
300
     T9=Ø
     FOR Z=01 TO 02
310
320
     IF T9#0 THEN 350
330
     Z=7-1
     GOTO 810
340
     IF F1<2 THEN 1910
350
360
     IF L1>59 THEN 2080
     READ #1.F1-1;85
370
380
     READ #1,F1;C$
390
     READ HS
400
     M4=M5=S4=Ø
410 IF H$#"1" THEN 430
420
     RESTORE
     FOR R=F1 TO L1
430
440
     A$=8$
450
     B$=C$
     READ #1,R+1;C$
460
     X$[1+1]=" "
470
     FOR Q=2 TO 61
480
490
     M=0
     FOR N=Q-1 TO Q+1
500
     IF A$[N+N]=" " THEN 530
510
520
     М=м+1
530
     NEXT N
540
     IF B$[Q-1,Q-1]=" " THEN 560
550
     М=м+1
560
     IF B$[Q+1,Q+1]=" " THEN 580
570
     м=м+1
58Ø
     FOR N=Q-1 TO Q+1
590
     IF C$[N,N]=" " THEN 610
600
     M=M+1
610
     NEXT N
     IF M#3 THEN 660
620
    IF B$[Q,Q]#" " THEN 680
630
640
     X$[Q,Q]=H$
650
     GOTO 710
     IF B$[Q,Q]=" " THEN 700
660
670
     IF M#2 THEN 700
680
     X$[Q,Q]=B$[Q,Q]
     GOTO 710
690
700
     X$[Q,Q]=" "
710
     NEXT Q
720
     IF X$[2,2]=" " THEN 740
730
     M4 = M4 + 1
     IF X$[61,61]=" " THEN 760
740
750
     M5=M5+1
760
     X$[62,62]=" "
770
     PRINT #2,R$X$
780
     NEXT R
     IF M4#0 THEN 1720
IF M5#0 THEN 1800
790
800
810
     S9=1
820
     T1=F1-1
830
     IF F1-1 >= 1 THEN 850
840
     T1=T1+1
850
     T2=L1
860
     GOSUB 1160
870
     Rl=R
880
     T1=L1
890
     S9=-1
900
     T2=F1
910
     GOSUB 1160
920
     IF R >= R1 THEN 950
930
     PRINT "LIFE NOW DEAD -- GENERATION #"Z
940
     STOP
950
     F1=R1-1
960
     L1=R+1
     IF T9=0 THEN 990
IF Z<E9 OR (Z-E9)/F9#INT((Z-E9)/F9) THEN 1090
970
980
990
     T9=1
1000
     PRINT "GENERATION #"Z;"N"
1010
      FOR TI=R1 TO R
1020
     READ #2,T1;X$
```

1030 FOR M=61 TO 2 STEP -1 1040 IF X\$[M,M]#" " THEN 1060 1050 NEXT M 1060 PRINT "ROW"T1;TAB(10);X\${1,m} 1070 NEXT T1 PRINT "N" 1080 FOR R=1 TO 62 1090 1100 READ #2,R;X\$ PRINT #1,R;X\$ 1110 1120 NFXT R 1130 NEXT Z 1140 DATA "2","3","4","5","6","7","8","9","0","1","X" 1150 END FOR R=T1+1 TO T2 STEP S9 1160 1170 READ #2,R\$X\$ 1180 IF XS#" " THEN 1200 1190 NEXT R 1200 RETURN 1210 PRINT "IS INPUT TO BE FIRST GENERATION"; 1220 INPUT AS 1230 IF A\$#"NO" THEN 1330 PRINT "WHAT IS THE # OF THE GENERATION TO BE INPUTED"; 1240 1250 INPUT 01 1260 01 = 01 - 11270 FOR R=2 TO 01-1 1280 READ HS 1290 IF H\$#"1" THEN 1310 1300 RESTORE 1310 NFXT R GOTO 1340 1320 1330 01=2 PRINT "WHAT IS # OF LAST GENERATION TO BE COMPUTED"; 1340 INPUT 02 PRINT "WHAT IS THE # OF THE FIRST GENERATION TO BE PRINTED"; 1350 1360 1370 INPUT E9 PRINT "WHAT IS THE INTERVAL OF PRINTED GENERATIONS YOU WANT"; 1380 1390 INPUT F9 1400 GOTO 80 1410 PRINT "DO YOU NEED INSTRUCTIONS"; 1420 INPUT X\$ IF X\$="YES" THEN 1460 1430 1440 IF X\$="NO" THEN 1210 1450 GOTO 1660 1460 PPINT "THIS IS JOHN CONWAY'S GAME OF LIFE. ARTICLES FURTHER DESCRIBING" 1470 PRINT "HIS GAME MAY BE FOUND IN THE MATHEMATICAL GAMES SECTION OF" PRINT "SCIENTIFIC AMERICAN ISSUES: NOOCTOBER 700NNOVEMBER 700NFEBRUARY 71" 1480 1490 PRINT "THE GAME INVOLVES CELLULAR GENERATION GROWTH. EACH CELL IS" 1500 PRINT "ONE PRINTED CHARACTER. A CELL IS SURROUNDED BY EIGHT OTHER" PRINT "CELLS, IN THREE DIRECTIONS: DIAGONALLY, HORIZONTALLY, VERTICALLY." 1510 1520 PRINT "IN EACH GENERATION CELLS DIE AND GROW SIMULTANEOUSLY." PRINT "A CELL DIES FROM OVER POPULATION IF IT IS SURROUNDED BY MORE" 1530 PRINT "THAN 3 LIVING CELLS. IT WILL ALSO DIE OF ISOLATION IF IT HAS" PRINT "LESS THAN 2 CELLS SURROUNDING IT. NEW CELLS CAN BE FORMED ONLY" 1540 1550 PRINT "IN EMPTY POSITIONS IF AND ONLY IF IT HAS 3 CELLS AROUND IT." 1560 PRINT "THE MAXIMUM GRID SIZE IS A 60X60 MATRIX." PRINT "INPUT YOUR CELLS IN QUOTES --- SPACING AND PRINTING A " 1570 1580 PRINT " '1' WHERE YOU WANT A LIVING CELL. BLANK POSITIONS WILL" 1590 PRINT "BE ASSUMED TO BE EMPTY CELLS. WHEN YOU AR PRINT "TYPE 'DONE' IN RESPONSE TO THE ROW NUMBER" 1600 WHEN YOU ARE FINISHED " 1610 1620 PRINT "-----NOTE-----NOTHIS PROGRAM REQUIRES THAT YOU OPEN 2 FILES. IF " 1630 PRINT "I COME BACK WITH A MESSAGE STATING: YOU HAVE REQUESTED A NON-EXISTANT" PRINT "FILE. TYPE:NOOPEN-A,62NOOPEN-B,62NO1 FILES A, BNOTHEN TRY RENNUNING"" THE PROGRAM." 1640 1650 PRINT "YOU NEED NOT ASK FOR INSTRUCTIONS AGAIN.""NONGOOD LUCK.....HERE WE GONNN" 1660 READ #1.1 1670 GOTO 1210 1680 PRINT "PLEASE TYPE A 'GYESG' OR 'GNOG' ANSWER." 1690 GOTO 1410 1700 PRINT "BOTH LEFT AND RIGHT ADJUSTMENT ERRORS ... PROGRAM MAY NOT BE ACCURATE"" FROM HERE ON" 1710 GOTO 810 1720 PRINT "LEFT ADJUSTMENT ERROR, CORRECTION BEING MADE A SPACE TO RIGHT" 1730 FOR D=F1 TO L1 1740 READ #1,D;A\$ 1750 A\$[1,1]=" " 1760 A\$[2,62]=A\$[1,62] 1770 PRINT #1,D;A\$ 1780 NEXT D 1790 GOTO 1860 1800 PRINT "RIGHT ADJUSTMENT ERROR, CORRECTION BEING MADE A SPACE TO LEFT"

```
LIFE, page 6
November 1971
A903-36138A
1810 FOR D=F1 TO L1
1820
     RFAD #1,D;A$
1830 A$[1+62]=A$[2+62]
1840
     PRINT #1,D:A$
1850 NEXT D
1860
     RFAD #1,F1-1;8$
     M4=M5=Ø
187Ø
     READ #1+F1;C$
1880
1890
     S4=1
1900
     GOTO 430
1910
     IF L1=60 THEN 2210
1920
     B$[1,62]=" "
     PRINT "TOP ADJUSTMENT ERROR--CORRECTION BEING MADE A ROW LOWER"
1930
1940
     READ #1,1:4$
1950
     PRINT #1,1:8$
1960
     FOR R=1 TO 59
1970
     READ #1,R+1;8$
1980
     PRINT #1,R+1;A$
1990
     A$=B$
2000
     NEXT R
     B$[1,62]=" "
2010
2020
     F1=F1+1
2030 L1=L1+1
2040 FOR R=1 TO 62
2050
     PRINT #2,R:B$
2060 NEXT R
2070
     GOTO 350
     PRINT "BOTTOM ADJUSTMENT ERROR--CORRECTION BEING MADE A ROW UP"
2080
2090 RFAD #1,60;A$
2100 8$[1,62]=" "
2110 PRINT #1,60;8$
2120 FOR R=60 TO 2
2130
     READ #1,R-1;8$
     PPINT #1,R-1;A$
2140
2150
     A$=8$
2160 NEXT R
2170 L1=L1-1
2180
     F1=F1-1
2190
     B$[1+62]=" "
2200
     G0T0 2040
2210
     PRINT "BOTH TOP AND BOTTOM ADJUSTMENT ERRORS PROGRAM SPECIFICATIONS ARE"
     PRINT " BEING EXCEEDED ===PROGRAM TERMINATION=== **SORRY**"
2220
2230
     END
```

CONTRIBUTED PROGRAM BASIC

TITLE:	ROOTER FINDS THE ROOTS OF POLYNOMIALS A311-36024A
DESCRIPTION:	This program finds the roots of a polynomial using Barstow's Method.
INSTRUCTIONS:	Before running the program supply data as follows: 9900 DATA N,A _N ,A _{N-1} ,,A ₁ ,A ₀ 99xx DATA Ø where N is the order of the polynomial A_1 is the coefficient of the ith term of the polynomial of the form $A_N X^N + A_{N-1} X^{N-1} + + A_1 X + A_0$ This program will solve for the roots of as many polynomials as desired, and will terminate execution when reading a value for N of zero (Ø). In cases where the program is not converging to a solution the user will be asked if he wishes to continue or go to the next polynomial.
SYSTEM SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	There are some forms of polynomials for which this program cannot find the roots. If this condition occurs the program will indicate this and continue to the next polynomial. For high order polynomials the running time may be excessive since many iterations may be required.
ACKNOWLEDGEMENTS:	

ROOTER, page 2 December 1970 A311-36024A RUN GET-\$ROOTER 9900 DATA 3 9901 DATA 1,6,11,6 9902 DATA 2 9903 DATA 1,0,1 9904 DATA 0 RUN ROOTER POLYNOMIAL NUMBER 1 IS OF ORDER 3 COEFFICIENTS (IN DESCENDING ORDER) ARE: 11 1 6 6 THE ROOTS ARE: -3. -.999998 AND -2.

POLYNOMIAL NUMBER 2 IS OF ORDER 2

COEFFICIENTS (IN DESCENDING ORDER) ARE:

1 Ø 1

THE ROOTS ARE:

6 + J ≭ 1 AND 6 - J ≭ 1

DONE

LISTING

ROOTER

```
9000
           REM
                ***** ROOTER ***** MATHEMATICS PROGRAM ****
                ***** VERSION 1 ***** 7/31/69 *****
      9001
           REM
           REM FINDS THE ROOTS OF POLYNOMIALS
      9002
      9003
           DIM A[26],B[26],X[26]
9004
           LET G8=0
$ 53 9005
           PRINT
      9006
           LET C1=0
      9007
           LET D1=1
      9008
           LET 0=0
           LET G8=G8+1
      9009
      9010
           PRINT
     9011
           READ N
           IF N=0 THEN 9133
      9012
           PRINT
      9013
           PRINT "POLYNOMIAL NUMBER" $ G8 $ "IS OF ORDER" $ N
     9014
      9015
           PRINT
                      COEFFICIENTS (IN DESCENDING ORDER) ARE:"
      9016
           PRINT "
      9017
           PRINT
      9018
           PRINT "
                         ....
      9019 (FOR I=1 TO N+1
      9020
           READ ALL
           PRINT A[1];
      9021
           LET B(I)=A[I]
NEXT I
      9022
      9023
      9024
           PRINT
      9025
           PRINT
      9026
           PRINT "
                     THE ROOTS ARE:"
      9027
           PRINT
100
 90%
     9028
            IF N <= 2 THEN 9093
 $6 9029
            IF A(N+1)=0 THEN 9101
      9030
           IF (N/2-INT(N/2))=0 THEN 9033
      9031
           GOSUB 9109
           GOTO 9028
     9032
  9033
9034
           IF ABS(A[N-1])<1.E-25 THEN 9037
           LET P=A[N]/A[N-1]
```

ROOTER, page 3 December.1970 A311-36024A

al renations

9035 LET Q=A[N+]]/A[N-]] 9036 GOTO 9039 9037 LET P=A[N] 9038 LET Q=A[N+1] 9033 9039 FOR I=1 TO N+1 75 66 9036 9040 LET X[I]=A[I] 9041 NEXT I 9042 GOSUB 9104 FOR I=1 TO N-1 LET B[I]=X[I] 9043 9044 LNEXT I 9045 9046 LET R=X[N] LET S=A[N+1]-P+X[N]-Q+X[N-1] 9047 9048 GOSUB 9104 LET X[N]=P+X[N-1]-Q+X[N-2] 9049 LET D=X[N-1]+2-X[N]+X[N-2] 9050 IF ABS(D)>1.E-25 THEN 9054 9051 9052 PRINT "SOLUTIONS UNOBTAINABLE WITH THIS PROGRAM." 9053 GOTO 9005 9054 LET P1=P+(R*X[N-1]-S*X[N-2])/D 51 9055 LET Q1=Q+(S+X[N-1]-R+X[N])/D IF ABS(P)>1.E-25 THEN 9060 9056 9057 IF ABS(P1)>1.E-25 THEN 9060 IF ABS(Q)>1.E-25 THEN 9061 9058 9059 GOTO 9062 52.57 <u>9060</u> 9061 IF ABS(P1/P-1)>.000001 THEN 9062 IF ABS(Q1/0-1)<.000001 THEN 9076 58 9062 LET P=P1 59 60 9063 LET Q=Q1 LET C1=C1+1 9064 9065 IF C1=D1+25 THEN 9067 9066 GOTO 9039 65 <u>9067</u> 9068 PRINT PRINT "THE SOLUTION DID NOT CONVERGE AFTER" #C1#"ITERATIONS TO" PRINT "CONTINUE THE SOLUTION FOR 25 MORE ITERATIONS TYPE 1 OTHERWISE" 9069 PRINT "TYPE 0." 9070 INPUT K1 9071 9072 IF K1=1 THEN 9074 9073 GOTO 9005 72 9074 LET D1=D1+1 9075 GOTO 9039 9076 FOR I=2 TO N-1 LET A[I]=B[I] 51 9077 9078 -NEXT I 9079 LET N=N-2 ***** 9080 LET D=P+P-4+Q IF D<0 THEN 9088 9081 LET D=SOR(D) 9082 "\$(-P+D)/2;" AND "\$(-P-D)/2 9083 PRINT " 9084 LET C1=0 9085 LET D1=1 9086 IF N-2>0 THEN 9029 9087 GOTO 9093 9088 LET D=SQR(-D) 81 9089 "3-P/23"+ J +"3D/23" AND "3-P/23"- J +"3D/2 PRINT " 9090 LET C1=0 9091 LET D1=1 9092 IF N-2>0 THEN 9029 302 8 . \$? 9093 IF N=1 THEN 9099 9094 IF N=0 THEN 9005 9095 LET P=B(2)/B(1) 9096 LET Q=B(3)/B(1) 9097 LET N=0 9098 GOTO 9080 93 9099 PRINT " ";-B[2]/B[1] 9100 GOTO 9005 9101 9102 PRINT " 0.00000" 9024 LET N=N-1 9103 GOTO 9028 9104 LET X[2]=X[2 9105 FFOR I=3 TO N 1 Same Provent **8 LET X{2]=X(2]-P*X(1) 9106 LET X[I]=X[I]-P*X{I-1]-Q*X[I-2] 9107 -NEXT I 9108 RETURN 1 503 IF B[2]=0 THEN 9112 9109 4121 9110 LET X=-B[2]/B[1] 9111 GOTO 9113 10% 9112 LET X=-B[N+1]/B[1]

ROOTER, page 4 December 1970 A311-36024A 125 4/12 9113 LET F=0 9114 LET F1=0 9115 FOR I=1 TO N+1 9116 LET J=N-I+2 9117 IF B(J]=0 THEN 9121 9118 LET F=B(J]*X+(I-1)*F 9119 IF I-1=0 THEN 9121 UET F1=(I-1)*B[J]*X+(I-2)*F1 9120 LET F1=(I-1)*B[J]*X+(I-2)*F1 9121 NEXT I 9122 LET X1=X-F/F1 9123 IF ABS(X/X1-1)<.000001 THEN 9126 9124 LET X=X1 9125 GOTO 9113 12 9126 PRINT " "\$X1 9127 LET N=N-1 9128 FOR I=2 TO N+1 9129 LET A(I)=B[I]+X1*A[I-1] 9130 LET B[I]=A[I] 9130 LET B[1]=A[1] 9131 -NEXT I 9132 RETURN 9133 STOP 9900 DATA 3+1+6+11+6+2+1+0+1+0 9999 END

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The Frate and Carments

CONTRIBUTED PROGRAM BASIC

TITLE:	SIMEON SOLVES SIMULTANEOUS LINEAR EQUATIONS A314-36026A
DESCRIPTION:	This program solves systems consisting of N linear equations in N unknowns.
INSTRUCTIONS: SYSTEM SPECIFICATIONS: SPECIAL CONSIDERATIONS:	To use, coefficients in the equations are entered in data-statements, starting in statement number 9901 with the first coefficient of the first equation, and ending with the N-th coefficient of the N-th equation. All zero coefficients must be entered in their proper place. The right-side constant terms of the equations are then entered in subsequent data statements. If additional cases with the same coefficient matrix but different right sides are to be run, they may all be run at once by simply entering additional data statements with the right-side values of the other cases. The data statement in line 900 (preceding all the above) is used to specify the number of systems to be solved, and the number of equations (and hence variables) in the system. Thus, the two systems: 3X + 5Y -2Z = 9 7X + Y = -3 X - 7Y + 9Z = 14 X - 7Y +9Z = 18 Could be solved by typing: 900 DATA 2,3 900 DATA 2,3 900 DATA 2,3 900 DATA 2,3 900 DATA 3,5,-2,7,1,0,1,-7,9 9002 DATA 9,-3,14,19,-3,8 Solutions are proofed by multiplying the vector by the original coefficient matrix. 2000A and Teletype "NEARLY SINGULAR MATRIX IN LINE 9055" means solution of the system is not possible with the program.
ACKNOWLEDGEMENTS:	

SIMEQN, page 2 January 1972 A314-36026A

GET-\$SIMEQN

RUN

9900 DATA 2,3 9901 DATA 3,5,-2,7,1,0,1,-7,9 9902 DATA 9,-3,14,19,-3,8 RUN SIMEON LINEAR SYSTEM SOLVER DO YOU WANT INSTRUCTIONS (YES OR NO)?NO SOLUTION FOR LINEAR SYSTEM OF ORDER 3 COEFFICIENT MATRIX 3 5 -2 7 1 Ø 1 -7 9 DEPENDENT VARIABLE VECTOR FOR CASE 1 9 -3 14 SOLUTION VECTOR FOR CASE 1 VARIABLES X2 X1 ΧЗ -1.07447 4.52128 5-19149 PROOF OF SOLUTION FOR CASE 1 9.00001 -3 14. DEPENDENT VARIABLE VECTOR FOR CASE 2 19 -3 8 SOLUTION VECTOR FOR CASE 2 VARIABLES X 1 X2 ΧЗ -1.48936 7.42553 6.82979 PROOF OF SOLUTION FOR CASE 2 19. -3 7.99999 DONE LISTING SIMEQN 9000 REM ***** SIMEQN ***** MATHEMATICS PROGRAM ***** **** VERSION 1 ***** 7/31/69 ***** 9001 REM REM SOLVES SIMILTANEOUS LINEAR EQUATIONS 9002 DIM A(25,25),B(25,25),X(25,1),Y(1,25),Z(25,1),A\$(3),B\$(72) 9003 9004 PRINT "LINEAR SYSTEM SOLVER" PRINT "ONDO YOU WANT INSTRUCTIONS (YES OR NO)"; 9005 9006 INPUT AS IF AS="NO" THEN 9046 9007 9008 GOTO 9046 9009 PRINT 9010 PRINT " THIS PROGRAM SOLVES SYSTEMS CONSISTING" PRINT "OF N LINEAR EQUATIONS IN N UNKOWNS. TO USE," 9011 9012 PRINT "COEFFICIENTS IN THE EQUATIONS ARE ENTERED" 9013 PRINT "IN DATA STATEMENTS, STARTING IN STATEMENT" PRINT "NUMBER 9901 WITH THE FIRST COEFFICIENT OF THE " 9014 9015 PRINT "FIRST EQUATION, AND ENDING WITH THE N-TH"

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ĺ 9016 PRINT "COEFFICIENT OF THE N-TH EQUATION. ALL ZERO" 9017 PRINT "COEFFICIENTS MUST BE ENTERED IN THEIR PROPER" 9018 PRINT "PLACE. THE RIGHT-SIDE CONSTANT TERMS OF" 9019 PRINT "THE EQUATIONS ARE THEN ENTERED IN SUBSEQUENT" PRINT "DATA STATEMENTS. IF ADDITIONAL CASES WITH" PRINT "THE SAME COEFFICIENT MATRIX BUT DIFFERENT" PRINT "RIGHT SIDES ARE TO BE RUN, THEY MAY ALL BE" 9020 9021 9022 9023 PRINT "RUN AT ONCE BY SIMPLY ENTERING ADDITIONAL" 9024 PRINT "DATA STATEMENTS WITH THE RIGHT-SIDE VALUES" 9025 PRINT "OF THE OTHER CASES. THE DATA STATEMENT IN LINE" PRINT "9900 (PRECEDING ALL THE ABOVE) IS USED TO SPECIFY" 9026 PRINT "THE NUMBER OF SYSTEMS TO BE SOLVED, AND THE" 9027 PRINT "NUMBER OF EQUATIONS (AND HENCE VARIABLES)" 9028 9029 PRINT "IN THE SYSTEM. THUS, THE TWO SYSTEMS:" motination PRINT 9030 9031PRINT"3x + 5y - 2Z = 93x + 5y - 2Z = 19"9032PRINT"7x + y = -37x + y = -3"9033PRINT"x - 7y + 9Z = 14x - 7y + 9Z = 8"9034 PRINT 9035 PRINT "COULD BE SOLVED BY TYPING:" 9036 PRINT 9037 PRINT 9900 DATA 2,3" 9038 PRINT " 9039 PRINT " 9901 DATA 3,5,-2,7,1,0,1,-7,9" PRINT " 9040 9902 DATA 9,-3,14,19,-3,8" 9041 PRINT " RUN" 9042 PRINT 9043 PRINT "SOLUTIONS ARE PROOFED BY MULTIPLYING THE" 9044 PRINT "VECTOR BY THE ORIGINAL COEFFICIENT MATRIX." 9045 STOP General Contract 9046 READ L.M 9047 LET B\$="1 2 3 4 5 6 7 8 9 10111213141516171819202122232425" 9048 PRINT 9049 PRINT "SOLUTION FOR LINEAR SYSTEM OF ORDER" # 9050 PRINT "ONCOEFFICIENT MATRIXON" 9051 MAT READ A(M,M) 9052 MAT PRINT A - fant it & 9053 PRINT 9053 PRINI 9054 MAT B=ZER[M+M] may no de monoris unloss this to redender on 9055 MAT B=INV(A) 9056 MAT Y=ZER[1,M] 9057 MAT Z=ZER[M,1] Continues A, Depender V 9058 LET Q=0 9059 LET Q=Q+1 Surren - 1 PRINT "ONDEPENDENT VARIABLE VECTOR FOR CASE" 30 9060 9061 PRINT Y=TRUTION - X] 9062 MAT READ X[M+1] 9063 MAT Y=TRN(X) 9064 MAT PRINT Y 9065 MAT Z=8+X MAT Y=TRN(Z) 9066 9067 PRINT 9068 PRINT 9069 PRINT "SOLUTION VECTOR FOR CASE";Q 9070 PRINT "ON";TAB(17);"VARIABLESON" Takemander For Kollo M 9071 FOR K=1 TO M 9072 PRINT " X";8\$[2*K-1+2*K], 9073 NEXT K PRINT " X"; K = "Y(A, K) 9074 PRINT Next K 9075 MAT PRINT Y 9076 PRINT "PROOF OF SOLUTION FOR CASE"Q 9077 PRINT 9078 MAT X=A+Z 9079 MAT Y=TRN(X) 9081 IF Q<L THEN 9059 9082 STOP 9080 MAT PRINT Y 9900 DATA 2,3 9901 DATA 3+5+-2+7+1+0+1+-7+9 9902 DATA 9,-3,14,19,-3,8 9999 END

Sec. 1

CONTRIBUTED PROGRAM **BASIC**

TITLE:	SALARY SCHED	ULE COST SIMULATOR	SALSIM A720-36072A		
DESCRIPTION:	This program computes the total cost, average salary per teacher, cost of training and experience increments, and various other related costs for a proposed salary schedule. Output also includes optional reproduction of personnel matrix with marginal totals and average number of years teaching experience.				
INSTRUCTIONS:	This program	requires two files to be opened (MLØØØ5 and MLØØ	917).		
	statement, t	the data tapes type all figures for step 1 in th ype all figures for step 2 in the next data state anes are defined as follows:)	ne first data ement, etc.		
		LANE			
		STEP 7000= 7200 7400 7400 7800 :			
		•			
	The question allows two o	"what number do you want to multiply your schedu ptions.	le by?"		
	Option l	To multiply the entire schedule by a percentage (Example: Type in 1.03 to multiply the entire s by 3%, 1.05 to multiply by 5%, etc.)	increase. chedule.		
	Option 2	To use an index instead of a proposed schedule. want to use an index in place of the proposed sc just follow the same format for preparing the da substituting indices for actual salaries.	hedule		
	Because two sets of data are appended to the program it is important that they are numbered correctly.				
	The "PERMAT"	tape (personnel matrix) must be numbered from 40	00 to 6900.		
	The "PROSCH"	tape (proposed schedule) must be numbered from 7	000 to 9900.		
	ment (9999 e	e two tapes are appended you must also include an nd) either on the end of⊰the "PROSCH" tape or by s have been appended.			
	and 14 lanes	posed schedule and the personnel matrix may not ex . Both the proposed schedule and the personnel m e Number of steps and lanes.			
SYSTEM SPECIFICATIONS:	2000A and Te	letype			
SPECIAL CONSIDERATIONS:	See attached	copy for additional information.			
ACKNOWLEDGEMENTS:	TIES St. Paul, Mir	nnesota 55113			

SALSIM

(SALary schedule cost SIMulator)

Purpose

To compute the total and related cost for a proposed salary schedule.

Input

- A copy of the proposed salary schedule.
- 2. A personnel matrix for your district (number of teachers in each salary category).

Output

- Optional -- A step-by-lane reproduction of the personnel matrix with marginal totals and the average number of years teaching experience.
- 2. A cost matrix showing the cost in each category with step and lane marginal totals.
- 3. The total cost of the proposed schedule.
- 4. The cost if all teachers were placed on step one.
- 5. The cost of experience increments.
- 6. The cost if all teachers were placed in lane one.
- 7. The cost of training increments.
- 8. The ratio of cost of experience increments to the cost of training increments. (A number greater than 1 means that more money is being spent on experience than on training. A number equal to 1 means that money being spent on experience is equal to money being spent on training. A number less than 1 means that more money is being spent on training than on experience).
- 9. The average salary for teachers .

Options

There is now a question within the program that asks WHAT NUMBER DO YOU WANT TO MULTIPLY YOUR SCHEDULE BY? This question gives you two options.

- 1. To multiply your whole schedule by a percentage increase. (Example: Type in <u>1.03</u>, when the question is asked, to multiply your whole schedule by 3%, 1.05 to multiply by 5%, etc.)
- 2. To use an index instead of a proposed schedule. When using an index in place of the proposed schedule follow FORMAT B IN SECTION I UNDER OFF-LINE PROCEDURE. When the above question is asked type in the BA base figure you want to multiply your index by. (Type in <u>7500</u> to multiply the entire schedule by \$7500, 8000 to multiply by \$8000, etc.)
- Type in a 1 if you do not want to multiply your proposed schedule (i.e. if you do not want to take advantage of these options.)

Restrictions

Both the proposed schedule and the personnel matrix may not exceed 15 steps and 14 lanes. Both the proposed schedule and the personnel matrix must have the same number of steps and the same number of lanes.

PRELIMINARY OFF-LINE PROCEDURE FOR RUNNING ALL SALARY PROGRAMS

The following two sections I and II, are instructions for preparing tapes off-line.

To run SALSIM follow sections I and II.

I. Proposed Schedule - PROPS1

You must type a tape of your proposed schedule using the following format.

Type each step of your proposed schedule in one data statement.

NOTE: DATA STATEMENTS FOR THIS FILE MUST BEGIN AT STATEMENT NUMBER 7000 AND CONTINUE AT ANY INTERVAL TO 9000. THE LAST STATEMENT MUST BE A 9999 END.

Format A

If you want to use an index in place of the proposed schedule you must follow the format below.

```
Format B
```

7000 DATA 1,1.05, 1.1, 1.15, 1.2, 1.25, 1.3
7100 DATA 1.06, 1.12, 1.18, 1.24, 1.3, 1.36, 1.42
7200 DATA 1.12, 1.19, 1.26, 1.33, 1.4, 1.47, 1.54
...
8700 DATA 1.87, 1.98, 2.09, 2.2, 2.31, 2.42, 2.53
9999 END

II. Personnel Matrix - PERMAT

You must type a tape of your personnel matrix using the following format. Type each step of your personnel matrix in one data statement. NOTE: DATA STATEMENTS FOR THIS FILE MUST BEGIN AT STATEMENT NUMBER 5000 AND CONTINUE AT ANY INTERVAL TO 6900.

5000 DATA 10, 4, 2, 0, 3, 0, 0 5100 DATA 5, 6, 3, 1, 2, 0, 0 5200 DATA 6, 3, 6, 4, 7, 1, 0 6700 DATA 4, 7, 12, 16, 8, 5, 3

PRELIMINARY ON-LINE PROCEDURE FOR RUNNING SALARY PROGRAMS

- Call the H/P Time Sharing System.
- 2. When you hear a high-pitched tone, place phone in coupler.
- 3. Type in any number (0-9) and hit carriage return.
- 4. When computer asks you to log in, type in your appropriate district user ID, hit carriage return, and wait for READY message.
- The first time you run SALSIM you must type in the following two statement. OPE-MLØØØ5,5 OPE-MLØØ17,7

You need never type in these statements again. (In fact it would be best if you took a pen and crossed out this step after you have done it.)

- 6. If you have <u>never</u> run SALSIM, proceed to step 7, otherwise type in KIL-PROPS1 and hit carriage return.
- 7. Type in TAPE, hit carriage return and begin reading in the proposed schedule tape.
- 8. When the tape has been read in, type in NAM-PROPS1 and hit carriage return.
- 9. Type in SAV and hit carriage return.
- 10. Type in SCR and hit carriage return.
- 11. If you have <u>never</u> run SALSIM, proceed to step 12, otherwise type in KIL-PERMAT and hit carriage return.
- 12. Type in TAPE, hit carriage return, and begin reading in personnel matrix tape.
- 13. When tape has been read in, type in NAM-PERMAT and hit carriage return.
- 14. Type in SAV and hit carriage return.
- 15. Type in SCR and hit carriage return.

PROCEDURE FOR RUNNING - SALSIM

- 1. Type in GET-PERMAT and hit carriage return.
- 2. Type in APP-PROPS1 and hit carriage return.
- 3. Type in RUN and hit carriage return.

The computer will ask you to PLEASE TYPE IN THE NUMBER OF STEPS THEN THE NUMBER OF LANES SEPARATED BY A COMMA. When you have responded the computer will print DONE.

- 4. Type in GET-SALSIM and hit carriage return.
- 5. Type in RUN and hit carriage return.

The computer will now ask the following questions:

PLEASE TYPE IN THE NUMBER OF STEPS THEN THE NUMBER OF LANES SEPARATED BY A COMMA.

WHAT NUMBER DO YOU WANT TO MULTIPLY YOUR SCHEDULE BY? IF YOU DO NOT WANT TO MULTIPLY YOUR SCHEDULE TYPE IN A 1.

PLEASE ENTER YOUR LANE HEADINGS. MAXIMUM HEADING LENGTH IS 7 CHARACTERS. PLEASE TYPE ONLY ONE LANE HEADING AFTER EACH QUESTION MARK THAT FOLLOWS.

? BA
? BA + 30
? MA
? MA + 30
? PH, D.

EXAMPLE:

DO YOU WISH TO ADVANCE ALL TEACHERS ONE STEP FOR PROJECTED COST COMPUTATIONS? (TYPE 1 FOR NO, 2 FOR YES).

DO YOU WANT A PRINTOUT OF THE PERSONNEL MATRIX? (TYPE 1 FOR YES, 2 FOR NO).

When the program has finished running it will print DONE. If you want to run the program again type in RUN and hit carriage return. If you want to run one of the other programs go to the respective PROCEDURE FOR RUNNING section for that program. If you are done running programs type in BYE and hit carriage return.

RUN SAMPLE OUTPUT - SALSIM

DO YOU WISH TO ADVANCE ALL TEACHERS ONE STEP FOR PROJECTED COST COMPUTATIONS? (TYPE 1 FOR YES, 2 FOR NO)

?l

****PERSONNEL MATRIX (TRAINING BY EXPERIENCE)*****

LANE L	LANE 2	LANE 3	LANE 4	LANE 5
LANE L	LANE 7	LANE 8	LANE 5	
0	60	8	5	0
0	0	0	0	73
0	57	15	E	ጌ
0	1"	D	D	74
0	29	9		0
0	0	0		38
ר	ד	6	1.	1
נ	ד	0	D	27
о	75	2	ם	19
Э	75	0	ג	D
ר	15	ד	2	53
נ	1	5	0	1
0	6	4	ר	ם
	0	D	ב	ב
5	٦	9	ե	57
L	٦	0	Ն	7
2		8	7	19
2		0	0	19
l	Э	٦		ב
L	О	D		7
Լ	דד	ե	9	0
5	2	7	4	50
5	15	66	Э4	5
15	570	9	Ь	362

THE AVERAGE STEP (ROW) ATTAINED BY YOUR CURRENT STAFF IS 4.73

SAMPLE OUTPUT - SALSIM

*****COST BY CATEGORY FOR THE PROPOSED SALARY SCHEDULE****

LESS	BA	BA+15	BA+30	BA+45
\$ 0	\$ 0	\$ D	\$ O	\$ (
\$ D	\$ 498000	\$ 69600	\$ 455OO	\$ 0
\$ D	\$ SO1600	\$ 110400	¢ 28800	\$ 10000
\$ D	\$ 269700	\$ 87 3 00	\$ 0	\$ 0
\$ 0	\$ 1 66 600	¢ PJ500	\$ 10600	\$ 17000
\$ 0	\$ 153POO	\$ 21400	\$ D	\$ 0
\$ 0	\$ 163500	\$ 22600	\$ 23400	\$ 12100
\$ 0	\$ 69000	\$ 476OO	¢ 75300	\$ 0
\$ 9900	\$ 0	¢ 115200	\$ 774OO	\$ 13300
\$ 27000	\$ 0	\$ 105600	\$ 95200	\$ 0
\$ 22400	\$ 189000	¢ 83400	\$ 128700	\$ 14700
\$ 53300	\$ 1981000	\$ 727POO	\$ 421,900	\$ FJ700

\$

\$

*****COST BY CATEGORY FOR THE PROPOSED SALARY SCHEDULE(CONT)*****

MA	MA+15	MA+30	MA+45	TOTAL
\$ 0	\$ ()	\$ 0	\$ 0	≑ 0
\$ 0	\$ 0	÷ 0	\$ O	¢ 673700
\$ 0	\$ 10800	\$ D	\$ ()	¢ 777700
\$ 0	\$ 0	\$ O	\$ 0	\$ 357000
\$ 11400	\$ JJ900	\$ ()	≑ 0	\$ 272600
\$ 35700	≑ 75300	\$ 0	≑ 73700	¢507700
\$ 12500	\$ 12900	\$ 13300	\$ 0	\$ 260300
≑ □	\$ 0	\$ 0	\$ 0	\$ 159400
\$ 27600	\$ 14200	\$ 0	\$ 15000	\$ 269908
\$ 29000	≑ 0	\$ D	≑ 0	\$ 250800
¢ 27500	\$ 109200	\$ 159000	≑ 65600	¢ 832200
¢ 207400	\$ 171500	\$ 141300	\$ 9 3700	\$ 385250O

\$

SAMPLE OUTPUT - SALSIM

THE TOTAL COST FOR THE PROPOSED SALARY SCHEDULE IS \$ 3852500

THE TOTAL COST FOR THIS SALARY SCHEDULE WOULD BE \$ 2958600 IF ALL TEACHERS WERE PLACED ON STEP 1

THE TOTAL COST FOR THIS SALARY SCHEDULE WOULD BE \$ 2746000 IF ALL TEACHERS WERE PLACED IN LANE 1

THE COST OF TRAINING INCREMENTS FOR THIS SCHEDULE IS \$ LLOLSOD

THE RATIO OF THE COST OF EXPERIENCE INCREMENTS TO THE COST OF TRAINING INCREMENTS IS .81

THE AVERAGE SALARY PER TEACHER FOR THE PROPOSED SALARY SCHEDULE IS \$10642.3

LISTING

SALSIM FILES ML0005,ML0017 10 PRINT "PLEASE TYPE IN THE NUMBER OF STEPS THEN THE NUMBER OF LANES" 11 PRINT "SEPARATED BY A COMMA." 12 INPUT A,B 13 20 C=A+B 25 FOR I=1 TO C 26 READ R 30 PRINT #1;R, END 35 NEXT I 50 FOR I=1 TO C 55 READ R PRINT #2;R, END 60 65 NEXT I PRINT 69 PRINT "WHAT NUMBER DO YOU WANT TO MULTIPLY YOUR SCHEDULE BY?" 70 71 PRINT "(SEE INSTRUCTIONS FOR DETAILS.) IF YOU DO NOT WANT TO" PRINT "MULTIPLY YOUR SCHEDULE, TYPE IN A 1 ." 72 73 INPUT Q9 90 DIM Z\$[7] 110 DIM X[15,14],Y[16,15],Z[16,15],M[15],N[15] DIM A\$(7),B\$(7),C\$(7),D\$(7),E\$(7),F\$(7),G\$(7),H\$(7),I\$(7),J\$(7) 120 130 DIM K\$[7],L\$[7],M\$[7],N\$[7],O\$[7] 150 PRINT PRINT "PLEASE ENTER YOUR LANE HEADINGS. MAXIMUM HEADING " PRINT "LENGTH IS 7 CHARACTERS. PLEASE TYPE ONLY ONE " 160 170 PRINT "LANE HEADING AFTER EACH QUESTION MARK THAT FOLLOWS." 180 190 1 = 0FOR 0=1 TO B 20**0** 210 INPUT Z\$ 220 L=L+1GOTO L OF 260,280,300,320,340,360,380,400,420,440,455,465,475,485,495 230 240 IF L>B THEN 2358 NEXT O 245 250 GOTO 500 260 A\$=Z\$ GOTO 240 270 280 8\$=Z\$ 290 GOTO 240 300 C\$=2\$ 310 GOTO 240 320 D\$=Z\$ 330 GOTO 240 340 E\$=Z\$ 350 GOTO 240 360 F\$=Z\$ 370 GOTO 240 380 G\$\$=Z\$ 390 GOTO 240 400 H\$=Z\$ 410 GOTO 240 420 I\$=Z\$ 430 GOTO 240 440 J\$=Z\$ 450 GOTO 240 455 K\$=Z\$ 460 GOTO 240 465 L\$=Z\$ GOTO 240 470 475 M\$=Z\$ 480 GOTO 240 485 N\$=Z\$ 490 GOTO 240 495 0\$ = 7\$ 499 GOTO 240 500 MAT X=ZER 502 PRINT 505 MAT Z=ZER 510 MAT Y=ZER 515 READ #1,1 520 FOR I=1 TO A 530 FOR J=1 TO B 540 READ #1;Y[I,J] 550 IF END #1 THEN 590 NEXT J 560

```
570 NEXT I
580 GOTO 595
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2380 PRINT 2390 PRINT 2400 PRINT " *****COST BY CATEGORY FOR THE PROPOSED SALARY SCHEDULE****** 2410 PRINT 2420 G=0 2430 FOR I=1 TO A FOR J=1 TO B LET Z[I+B+1]=Z[I+B+1]+Z[I+J] 2440 2450 2460 NEXT J 2470 LET G=Z[I+6+1]+G 2480 NEXT I 2490 FOR J=1 TO B 2500 FOR I=1 TO A 2510 LET Z[A+1,J]=Z[A+1,J]+Z[I,J] 2520 NEXT I 2530 NEXT J 2540 LET Z[A+1,B+1]=G 2580 PRINT 2590 PRINT PRINT " "A\$," "B\$," "C\$," "D\$," "E\$ 2600 2610 PRINT " 2615 PRINT 2620 PRINT 2630 FOR I=1 TO A+1 FOR J=1 TO 5 2640 PRINT "\$"Z[I,J], 2650 2660 NEXT J PRINT 2670 2680 PRINT 2690 NEXT I 2700 PRINT 2720 2730 PRINT 2740 PRINT 2750 PRINT 2760 PRINT 2765 IF B <= 5 THEN 3380 PRINT 2770 2780 2782 PRINT 2783 PRINT 2784 PRINT 2785 PRINT "*****COST BY CATEGORY FOR THE PROPOSED SALARY SCHEDULE (CONT)****** 2786 PRINT 2787 PRINT 2788 PRINT PRINT " "F\$," "G\$," "H\$," "I\$," "J\$ 2790 IF B <= 9 THEN 2800 2791 2793 FOR J=6 TO 10 2795 PRINT " -------2796 NEXT J 2798 GOTO 2808 2800 FOR J=6 TO B+1 PRINT " 2805 ----!!, 2806 NEXT J 2808 REM 2810 PRINT 2812 PRINT IF B >= 10 THEN 2900 FOR I=1 TO A+1 2820 2830 FOR J=6 TO B+1 2840 PRINT "\$"Z[I+J]+ 2850 2860 NEXT J IF 8=9 THEN 2875 2870 PRINT 2872 2875 PRINT 2877 PRINT 2880 NEXT I 2885 PRINT 2890 GOTO 3010 2900 FOR I=1 TO A+1 2910 FOR J=6 TO 10 2920 PRINT "\$"Z[1,J], 2930 NEXT J 2940 PRINT 2950 PRINT 2980 NEXT I 2990 PRINT

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3020 PRINT 3030 PRINT 3040 PRINT 3045 IF B <= 9 THEN 3380 3050 PRINT 3080 3090 PRINT 3100 PRINT 3110 PRINT 3120 PRINT "*****COST BY CATEGORY FOR THE PROPOSED SALARY SCHEDULE (CONT)*****" 3130 PRINT 3135 PRINT 3140 PRINT 3150 PRINT " "K\$," "L\$," "M\$," "N\$," "O\$ 3160 FOR J=11 TO B+1 3170 PRINT " -----3180 NEXT J 3185 IF B=14 THEN 3200 3190 PRINT 3200 PRINT 3210 PRINT 3220 FOR I=1 TO A+1 3230 FOR J=11 TO B+1 3240 PRINT "\$"Z[I,J], NEXT J IF B=14 THEN 3280 3250 3260 3270 PRINT 3280 PRINT 3290 PRINT 3300 NEXT I 3310 PRINT 3330 3340 PRINT 3350 PRINT 3360 PRINT 3370 PRINT 3380 PRINT 3390 PRINT "THE TOTAL COST FOR THE PROPOSED SALARY SCHEDULE IS \$"G 3400 PRINT 3410 PRINT 3420 G1=G2=0 3430 FOR J=1 TO B 3440 M[J]=Y[A+1,J]*X[1,J] 3450 LET G1=G1+M[J] 3460 NEXT J 3470 PRINT "THE TOTAL COST FOR THIS SALARY SCHEDULE WOULD BE \$"G1 PRINT "IF ALL TEACHERS WERE PLACED ON STEP 1" 3480 3490 PRINT 3500 PRINT 3510 PRINT "THE COST OF THE EXPERIENCE INCREMENTS FOR THIS SCHEDULE IS \$"G-G1 3520 FOR I=1 TO A N[I]=Y[I,8+1]*X[I,1] 3530 3540 LET G2=G2+N[I] 3550 NEXT I 3560 PRINT 3570 PRINT PRINT "THE TOTAL COST FOR THIS SALARY SCHEDULE WOULD BE \$"G2 3580 3590 PRINT "IF ALL TEACHERS WERE PLACED IN LANE 1" 3600 PRINT 3610 PRINT 3620 PRINT "THE COST OF TRAINING INCREMENTS FOR THIS SCHEDULE IS \$"G-G2 PRINT 3630 3640 PRINT 3650 PRINT "THE RATIO OF THE COST OF EXPERIENCE INCREMENTS TO THE" PRINT "COST OF TRAINING INCREMENTS IS"INT(((G-G1)/(G-G2))*100+.5)/100 3660 3670 PRINT 3680 PRINT PRINT "THE AVERAGE SALARY PER TEACHER FOR THE PROPOSED" 3690 3700 PRINT "SALARY SCHEDULE IS \$"INT((G/P1)*100+.5)/100 PRINT 3710 3720 PRINT 3730 PRINT 3740 END

TITLE:	TOP MANAGEMENT DECISION GAME	DECSN A606-36065B
DESCRIPTION:	This program furnishes the simulated business conditions for operating a <u>business game</u> for any number from 10 to The participants form into teams representing ficticious make decisions on price, promotion, production, capacity tives, and training in a one product market. The progra of interrelated market and internal conditions that appr ditions, even including some random perturbation. The t converted into results fast enough so the results can be teams during the same class period, enabling the teams t sets of decisions during a two or three hour period. Th results has been found to have excellent educational rei tics.(See "ECONOMIC BACKGROUND" for further discussion.)	60 participants. companies and , research, incen- m provides a set oximate real con- eam decisions are given back to the o make up to three is quick feedback of nforcing characteris-
INSTRUCTIONS:	See attached.	
SYSTEM SPECIFICATIONS:	2000A and Teletype.	
SPECIAL CONSIDERATIONS:	None	
ACKNOWLEDGEMENTS:	Professor Joseph Nordstrom Bowling Green University	

ECONOMIC BACKGROUND

This game gives the participant practice in making top level management decisions under time pressure. The decisions to be made call for attention to the inter-dependencies among the various decision areas, in other words, to the need for integrated policy thinking. Through the use of a Hewlett-Packard table top computer (Model 2114A with an 8K word memory) which can be brought right into the classroom, the results of participant decisions can be made available to them in a very short time after the decisions are made. In fact, during a two hour class period, the participants can play two or three periods of the game, getting their results back each period only minutes after turning in their decisions. Finally, the simulated business situation programmed into the computer is considerably more complicated than would be possible for a paper and pencil game with the same turn-around speed. All the calculations described below are performed as automatic functions of the computer program.

As is the case in the market place, some carry-over exists in this game from period to period. For example, the promotion contracted for in one period will also affect sales in the following periods. The same is true of expenditures for Research and Training.

This game, departing from the practices present in most similar games, makes the participant teams compute their own accounting statements. The computer printout does not supply these figures. The participants are thus forced to consider accounting relationships more than otherwise. Experience has shown that this feature is a valuable part of this game.

The participant should develop a sense of the market as he plays. He should attempt to "psych-out" the demand relationships as functions of his decisions. It is to his interest, therefore, to adopt somewhat more extreme strategies in this game than would be safe under real business conditions. In this way, he can learn without cost, and in a short time, lessons that might cost much more, both in time and money in the real market. It is worth pointing out especially here the role of <u>strategy</u> in business as opposed to <u>decision</u>. The participant will learn little from a policy of changing decision rationale frequently. He will learn much more from the results of having made a series of decisions according to a certain rationale that he wishes to test, i.e., a <u>strategy</u>. This is true in real life and is true in this game.

Market Demand

In general, demand is a function of price and promotion; the higher the promotion or the lower the price, the higher will be the demand.* The participant must be concerned not only with demand relations, however, but also with production costs at various levels of capacity. Inventory costs also must be considered. These factors can be controlled to some degree by attention to investment in training, incentive and research activities, but the final results will be dependent on all these elements acting together. Finally, there are forces acting on demand that are outside the control of the participants, i.e., the general market trends. The game starts off with a growth trend for a few periods to invite attention to necessary increases in capacity. Then there is a market decline for a few periods, inviting attention to inventory costs and overextended production capability. Finally, there is another rise in demand. The result affords an excellent opportunity for the participant to practice forecasting talents.

^{*}With price the demand relationship is continuous. With promotion, however, the demand rises with promotion expense up to a maximum of \$1,000,000 expense per period, whereupon the promotion effect saturates and no further increase in demand results from increased promotional outlay.

The market trend is given to the game by the following relationship:

$$F2 = 1 + .2P - .036P^2 + .0019P^3$$

where P is the number of the period being played.

The relation of demand to price and promotion is given by the following:

$$F1 = \frac{75}{P} \times \frac{300+S}{1500+S}$$

where P is the price and S is the promotion expense. In the case of total demand, mean price and promotion figures are used. In the case of team demand, the team's price and promotion figures are used.

For the total demand, the relation is:

 $D = N \times F1 \times F2 \times 60,000$

where N is the number of teams. Fl gives the effects of price and promotion, and F2 gives the effect of the general market trend. The base demand is seen to be 60,000 units per team.

In addition to the factors mentioned above, there is a random perturbation of demand figures, so that a team's demand will not conform precisely to the functions noted above. This perturbation produces up to ten percent variation from the defined functions and can be thought of as the result of extraneous market conditions.

The Production Decision

The production cost is constant in any given period up to a production level which is 5000 units less than full capacity. Above this point, there is a per unit increase of 70 percent for production cost. For the participant this will result in gradually increasing average costs as he approaches and exceeds capacity. It might be noted that the participant may assume that he cannot produce above capacity. This is an erroneous assumption. Production in excess of capacity can be justified theoretically on the basis of creating a night shift, or farming some of the work out, etc.

The Capacity Decision

The capacity decision is made three periods in advance of the availability of the facilities contracted for. The facilities are not paid for until they are ready. The payment results in a reduction of the cash, but does not result in a commensurate reduction of profits in the period in which the facilities become available. The reduction in profits comes about through a steady state increase in administrative or overhead costs, so that, on a period by period basis, the cost is amortized. The amount of return on investment for money put into increased plant capacity will be favorable if this extra capacity is used, but it will just be extra expense if not used.

The Research Decision

Because it has been found advisable in this game for all teams to consider that they are selling the same product, research in product design is not appropriate. Therefore, it is assumed that research input is for the purpose of improving the process and that success in research will result in lower production costs. The research expenditures create a probability of breakthrough, the more expenditure the more DECSN, page 4 January 1972 A606-36065B

the probability. Only one breakthrough is possible in any one period and it lowers the production costs by 1.5 percent for every period from the point of breakthrough on. New breakthroughs increase the cost saving by the same factor. Obviously, the more production that is scheduled, the larger will be the resulting saving. The assignment of probabilities of breakthrough results from a random number simulation in the program. The characteristics of this probability function are such that a steady \$80,000 per period investment in inventory yields the best return on investment.

The Incentive Decision

It is assumed that trying to apply a wage incentive to either the skilled or unskilled classifications will result in no improvement at all, due to the practical difficulties involved. However, applying a wage incentive program for the semi-skilled workers will result in some substantial improvement. The improvement will take the form of increase in apparent capacity, so that, when a team is producing at or above stated capacity, the production costs will be less, enough so that a satisfactory return on investment (in the incentive plan) occurs. It is assumed that unit production costs will not be affected, because the form of the incentive is such that labor will get as much per unit of production under incentive as before. Therefore, savings will result from a reduction in the costs of above capacity production, in the manner stated.

The Training Decision

The training decision assumes that there will be a lower production cost associated with increased training expense. The effect of this training input, however, will attenuate over time so that the effect will be far less two or three periods hence than it is directly after instituting the program.

In Summary

The carry over of effects (Research, Training, etc.) occurs thru the continual updating of the last (data statement) matrix in the printout, as mentioned in the Instructions for the Referee. It is important either to carry out this updating thru entering the new data by hand from the last matrix or by entering it by tape in the manner described.

It should be noted that this game was developed for 12 periods of play. If the instructor plays many more periods, it would be advisable to move from [P = 12] back to [P = 5, P = 6, etc.]. If this is not done, the instructor will find the market tendency rising at a rate without bound.

In general, there is no existing equity relationship in the case, because there is no fixed asset item nor is long term indebtedness or equity mentioned. Some instructors using the game may wish to add these figures, making it possible to develop balance sheet relationships and financial ratios which are not possible under present conditions. This will be easy to accomplish.

INSTRUCTIONS FOR THE REFEREE

The referee should first make sure that the Basic compiler is in the computer (Hewlett-Packard Model 2114A, 8K memory) and operative. He should then read in the game tape. After initializing the game program according to INSTRUCTIONS FOR INITIALIZING, the game will be ready to play.

The participants in the game should be divided into teams, ideally no fewer than three, nor more than seven participants in each team. It is best when there are at least three teams and the computer program will not handle more than eight teams. Each team should be encouraged to select a chairman (or president), an accountant, and appoint members to represent the marketing, personnel, and production functions.

The referee should then make sure that each team has an official team booklet, with copies of Forms I through IV arranged in a set for three years (four periods each year). The official set should have initial data (as per copy attached to this set of instructions) entered on the forms. This should include data regarding production, capacity, inventory value, administrative cost, and cash balance. Each member of each team should have a set of PLAYERS' INSTRUCTIONS, a copy of Chart I showing the past twenty-four periods of sales experience for his team, and copies of Forms I through IV that he can use for calculations. It is advisable to make this material available for study sometime before initiating play of the game.

The referee should then explain the philosophy of the game, pointing out that it is up to the teams to find out how the market reacts to their decisions and explaining the decisions to be made in the play for the first period on Form I. It is wise at this point to discuss the basic nature of the game, the fact that the teams are interdependent, the fact that market response will be dependent on the team decisions, to some degree, but that the market response will also be determined by general economic trends and by some random variation. Also, it can be pointed out that one quarter's decisions will affect results not only for that quarter, but for future quarters as well.

Receiving the Decisions

Upon receiving the booklets (with decisions) from the teams, the referee should verify the calculations and the entries, making sure that enough lead time is given for decisions regarding new production and capability. He should check profit calculations and should assure himself that each team has entered the cost of negative cash balance, if the team incurred some.

Entering Data

The referee then types the decisions into the computer program as data. (See INSTRUCTIONS FOR ENTERING DATA.) Decisions as to price, promotiom, production, capacity, research, and incentives are typed into memory locations from 351 to 358 (as needed), team one's decisions being typed into 351, team two's into 352, etc. In the event that some team other than team one is the first to turn in its decisions, that team's decisions can be entered as soon as the form arrives. For example, if team four is the first to turn in its decisions as to training are entered into memory locations 361 through 368 (as needed) in the same way that data was entered in the 351-358 block. The referee should check the means for entering training data carefully before proceeding. It should be noted that the data for incentive wages and for training must be coded before entry.

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For incentive wages, the questions involve only whether the team has paid the full cost of the incentive plan and whether the plan is for the semi-skilled workers or not. A plan for another group of workers produces no effect at all. A plan, fully paid for, for semi-skilled workers, increases plant capacity, thereby causing less production expense when the plant is working near or above capacity. In coding the plan, the number entered should be 30 or more if the plan is for semi-skilled workers and less than 30 if the plan is for one of the other two classes of employees, or if there is no plan.

As for training, the number entered is a function of the number of periods since a training program was installed. In the first period, whether or not a training program was installed, this number will be (0). This is because the results of the training program are not apparent in the period for which it is installed. In the next period, if a training program was installed in the first period, the number should be (6). One period after the introduction of an additional new training program, six should be added to the number which appears as the last item of data in subject team's line in the last matrix printed out from the previous period (the matrix characterized as data statements). The data for the present period should be corrected by this increase. Note that, in entering such data, the whole data line must be entered, even though most of the data is as it was. For example, if team 4 had initiated a training program last period, and this period's data line had been "364 DATA 70,1,12,525,80,3.235", it should be re-entered as "364 DATA 70,1,12,525,80,9.235".

Running the Program

First, the "ON" button for the tape punch should be pressed and the "HERE IS" button should also be pressed. This will avoid any residual punching on the tape. Now, press the "OFF" button on the tape punch. At this point, after making sure that the program is initialized and all new data is fed in, type "RUN" and press the carriage return button. This should cause three matrices to be printed out along with two pieces of summary information. At the end of the second piece of summary information, "Total Promotion, \$XXX", there will be a pause of one second. During this second, press the "ON" button of the tape punch. All the new data for data block 361 through 36n will be typed out and punched onto the tape (n depending on the number of teams). At the end of this series of data statements there will be another pause of one second. At this point press the "OFF" button. This will insure that only the data statements are present on the tape. The computer will then type "READY". After this has happened, press the "ON" button again and press "HERE IS". This will give you some blank tape at the end of the data. Then press the "OFF" button. Immediately then put this piece of tape in the tape reader and read in the new data. The computer is now initialized for the next period of play. The first matrix printed out will simply show the team decisions for the referee's verification.

The referee should then insert the "sales" figures (in units), the "Prod Cost" figures (in dollars), and the "Admin Cost" figures (in dollars) from the second matrix in the appropriate places on the team forms. The last column, "unit cost", will be useful in the final game analysis. He can then hand the official booklets back to the teams. During the second play of the game, the teams will need assistance in completing the forms especially the Income Statement. It is probably appropriate to explain the forms to the participants as a group, going down through the necessary calculations.

Summarizing Results

After each period is decided, the referee should post on the blackboard: 1) the prices charged by each team last period; 2) a combined sales total for all teams; 3) the total amount charged by all teams for promotion. After each four periods post the year's profit for each team. <u>Each period represents</u> three months.

At the end of each four periods (i.e., each year) the referee will calculate a total profit for each team for the year. He will charge the team an income tax payable in the following period of play. This income tax will be 50% of the total profit calculated. This figure will be entered on Form II on line 15, labeled "Tax". The team must treat this as an expense in said period.

Upon completing the game for any one day's play, the referee should retain all official team booklets, allowing the participants to keep their calculation sheets. He should also read out the present stage of the game onto tape. This he does by first typing "PLIST" on the teletype, waiting a second and then pressing the "ON" button for the tape punch. The tape will be furnished with blank leader and follower in the process and can be used to initiate play of the game for the next period. Only the new decision data and the new period number will have to be furnished.

Game Analysis

Upon completion of all the plays of the game, the referee should post records of the performances of all teams. A suitable form for such a presentation is embodied in Chart II with a series of trend lines for each team depicting various criteria useful in analyzing the game experience. The teams should be encouraged to analyze their own experiences for the benefit of the other teams in the analysis session. The referee can comment as he feels appropriate. The data for the presentation can be found in the official team booklets and in the printouts from the computer.

<u>Note</u>: (1) It may be useful at times to experiment with the game in order to determine how the total demand function behaves. For such purpose, the experimenter may wish to print out only a selected portion of the total printout. He can eliminate printing Matrix A for example, simply by one instruction, "9 GO TO 17". Similarly he can eliminate printing the second matrix by typing "285 GO TO 330". The last (data statement) matrix can be omitted by typing "379 GO TO 400". When these matrices are again desired, simply type "9" then return, "285" then return, and "379" then return.

<u>Note</u>: (2) A copy of the referee's data sheet is included at the conclusion. It is useful to enter team decision data on this sheet before entering the data into the computer. In this way errors in entering data can be avoided. Further, information on this sheet will be useful in the final game analysis.

INSTRUCTIONS FOR INITIALIZING GAME

1. The letter "N" represents the number of teams in the game. In order to set up the program for a given play of the game, this number will have to be inserted in the following manner:

Type "4 LET N = (the number of teams)"

For example, if the number of teams is to be 5, the instruction is:

"4 LET N = 5"

2. Next, the period of play must be inserted. Assuming that this is the first period, this is done as follows:

Type "5 LET P = 1"

For the third period of play it would be:

"5 LET P = 3"

This instruction will give a market trend to the demand function throughout the game. As originally set up, this trend will call for rising total demand (all other things being equal) during the initial four periods. The demand will then level off and drop until the ninth period. The demand will then level off and rise again.*

3. The tape is set up initially for eight teams. For this reason, data will have to be omitted for any teams above the actual number playing. This will have to be done in two different data blocks, 351 to 358 and 361 to 368. The omissions should be from the higher numbers in each case to the lower numbers. For example, if the actual number of teams is 5, simply type the following numbers, pressing "return" after each number:

356, 357, 358, 366, 367, 368

 The data representing cumulative effects of past decisions are already entered in the initial tape. These entries won't have to be changed for the first period's play.

The game is now ready for the first period.

^{*}If the instructor contemplates playing many more than twelve periods, it would be wise to move from period 12 to period 5 and then to period 6, etc. Using period numbers much higher than 12 will introduce demands that will probably be too high for practical purposes.

PLAYER INSTRUCTIONS (To be given to all players)

You are a member of a closely knit management team that is competing directly with several companies for a share of an industrial market. All of the companies are selling a product that is technically similar. Price and promotional effort are the key elements affecting volume. Profits result from a careful assessment of market demand, competitor's activities, and sound production and expense planning and control.

As in any business, a number of forms must be used to communicate your decisions and to report the company's position. Each period you must determine the: (1) product price, (2) promotion expenditure, (3) amount to be spent on plant expansion, (4) volume of raw material to be placed into production, (5) amount of research investment, (6) amount of expenditure for an incentive program, and (7) amount of investment in a training program. These decisions will be fed into a computer simulation representing a real market situation, and the results will be given back by the referee. Your team's results will be determined by (1) your decisions, (2) your competitors' decisions, and (3) the market conditions (affected by some trend indices). Additionally, there will be some random variation.

Selling Price (Line 1)

All other things being equal, the higher your promotion outlay, the more units of your product the market will absorb and the lower the price the more units of your product the market will absorb. However, the number of units sold by your firm will depend on the price and promotion outlays set by your firm in relationship to competitor's actions. There will be cyclical, seasonal and random influence in total market demand, as well as influence from the average price charged by all competitors and the total amount they spend on promotion. Orders must be filled from currently available merchandise; and inventory deficiency results in lost sales.

Selling prices can only be changed in one dollar increments with a maximum variation of two dollars per unit from one period to the next. Assume that the last price charged was \$30.00 per unit and your company sold 59,000 units.

Over the past several years each competitor has maintained an equal share of the market. Chart I portrays your company's sales volume over the last twenty-four periods. Your marketing research staff has reported that they expect the upward trend to continue.

Promotion Budget (Line 2)

This is the amount spent for advertising and personal sales effort. The budgeted amount cannot be altered more than \$100,000 from one period to the next, and changes made in \$50,000 steps. Your promotion budget last period was \$450,000. The effect of promotional effort is somewhat cumulative. That is, there will be some effect on sales in later periods due to this period's promotion.

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Production (Line 3)

During any period you may begin the ordering and production cycle for any number of raw materials units. The complete cycle requires two periods: one period for the raw materials to arrive after they have been ordered and one period to change the inputs into finished goods. Therefore, if a stock of finished inventory is needed for sale during period five for example, the raw material order must be placed no later than the beginning of the third period. Therefore, the production decision must be made for the third period.

Two periods ago, 60,000 units of raw material were ordered. They can be sold during this first game period. Last period, 65,000 units were ordered and will be saleable during period II. If you wish to have additional inventory available for sale during the third period, enter the desired quantity now on line three, period III.

There is a 10% inventory carrying charge each period. This charge is based on <u>cost value</u> of the ending inventory. Your ending inventory last period was 41,000 units, valued at \$310,000. Thus the carrying charge would have been \$31,000 last period.

Your manufacturing cost is about \$10 per unit when production is near plant capacity. Above capacity production leads to overtime rates and other charges; if your plant operates much under its full potential, the \$700,000 fixed charges will raise the unit costs. However, this should not be construed as forbidding you to produce above capacity.

Plant Capacity Additions (Lines 4, 5, and 6)

Initially, your plant has a 75,000 unit per period capacity. Every \$60,000 spent for expansion will increase the plant's capacity 1,000 units. An expansion program initiated during one period is not completed until three periods have passed. Payments are not made for plant additions until the new space is available for use.

Your plant will have a 77,000 unit capacity during Period III. If you believe more capacity will be needed during the fourth period, this expansion program must be started now in the first period. Enter this decision on lines 7, 8, and 9 in the space provided under Period IV.

Research and Development (Line 7)

An investment may be made for research and development during any period. The more money that is put into research, the greater the probability of a breakthrough. For any investment made there is a period of delay due to the time needed for research before any results are realized. If a breakthrough does occur, the advantages will be realized through a reduction in total production cost for each period after the research investment repays itself. Repetitive breakthroughs are possible if research investments are repeated. The same total amount invested over time as a steady state input will give a greater possibility of breakthrough than if it is invested all in one period. That is, crash research programs, while effective, are more expensive than regular research investment. Investments in research must be made in multiples of \$20,000. There is an investment maximum of \$160,000 per period.

Incentive Wage Program (Line 8)

An incentive program may be installed for all levels of the production force: unskilled, semi-skilled, and skilled. Any one, all, or a combination of these segments may be put on incentive during any period. The costs of the program include an initial cost for determining each job's productivity measurement, for establishing evaluation methods, and for making accounting adjustments. This cost is \$50,000 for any or all groups of workers able to be put on incentive. There will also be a steady-state cost of \$10,000 per period for each skill level on incentive. This is needed to maintain the control, evaluation, and accounting procedures. The advantage of this program's establishment is that it may substitute for additions to the plant capacity. The increased production advantage of the program discontinues if the payments cease. As 60% of the work force is semi-skilled, the benefits of this group being put on incentive would be evidenced soonest -- during the period in which introduced. If this program is introduced, enter the amount of incentive expenditure on Line 4 of Form I. The <u>total</u> unit production, including increments added by incentives, will be taken into account when the computer calculates the production cost.

Training Program (Line 9)

It has been determined that the introduction and use of an extensive training program for production workers will result in lower total production costs whether production is at full capacity or not. If it is decided to begin this program, the expense will be one investment of \$30,000. This expense will include the cost of instructors and educational material. It will take a period before the details of the program's setup are complete and the instructors are trained. Then there will be a reduction in production costs. The amount of total production cost reduction will exist from time to first effect, in decreasing amount from period to period.

Negative Cash Balance

At the end of every period in which your cash balance is negative, you will be charged an extra 5% of the amount by which it is negative. Make your calculations on scratch paper first to see if you will have a negative cash balance. Then add this cost if so. This is the cost of borrowing money to cover debts.

Income Tax

At the end of each four periods (1 year) the referee will calculate an income tax to be paid in the following period. It will be entered in Form II, line 15 and also in the space provided.

Completing the Income Statement

- Step 1: The unit sales will be entered in Form II, line one, by the judge. Multiply the unit sales figure by the price charges by the company this period. Enter the dollar sales volume on line two.
- Step 2: Line three, Beginning Inventory, is the same as line six, Ending Inventory, from the previous period.
- Step 3: Line four, Production Cost, is entered on Form II by the judge.

- Step 4: Line five, Merchandise Available for Sale, is the sum of lines three and four.
- Step 5: Multiply the Unit Sales, line one, by the average unit cost (Form IV, line six) and enter the product on line <u>seven</u> as the Cost of Goods Sold. Form IV is provided as a worksheet to aid in calculating the number of units of ending inventory and also the average unit cost.
- Step 6: Subtract line 7, Cost of Goods Sold, from line 5, Merchandise Available for Sale, and enter on line 6, Ending Inventory.
- Step 7: Subtract line 7, Cost of Goods Sold, from line 2, Sales, and enter the difference on line 8, Gross Margin.
- Step 8: Enter the Promotion Expense on line 9, from Form I, line 2.
- Step 9: Enter the Research Expense on line 12 from Form I, line 7.
- Step 10: Enter the Incentive Cost on line 10, from Form I, line 8.
- Step 11: Enter the Training Expense on line 11 from Form I, line 9.
- Step 12: Inventory Carrying Charge, line 13, is 10% of line 6, Ending Inventory.
- Step 13: The Overhead is provided by the judge. It is a function of capacity.
- Step 14: Add lines 9 through 15 and subtract the total from line 8. Enter the difference on line 16.

Negative Cash Balance

- Step 1: Complete the Cash Available Statement Form III. The "cash end this period" is the result of subtracting the sum of lines 4 and 5 from the sum of lines 1, 2, and 3.
- Step 2: If there is a negative cash balance at the end of the period, enter 5% of that figure as a penalty on the Income Statement, Form II, line 15. Reduce the Net Income (or increase the Net Loss) for the company for every period that there is a negative cash balance on Form III.

Average Unit Cost (Form IV, Line 6)

Calculate the average unit cost by dividing the value of total merchandise for sale (Form II, line 5) by the number of units available for sale (Form IV, line 30). This figure should be entered on line 6 of Form IV.

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JUDGE'S FORM

Date_

Number of Teams_____

Judge____

Location	Designation	Team #	Price	Prom.	Prod.	Cap.	Research	Incentive
	DATA							
	DATA							
	DATA					L		
	DATA							
	DATA							
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	DATA							
	DATA							
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JUDGE'S FORM

Class	Management	460	(B))

Date 2/18/70

Number of Teams 5

Judge<u>Nordstrom</u>

Location	Designation	Team #	Price	Prom.	Prod.	Cap.	Research	Incentive
351	DATA	1	30	500	65	75	100	30
352	DATA	2	30	850	100	80	160	20
353	DATA	3	31	500	55	75	30	10
354	DATA	4	29	650	90	80	10	0
355	DATA	5	26	500	65	75	80	30
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FORM I MANAGEMENT DECISIONS

Company_____

Year__

I II III IV

1. S	elling	Price
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2. Promotion Budget

3. Production, Units

4. Plant Cap. Add'ns, Units

5. Plant Cap. Add'ns, \$

6. Cum. Cap. Add'ns, \$

7. Research Inv't, \$

8. Incentive Prog. Exp., \$

9. Training Prog. Inv't, \$

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FORM II INCOME STATEMENT

1. Sales, Units

2. Sales, \$

3. Begin, Inv'y, \$

4. Production Cost, \$

5. Mdse. Av. for Sale, \$

6. Ending Inv'y, \$

7. Cost of Goods Sold, \$

8. Gross Margin, \$

9. Promotion Exp., \$

10. Incentive Cost, \$

11. Training Exp., \$

12. Research Exp., \$

13. Inv'y Carrying Charge, \$

14. Overhead, \$

15. Cash Shortage Charge, \$

16. Net Income (loss), \$

FORM I MANAGEMENT DECISIONS

Company____X

Year____197X_____

1. Se	lling	Price
-------	-------	-------

2. Promotion Budget

3. Production, Units

4. Plant Cap. Add'ns, Units

- 5. Plant Cap. Add'ns, \$
- 6. Cum. Cap. Add'ns, \$
- 7. Research Inv't, \$
- 8. Incentive Prog. Exp., \$
- 9. Training Prog. Inv't, \$

I	II	III	IV
60,000	65,000		
		2,000	
		120,000	
75,000	75,000	77,000	

FORM II INCOME STATEMENT

		<u>г</u>	[[
1.	Sales, Units				
2.	Sales, \$				
3.	Begin. Inv'y, \$	310,000			
4.	Production Cost, \$				
5.	Mdse. Av. for Sale, \$				 Year's Profit
6.	Ending Inv'y, \$				
7.	Cost of Goods Sold, \$				 Transma
8.	Gross Margin, \$				Income Tax
9.	Promotion Exp., \$				
10.	Incentive Cost, \$				 Not After
11.	Training Exp., \$				Net After Tax
12.	Research Exp., \$				
13.	Inv'y Carrying Charge, \$				
14.	Overhead, \$	700,000			
15.	Cash Shortage Charge, \$				
16.	Net Income (loss), \$				

FORM III CASH AVAILABLE

- 1. Cash, End of Last Per.
- 2. Inv'y End Last Period
- 3. Net Income This Period
- 4. Paid for Add'l Plant Cap.
- 5. Inv'y End This Period
- 6. Cash End This Period

I	II	III	IV
			· · · · · · · · · · · · · · · · · · ·

FORM IV INVENTORY WORKSHEET

- 1. Beginning Inv'y
- 2. Units This Period
- 3. Total Units for Sale
- 4. Unit Sales, This Per.
- 5. Ending Inv'y, Units
- 6. Av. Unit Cost (II5/IV3)

FORM III CASH AVAILABLE

- 1. Cash, End of Last Per.
- 2. Inv'y End Last Period
- 3. Net Income This Period
- 4. Paid for Add'l Plant Cap.
- 5. Inv'y End This Period
- 6. Cash End This Period

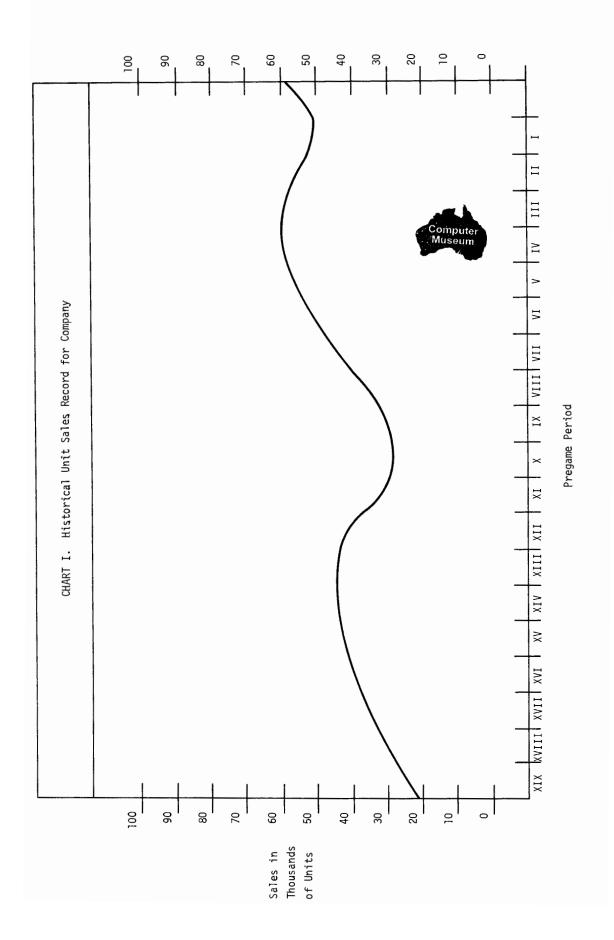
II	III	IV
	120,000	
	II	II III 120,000

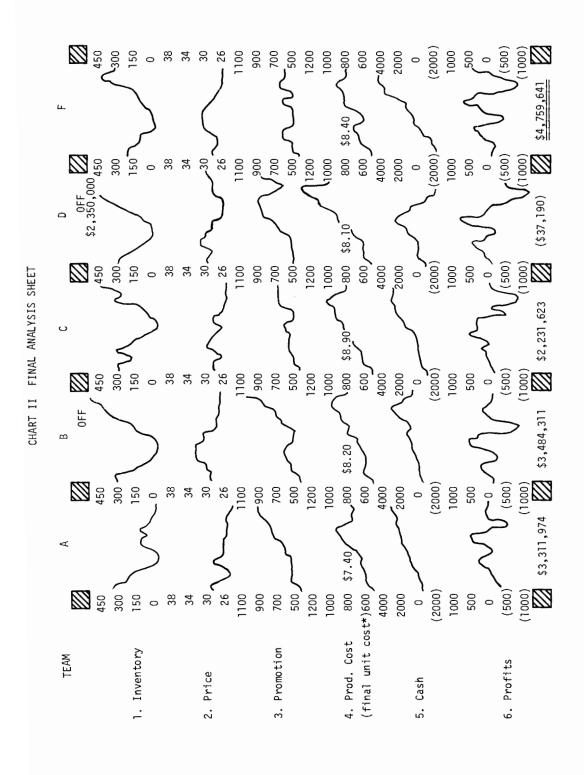
FORM IV INVENTORY WORKSHEET

- 1. Beginning Inv'y
- 2. Units This Period
- 3. Total Units for Sale
- 4. Unit Sales, This Per.
- 5. Ending Inv'y, Units
- 6. Av. Unit Cost (II5/IV3)

31,000		
60,000		
91,000		
	1	

.





TITLE:	KR20 ITEM ANALYSIS AND KUDER-RICHARDSON FORMULA 20 RELIABILITY A408-36137A
DESCRIPTION:	This program may be used to do an item analysis on teacher-constructed tests to determine the difficulty, discrimination index, and PQ value for each item, and the average difficulty, average discrimination index, and Kuder-Richardson Formula 20 Reliability for the test.
INSTRUCTIONS:	After determining the number of students in the upper 27% and the number in the lower 27% of all the students who took the test, the teacher tabu- lates the number of correct responses to each item on the test for each of these two groups. DATA: line 350: number of items on the test, number of people in either the high or low group (27% of all those taking the test). in following data lines, list the number of correct responses for the high group on item mo. 1; then correct responses for the high group on item no. 2, no. of correct responses for the low group on item no. 2, etc. last data line (line 400) must be the variance (standard deviation squared) for the test obtained previously using all test scores.
SYSTEM SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	NONE
ACKNOWLEDGEMENTS:	Donald E. Gettinger Stillwater Senior High School

KR20, page 2 January 1972 A408-36137A

RUN

RUN KR2Ø

TEST ITEM	HIGH	LOW	DIFFICULTY	DISCR. INDEX	PQ
1	44	27	.622807	•298246	•234918
2	52	42	•824561	• 175439	•14466
3	50	11	•535088	•684211	•248769
4	49	32	•710526	•298246	•205679
5	18	2	•175439	•280702	• 14466
6	22	12	•298246	• 175439	•209295
7	56	26	•719298	•526316	•201908
8	56	29	•745614	•473684	• 189674
9	54	32	•754386	• 385965	• 185288
10	56	29	•745614	•473684	•189674
11	41	13	• 473684	• 49 1 2 28	•249307
12	54	37	•798246	•298246	•16105
13	5 7	47	•912281	• 175439	8.00246E-02
14	5 7	36	•815789	• 368421	•150277
15	55	35	.789474	• 350877	•166205
16	55	48	•903509	• 122807	8.71807E-02
17	51	27	.684211	•421053	•216066
18	52	15	•587719	•649123	•242305
19	50	18	• 596491	• 561404	• 240689
20	15	8	·201754	• 122807	• 16105
21	57	52	•95614	8.77193E-02	•041936
22	53	31	.736842	• 38 59 6 5	• 19 39 06
23	55	40	•833333	•263158	•138889
24	56	21	•675439	•614035	•219221
25	55	21	•666667	• 59 6 49 1	• 222222
26	47	14	• 535088	• 578947	•248769
27	54	9	• 552632	• 789474	•24723
28	45	18	• 552632	• 473684	•24723
29	27	11	• 333333	•280702	•222222
30	55	10	•570175	• 789474	•245075
31	48	16	• 561404	.561404	•24623
32	51	22	•640351	• 508772	•230302
33	19	14	.289474	8.77193E-02	•205679
34	22	10	.280702	•210526	•201908

SUM OF PQ= 6.6195VARIANCE= 29.963AVERAGE DIFFICULTY IS.619969AVERAGE DISCRIMINATION INDEX IS.398865KUDER-RICHARDSON FORMULA 20 RELIABILITY=.802686

DONE

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LISTING

KR20 10 REM *** HP TIME-SHARED BASIC PROGRAM LIBRARY ******************* 11 REM 12 REM KR20: ITEM ANALYSIS AND KUDER-RICHARDSON FORMULA 20 13 REM RELIABILITY 14 REM 36137 (A408) REV A -- 7/71 15 REM 16 17 REM 100 REM ITEM ANALYSIS 110 REM K=NO. ITEMS, N=NO. PEOPLE IN EITHER GROUP 120 READ KON 130 LET S≠Ø PRINT "TEST ITEM","HIGH LOW DIFFICULTY PRINT " PQ" 140 DISCR. INDEX", 150 160 LET D1=0 170 LET D2=0 180 FOR I=1 TO K 190 READ H.L 200 PRINT I+H:L:(H+L)/(2*N)+(H-L)/N+ 210 LET D1=D1+(H+L)/(2*N) 220 LET D2=D2+(H-L)/N 230 LET P=((H+L)/(2*N))*((2*N-H-L)/(2*N)) 240 PRINT P

250 LET S=S+P 260 NEXT I 270 REM V=VARIANCE (S.D.+2) 280 READ V 290 LET R=(K/(K-1))*(1-S/V) 300 PRINT 310 PRINT "SUM OF PQ="S+"VARIANCE="V 320 PRINT "AVERAGE DIFFICULTY IS "DI/K 330 PRINT "AVERAGE DISCRIMINATION INDEX IS "D2/K PRINT "KUDER-RICHARDSON FORMULA 20 RELIABILITY="R 340 350 DATA 34+57 360 DATA 44,27,52,42,50,11,49,32,18,2,22,12,56,26,56,29,54,32 DATA 56+29+41+13+54+37+57+47+57+36+55+35+55+48+51+27+52+15 370 380 DATA 50,18,15,8,57,52,53,31,55,40,56,21,55,21,47,14,54,9 390 DATA 45.18,27.11.55.10.48.16.51.22.19.14.22.10 400 DATA 29.963 410 END

. ,

TITLE:	SCORES COMPUTES MEAN, STANDARD DEVIATION, AND STANDARD SCORES A408-36136A
DESCRIPTION:	FOR TEST SCORÉS Program finds the mean and standard deviation for a set of scores, and the deviation, Z-score, and T-score for each of the individual scores.
INSTRUCTIONS:	DATA: First line (line 370) is number of scores. List the scores on the following data line(s).
SYSTEM SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	Program assumes a normal distribution of scores.
ACKNOWLEDGEMENTS:	Donald E. Gettinger Stillwater Senior High School

SCORES, page 2 January 1972 A408-36136A

RUN

RUN SCORES

MEAN = 41.3333 STANDARD DEVIATION = 7.66522

SCORE	DEVIATION	Z-SCORE	T-SCORE
5Ø	8 • 6 6 6 6 6	1 • 13065	61.3065
50	8 • 6 6 6 6 6	1.13065	61.3065
50	8 • 6 6 6 6 6	1 • 13065	61.3065
48	6•66666	•869729	58.6973
48	6•66666	•869729	58 • 69 73
44	2.66666	•347891	53.4789
43	1.66666	·217432	52.1743
42	•666664	8•69726E-Ø2	50.8697
42	•666664	8•69726E-Ø2	50.8697
42	•666664	8.69726E-Ø2	50.8697
41	333336	-4•34868E-Ø2	49 • 5651
35	-6.33334	- • 826243	41.7376
30	-11.3333	-1.47854	35 • 2146
29	-12.3333	-1.609	33.91
26	-15.3333	-2.00038	29.9962

DONE

LISTING

SC(S 10 EM *** HP TIME-SHARED BASIC PROGRAM LIRRARY ***************** ⊰EΜ 11 SCORES: COMPUTES MEAN, STANDARD DEVIATION AND STANDARD 12 REM 13 REM SCORES FOR TEST SCORES 36136 (A408) REV A -- 7/71 14 REM 15 REM 16 REM *** CONTRIBUTED PROGRAM ******************************** 17 REM 100 REM STATISTICS PROGRAMS: MEAN, STANDARD DEVIATION, STANDARD SCORES DIM X[100],D[100],Z[100],T[100] 110 LET X=Ø 120 READ N 130 140 FOR I=1 TO N 150 READ X[]] LET X=X+X(1) 160 170 NEXT I 180 LET M=X/N PRINT "MEAN = ";M 190 200 LET D=0 FOR I=1 TO N LET D[I]=X[I]-M 210 220 230 LET D=D+D(1)+2 240 NEXT I 250 LET S=SOR(D/N) PRINT "STANDARD DEVIATION = ";S 260 270 FOR I=1 TO N LET Z(I)=D(I)/S LET T(I)=10*D(I)/S+50 280 290 300 NEXT I PRINT 310 PRINT "SCORE", "DEVIATION", "Z-SCORE", "T-SCORE" 320 330 PRINT "-----","-----","------","-----","-----" 340 FOP I=1 TO N 350 PRINT X[[],0[1],Z[]],T[]] NEXT I 360 370 DATA 15 380 DATA 50,50,50,48,48,44,43,42,42,42,41,35,30,29,26 390 END

TITLE:	INTGRT COMPUTES NUMERIC INTEGRAL OF A FUNCTION A310-36021A
DESCRIPTION:	This program uses Simpson's Rule for finding the numeric integral of a function.
	TUNCTION.
INSTRUCTIONS:	The function should be defined by a $DEF FNF(X)=$
	statement with a line number less than 9000. The following data should be supplied in line 9900:
	A = lower X bound B = upper X bound
	E = acceptable error To use this routine as a subroutine, change line 9017 to RETURN, delete line
	9003. Now define the function and data in the main program. To stop print- out, delete line 9016. The value of the integral is given by the variable S.
	Variables used: A,B,E,H,M,S,T,X
SYSTEM SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	None
ACKNOWLEDGEMENTS:	I

```
INTGRT, page 2
January 1972
A310-36021A
 RUN
 GET-SINTGRT
 8900 DEF FNF(X)=SIN(X)
 9900 DATA 0,3.142+159,.001
 RUN
 INTGRT
 INTEGRAL = 2.
 DONE
 LISTING
 INTGRT
8900 DEF FNF(X)=SIN(X)

9000 REM **** INTGRT **** MATHEMATICS PROGRAM ****

9001 REM **** VERSION 1 **** 7/31/69 ****

9002 REM COMPUTES NUMERIC INTEGRAL OF A FUNCTION

9003 READ A, B, E

9004 LET H=B-A

9005 LET T=(FNF(A)+FNF(B))*H

9006 LET M=0

9007 LET T=(T+M)/2

9008 LET M=0

9009 FOR X=A+H/2 TO B STEP H

9010 LET M=M+FNF(X)

9011 NEXT X

9012 LET M=M+H

9013 LET S=(T+2*M)/3

9014 LET H=H/2
  9014 LET H=H/2
 9015 IF ABS(T-M)/ABS(S)>E THEN 9007
9016 PRINT "INTEGRAL = "S
9017 STOP
 9900 DATA 0,3.14159,.001
9999 END
```

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TITLE:	EUCLID COMPUTES LARGEST COMMON FACTOR OF TWO INTEGERS A301-36035B
DESCRIPTION:	This program finds the largest common factor of two integer numbers using the Euclidean Algorithm.
INSTRUCTIONS:	The program will request the two integers during execution and print out the result.
SYSTEM SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	None
ACKNOWLEDGEMENTS:	Richard Klein Los Angeles City Unified School District

EUCLID, page 2 January 1972 A301-36035B

RUN

RUN EUCLID

WHAT ARE YOUR TWO INTEGERS?48,32 LARGEST COMMON FACTOR IS 16

DONE

LISTING

EUCLID 9000 REM *** HP TIME-SHARED BASIC PROGRAM LIBRARY ***************** 9001 REM 9002 REM EUCLID: 36035 (A321) REV B -- 9/71 9003 REM COMPUTES LARGEST COMMON FACTOR OF TWO INTEGERS 9004 REM 9005 RFM *** CONTRIBUTED PROGRAM ********************************** 9006 PRINT 9007 PRINT "WHAT ARE YOUR TWO INTEGERS"; 9008 INPUT A+B 9009 X1=A MAX B 9010 X2=A MIN B 9011 DFF FNA(X)=X1/X2 9012 X3=X2 9015 X2=(X2*(FNA(1)-INT(FNA(1)))) 9020 X2=X2+.5 9025 X2=INT(X2) 9030 X1=X3 9035 IF X2#0 THEN 9012 9040 PRINT "LARGEST COMMON FACTOR IS "X1 9999 END

TITLE:	FINDS PRIME FACTORS OF POSITIVE INTEGERS A301-36037A
DESCRIPTION:	This program will find the prime factors of a number.
INSTRUCTIONS:	The program will request the number to be factored and print out all prime factors and their multiplicity.
	Input a zero (\emptyset) or negative number to terminate execution.
SYSTEM	
SPECIFICATIONS:	2000A and Teletype
SPECIAL CONSIDERATIONS:	The number to be factored must be a positive integer less than 32768.
ACKNOWLEDGEMENTS:	

```
FACTOR, page 2
January 1972
A301-36037A
RUN
GET-SFACTOR
RUN
FACTOR
PROGRAM TO FIND PRIME FACTORS OF A POSITIVE INTEGER.
TO TERMINATE EXECUTION INPUT A '0'.
WHAT NUMBER IS TO BE FACTORED?77
THE PRIME FACTORS OF 77
                          ARE:
               MULTIPLICITY
PRIME
-----
               -----
                1
11
                1
WHAT NUMBER IS TO BE FACTORED?147
THE PRIME FACTORS OF 147 ARE:
PRIME
              MULTIPLICITY
----
3
                1
                2
7
WHAT NUMBER IS TO BE FACTORED?0
DONE
LISTING
FACTOR
9000 REM ***** FACTOR ***** MATHEMATICS PROGRAM ****
9001 REM ***** VERSION 1 ***** 7/31/69 *****
9002 REM FINDS PRIME FACTORS
     PRINT "PROGRAM TO FIND PRIME FACTORS OF A POSITIVE INTEGER."
9003
     PRINT "TO TERMINATE EXECUTION INPUT A "0"."
9004
9005 PRINT
9006
     PRINT "WHAT NUMBER IS TO BE FACTORED";
     INPUT A
9007
9008
     IF A <= 32767 THEN 9012
     PRINT "SORRYITHIS PROGRAM IS ONLY DESIGNED TO FACTOR NUMBERS"
9009
9010 PRINT "OF 5 DIGITS UP TO 32767 OR LESS!PLEASE TRY AGAIN"
9011
     GOTO 9005
     LET D=A
9012
9013 PRINT
9014
     IF A=2 THEN 9044
9015 LET Q=0
9016
     IF A>0 THEN 9018
9017
     STOP
9018 LET C=2
9019
      GOSUB 9023
9020 FOR C=3 TO SQR(A) STEP 2
9021 GOSUB 9023
9022 GOTO 9039
9023 LET B=0
9024
     IF A=C+INT(A/C) THEN 9026
9025 GOTO 9029
9026
      LET A=A/C
9027 LET B=B+1
9028 GOTO 9024
      IF 8<1 THEN 9038
9029
9030 IF Q=1 THEN 9037
9031 LET Q=1
      PRINT "THE PRIME FACTORS OF";D:"ARE:"
9032
9033 PRINT
     PRINT "PRIME", "MULTIPLICITY"
9034
9035 PRINT "-----","------"
9036
      PRINT
     PRINT C,B
9037
     RETURN
9038
9039
      NEXT C
9040 IF A=1 THEN 9005
     IF Q=0 THEN 9044
9041
     PRINT A,1
9042
9043 GOTO 9005
      PRINT "THE NUMBER" #A # "IS PRIME"
9044
     GOTO 9005
9045
9046
      STOP
9999 END
```

TITLE:	CALCULATOR PROGRAM WITH OPTIONAL PLOTTER OUTPUT CALCOM/CALPLT A301-36131A
DESCRIPTION:	CALCOM and CALPLT allow the user to perform immediate mode calculations and other functions. The two programs are identical other than for the GRAPH command, which utilizes the HP 7200A Plotter with CALPLT, or the printing terminal with CALCOM.
	The sample run utilized CALPLT (and the HP 7200A Plotter).
INSTRUCTIONS:	See Page 2.
SYSTEM SPECIFICATIONS:	2000B and Teletype
SPECIAL CONSIDERATIONS:	There is a heirarchy of operators with factorialization being performed first followed by the min and max functions, then exponentiation, multiplication and division, and finally addition and subtraction. Paranthesis may be used at any time to override the order in which the operations are performed. In addition to performing direct calculations, the user may retain the results of a calculation as a variable consisting of a single letter. Variables may be used in later calculations once they have been defined. Undefined variables are set to zero.
	By using a backslash \smallsetminus (shift L) the user may perform more than one calculation per line. The different calculations are performed from left to right in the command string.
ACKNOWLEDGEMENTS:	Steve Poulsen OMSI

INSTRUCTIONS

SYMBOL	MEANING	EXAMPLE
+ * / or ^ % > ! ? + or _	Addition Subtraction Multiplication Division Exponentiation Root function A%B=B+(1/A) MIN function. Value is lesser number on either side MAX function. Value is greater number on either side Factorialization of number preceding ! Value is supplied by user Allows more than one command per line Deletes preceding character	2+5=7 5-2=3 2*5=10 2/5=.4 2+5=32 2%5=2.236 2<5=2 2>5=5 5!=120 W=?+3*?/2 2+5\FACTOR 314*W 2+3_5=7
COMMAND	MEAN ING	
BASE n BASE DEGREES FACTOR GRAPH LIST RADIANS SAME SCRATCH STOP ZERO	Changes input and output to base n Changes input and output back to base 10 Allow trig functions to be evaluated in de Prime factors number following command Graphs functions following command on tele Lists variables not equal to zero Allows trig functions to be evaluated in a Repeats last command string Sets all variables equal to zero Stops the running of CALC Approximates the points at which the equation command is equal to zero	eprinter (or plotter) radians
FUNCTION NAME	MEANING	
ABS COS COT CSC EXP INT LOG RND SEC SIN TAN	Absolute value of number Cosine of angle Cotangent of angle Cosecant of angle "e" raised to a real power Integer part of number Natural logarithm of number Random number between 0 and 1 Secant of angle Sine of angle Tangent of angle	

The following symbols, commands, and functions are available:

Arc functions are called by placing the prefix ARC in front of the function such as: ARCSIN, ARCCOT, or ARCCSC.

Hyperbolic functions are called with the prefix HYP such as: HYPSIN, HYPCOS, HYPSEC, ARCHYPCOT, ARCHYPCSC, HYPARCTAN, or HYPARCCOS.

CALCOM/CALPLT, page 3 January 1972 A301-36131A

RUN	PLTL	
	Ø	100
RUN	0	5000
CALPLT	0	9900
INTERPRETIVE CALCULATOR	PLTT PLTL	
INTERFRETIVE CRECOLATOR	0	4.99950E+33
	49	9991
	99	9966
	1 4 9	9924
0 2+3*(5/2)	199	9867
9.5 0 Q=2+3*(5/2)	249 299	9793 9704
	349	9601
19	399	9483
Q 2+3*(5/2)\Q*2	449	9351
9.5	499	9206
19	549	9050
0 ?+3*(5/2) INPUT DATA?2	599 649	8883 8705
9.5	699	8519
□ ?+3 * (?/2)	749	8324
INPUT DATA?2	799	8123
INPUT DATA?5	849	7916
9.5	899	7704
0 INT(2+3*(5/2))	949	7 490
9 1 ABS(2-3*(5/2))	999 1049	7273 7055
5.5	1049	6837
0 COS(3.14159	1149	6620
COS(3.14159	1199	6407
t	1249	6196
MISSING RIGHT PARENTHESIS	1299	5991
3•14159 0 COS(3•14159)	1349 1399	5791 5598
-1.	1449	5412
0 ARCTAN(-1)	1 499	
785398	1549	5067
0 FACTOR (52/2)	1599	4908
2 * 13	1649	4761
0 Q=1024 0 BASE 2\0	1699 1749	4624 4498
1000000000	1799	4385
0 10010*1001	1849	4284
10100010	1899	4195
0 BASE	1949	4118
0 A=2+2\B=2*3\C=2/5 0 LIST	1999 2049	4054 4002
A 4	2099	3962
B 6	2149	3934
C •4	2199	3918
Q 1024	2249	3913
O SCRATCH O LIST	2299	3920
0 2*?+?†2	23 49 2399	3936 3962
INPUT DATA?2	2449	3997
INPUT DATA?3	2499	40 4 1
13	2549	4092
O SAME	2599	4150
INPUT DATA?1	2649 2699	4214
INPUT DATA?2	2099	4284 4358
6	2799	4436
0 ZERO Y=X+3-X+2-10+X-8	28 49	4516
LOWER LIMIT OF SEARCH?-8	2899	4599
UPPER LIMIT OF SEARCH?8 -2 -1 4	2949	4683
GRAPH Y=(SIN(X))/X	2999 30 4 9	4767 4850
LOWER LIMIT OF X?0	3099	4933
UPPER LIMIT OF X?20	3149	5013
X INCREMENT? . 1	3199	5091
X OFFSET?Ø	3249	5165
Y SCALING FACTOR?10 PlTl	3299	5235
100 5000	3349 3399	5302 5363
5000 5000	3449	5419
9900 5000	3499	5469
PLTT	3549	5513

CALCOM/CALPLT, page 4 January 1972 A301-36131A

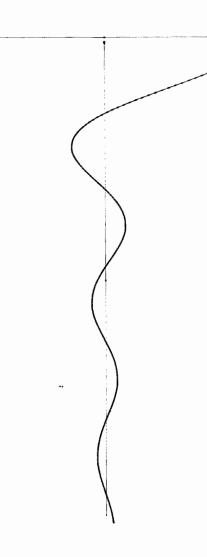
3599	5551	7.400	5014
3649	5582	7 499	5216
		7549	5189
3699	5607	7599	5159
37 49	5625	7649	5129
3799	5636	7699	5098
3849	5641	7749	5066
3899	5640	7799	5034
3949	5632		
	5618	7849	5002
3999		7899	4970
40 49	5598	7949	4939
4099	5573	7999	4910
41 49	5543	80 49	4881
4199	5508	8099	4854
4249	5469	81 49	4828
4299	5426		
4349	5380	8199	4805
		8249	4784
4399	5332	8299	4765
4449	5281	8349	47 49
4499	5228	8399	4735
4549	5175	8449	4725
4599	5121	8499	4717
4649	5066	8549	4712
4699	5013		
		8599	4710
47 49	4960	8649	4711
4799	4909	8699	4714
4849	4859	8749	4721
4899	4813	8799	4730
4949	4768	8849	47 42
4999	4728	8899	4756
50 49	4690		
5099	-	8949	4772
	4656	8999	4791
5149	4627	90 49	4811
5199	4602	9099	4833
5249	4581	91 49	4857
5299	4564	9199	4881
5349	4553	9249	4907
5399	4545	9299	4933
5449	4543		
		9349	4960
5499	4545	9399	4986
5549	4552	9449	5013
5599	4562	9499	5039
5649	4577	9549	5064
5699	4596	9599	5089
5749	4619	9649	
5799	4645		5112
		9699	5134
5849	4674	9749	5155
5899	4706	9799	5173
5949	47 40	9849	5190
5999	4776	9899	5205
6049	4814	9948	5217
6099	4853	9998	5228
61 4 9	4893	PLTT	2220
6199	4933		
		0 STOP	
6249	4973		
6299	5013	DONE	
6349	5052		
6399	5090		
6449	5126		
6499	5161		
6549	5194		
6599	5224		
6649	5251		
6699	5276		
67 49	5297		
6799	5315		
6849	5330		
6899	5341		
6949	5349		
	5353		
6999			
7049	5354		
7099	5351		
7149	5344		
7199	5335		
7249	5322		
7299	5306		
7349			
	5287		
7399	5266		

1	34	7	J
7	39	9	5

5242

```
CALCOM
10
  COM X+V[36]
11
   REM
12
   REM ***
            HP TIME-SHARED BASIC PROGRAM LIBRARY ***********************
   REM
13
               CALCOM: KEYBOARD ENTRY CALCULATOR PROGRAM
14
   REM
15
   REM
               36131 (A301) REV A -- 7/71 (PART 1 OF 2)
   REM
16
17
   REM
            REM ###
18
19
   REM
20
   REM
               6/1/71 VERSION BY STEVE POULSEN OF OMSI
40
   DIM P(70)+A$(72)+B$(72)+S$(52)+C$(37)+F$(45)
50
   $$="+-*/*%<>!()\?0123456789ABCDEFGHIJKLMNOPQRSTUVWXYZ."
60
   C$="BASDEGFACGRAHELL ISQUARADSAMSCRSTOZER"
70
   F$="ABSARCCOSCOTCSCEXPHYPINTLOGRNDSECSGNSINTAN"
80
   MAT P=ZER
90
   N3=0
100
   MAT V=ZER
120
   B≠1Ø
   M1=01=Q=Q1=E1=Q2=I1=D1=F=S1=A1=H1=P2=S3=X=Ø
130
140
    P7=B1=BØ=Ø
150
   P=T1=L1=N1=02=L=1
160
    PRINT "INTERPRETIVE CALCULATOR"
170
    PRINT "NNN"
180
    PRINT "[0] ";
190
    T2=100
200 ENTER T2+T2+B$
```

LISTING



CALCOM/CALPLT, page 6 January 1972 A301-36131A 210 IF T2 <> -256 THEN 240 220 PRINT "GGGG" 230 GOTO 190 240 P=1 250 M1=LEN(B\$) 260 PRINT IF P>M1 THEN 180 270 280 IF B\$[P.P] <> " " THEN 310 290 P=P+1 300 GOTO 270 310 IF P+2>M1 THEN 420 320 01=0 330 FOR Q=1 TO 36 STEP 3 IF B\$[P+P+2] <> C\$[Q+Q+2] THEN 400 340 35Ø 01=INT(Q/3)+1360 P=P+l 370 IF P>M1 THEN 400 IF B\$[P+P]="\" THEN 400 380 IF B\$[P,P] <> " " THEN 360 390 400 NEXT Q 410 IF 01 <> 0 THEN 450 420 GOSUB 700 430 GOSUB 1010 440 GOTO 910 GOTO 01 OF 460,510,4470,4080,680,530,680,600,620,650,670,4720 450 460 GOSUB 1400 470 IF X>1 AND X<37 THEN 490 480 X=1Ø 490 B=INT(x)500 GOTO 910 510 T1=3.14159/180 520 GOTO 910 530 FOR 07=8+14 TO LEN(S\$)-1 540 IF V[Q7-14]=0 THEN 580 550 PRINT 55[07+07]+ 560 X=V[07-14] 570 GOSUB 1010 580 NEXT Q7 59Ø GOTO 910 600 T1=1 610 GOTO 910 620 B\$=A\$ 630 S3=1 640 GOTO 24Ø 650 MAT V=ZER 660 GOTO 910 670 ST₀P 680 PRINT "NOT YET IMPLEMENTED" 690 GOTO 910 700 Q=P-1 710 Q=0+1 720 E1=Ø 730 IF Q>M1 THEN 890 IF B\$[Q,Q]="\" THEN 890 740 IF B\$[Q,Q] <> "=" THEN 710 750 760 Q2=Q 770 Q=0-1 780 IF Q<P THEN 830 IF B\$[Q,Q]=" " THEN 770 790 800 FOR Q1=14+B TO LEN(S\$)-1 810 IF B\$[Q,Q]=S\$[Q1,Q1] THEN 870 820 NEXT Q1 830 P=Q 840 GOSUB 980 850 PRINT "ILLEGAL VARIABLE ON LEFT OF EQUAL SIGN" GOTO 910 860 870 E1=Q1 880 P=02+1 890 GOSUB 1400 900 RETURN 910 A\$=B\$ IF B\$[P,P] <> "\" THEN 950 920 930 P=P+1 940 GOTO 270 950 P=P+1 960 IF P>M1 THEN 180 970 GOTO 920 980 PRINT BS

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990 PRINT TAB (P-1) ; "+" 1000 RETURN 1010 E1=E1-14 1020 IF El <= .0001 THEN 1060 1030 V[E1]=X 1040 E1=0 1050 RETURN 1060 IF B <> 10 THEN 1090 1070 PRINT X 1080 RETURN 1090 IF X >= 0 THEN 1120 1100 PRINT "-"; 1110 X=ABS(X) 1120 I1=INT(X) 1130 D1=X-11 1140 IF X <> 0 THEN 1170 1150 PRINT "Ø" 1160 RETURN 1170 IF ABS(INT(LOG(X)/LOG(B)))<70 THEN 1200 1180 PPINT X;"(BASE 10)" 1190 RETURN 1200 A\$=" 1210 B1=60 1220 X=I1 1230 B1=B1-1 1240 Q=X-INT(X/B)*B 1250 A\$[B1,B1]=\$\$[Q+14,Q+14] 1260 X=INT(X/B) 1270 IF X>0 AND B1>2 THEN 1230 1280 X=D1 1290 A\$=A\$[B1+B1+LEN(A\$)] 1300 B]=LEN(A\$) 1310 IF D1=0 THEN 1380 1320 A\$[B1+B1]="." 1330 Q=INT(X*B) 1340 B1=B1+1 1350 A\$[B1,B1]=\$\$[Q+14,Q+14] 1360 X=X*B=Q 1370 IF B1<72 AND X <> 0 THEN 1330 1380 PRINT AS 1390 RETURN 1400 P=P-1 1410 N]=L1=1 1415 B1=0 1420 X=S1=P7=L=0 1430 P=P+1 1440 IF P <= M1 THEN 1520 1450 02=0 1460 GOSUB 2690 1470 GOSUB 3150 1480 IF L1 <= 1 THEN 1510 1490 GOSUB 980 1500 PRINT "MISSING RIGHT PARENTHESIS" 1510 RETURN 1520 IF B\$[P,P]=" " THEN 1430 1530 FOR Q=1 TO LEN(S\$) 1540 IF B\$(P,P]=S\$(Q,Q) THEN 1590 1550 NEXT Q 1560 GOSUB 980 1570 PRINT "ILLEGAL CHARACTER" 1580 GOTO 1430 1590 C=Q 1600 IF C=12 THEN 1450 1610 IF C <> 11 THEN 1810 1620 02=0 1630 G0SUB 2690 1650 N1=2 1660 IF L1>1 THEN 1700 1670 GoSUB 980 1680 PRINT "EXTRA RIGHT PARENTHESIS" 1690 GOTO 1430 1700 GOSUB 1770 1710 H1=INT(A/10) 1720 A1=A-H1*10 1730 GOSUB 1770 1740 L=INT(A) 1750 F=(A+L)+100

CALCOM/CALPLT, page 8 January 1972 A301-36131A 1755 GOSUB 3150 1758 GOSUB 2690 1760 GOTO 1430 1770 IF L1 <= 1 THEN 1670 1780 A=P[L1] 1790 L1=L1+1 1800 RETURN 1805 IF L=0 THEN 1890 1810 IF C <> 10 THEN 2040 1820 A=X 1830 X=0 1840 L=L+1 1850 GoSUB 1970 1860 A=02 1870 02=0 1880 GOSUB 1970 1890 A=L+F/100 1900 F=L=0 1910 GOSUB 1970 1920 A=H1#10+A1 1930 GoSUB 1970 1940 H1=A1=Ø 1950 N1=1 1960 GOTO 1420 1970 L1=L1+1 1980 IF L1<70 THEN 2020 GOSUB 980 1990 2000 PRINT "EXPRESSION TOO COMPLEX" GOTO 1620 2010 P[[]]=A 2020 2030 RETURN 2040 GOSUB N1 OF 2060,2550 2050 GOTO 1430 2060 IF C=50 THEN 2150 2070 IF C<14 OR C>13+B THEN 2250 2080 IF P7>0 THEN 2120 2090 X=X*B+C-14 2100 S1=N1=1 2110 RETURN 2120 X=X+B+(-P7)+(C-14) 2130 P7=P7+1 2140 GOTO 2100 2150 IF P7>0 THEN 2200 2160 P7=1 2170 51=1 2180 N1=1 2190 RETURN GOSUB 980 2200 2210 PRINT "ILLEGAL DECIMAL POINT" 2220 GOTO 2160 2230 N]=1 2240 RFTURN 2250 IF S1 <> 1 THEN 2300 P=P-1 2260 S1=P7=0 2270 2280 N1=2 2290 RETURN 2300 IF C<13+B OR C>50 THEN 2490 2310 IF P+2>M1 THEN 2350 2320 FOR F=1 TO 14+3-1 STEP 3 2330 IF B\$[P+P+2]=F\$[F+F+2] THEN 2380 2340 NEXT F 2350 F=0 2360 X=V[C-14] 2370 GOTO 2270 2380 P=P+2 2390 F=INT(F/3)+1 2400 IF F <> 2 THEN 2440 2410 F=0 2420 A1=1 2430 GOTO 2230 2440 IF F <> 7 THEN 2230 2450 F=0 2460 H1=1 2470 GOTO 2230 2480 F=Ø 2490 IF C <> 13 THEN 2530 2500 PPINT "INPUT DATA";

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2510 INPUT X 2520 GOTO 2270 2530 X=0 2540 GOTO 2260 2550 P7=51=Ø IF C <> 9 THEN 2640 2560 257Ø Q **≕** 1 258Ø FOR Q1=1 TO X 2590 Q=Q*Q1NEXT Q1 2600 2610 X=Q 2620 N2=2 2630 RETURN IF C>8 THEN 2670 2640 2650 02=C 2660 GOTO 2690 2670 02≖3 2680 P=P-l 2690 IF L>0 THEN 2800 IF 02=0 THEN 2790 2700 2710 A=X 2720 X=Ø 2730 L=L+l 2740 GOSUB 1970 2750 A=02 2760 02=0 2770 GOSUB 1970 278Ø N1 = 12790 RETURN 2800 GOSUB 1770 IF INT((A+1)/2) >= INT((02+1)/2) THEN 2840 2810 2820 GOSUB 1970 2830 GOTO 2710 2840 07=A 2850 GOSUB 1770 2860 L=L-1 2870 N3=A GOSUB 07 OF 2900,2920,2940,2960,3030,3080,3110,3130 2880 2890 GOTO 2690 2900 X=N3+X 2910 RETURN 2920 X=N3-X 2930 RETURN 2940 X=N3#X 2950 RETURN 2960 IF X#0 THEN 3010 2970 IF P2#0 THEN 2990 PRINT "DIVISION BY ZERO" 2980 2990 X=1.E+30 3000 RETURN 3010 X=N3/X RETURN 3020 3030 IF N3>0 THEN 3040 IF X=INT(X) THEN 3040 3ø32 IF P2>0 THEN 2990 3034 PRINT "NEGATIVE NUMBER TO REAL POWER - - WARNING ONLY" 3036 3038 N3=A85(N3) 3040 X=N3+X 3050 RETURN 3060 X = 1 3070 RETURN IF N3=0 OR X=0 THEN 3060 3080 3082 XØ=1 GOTO 2*(N3#INT(N3))+(P2>0)+1 OF 3084+3084+3086+2990 3083 X9=1+4*((N3/2)=INT(N3/2))+2*SGN(1+SGN(X))+(P2>0) 3084 GOTO X9 OF 3098, 3098, 3094, 3094, 3086, 2990, 3094, 3090 3085 PRINT "ROOT OF NEGATIVE NUMBER - - WARNING ONLY" 3086 3088 GOTO 3094 3090 81=B1+1 X0=1-2*((B0/(2+B1))=INT(B0/(2+B1))) 3092 3094 X=ABS(X)+(1/N3)+XØ 3096 RETURN 3098 XØ=-1 3099 GOTO 3094 3100 RETURN 3110 X=X MIN N3 3120 RETURN X=X MAX N3 3130

January 1972 A301-36131A 3140 RETURN IF F <= 0 THEN 3190 3150 IF A1=0 THEN 3160 3152 3154 X=X/T1 3160 F=INT(F*10+.5)/10 3170 IF F>9 THEN 3210 3180 GOSUB F OF 3230.3240.3250.3370.3490.3610.3240.3630.3650 3182 IF A1=0 THEN 3190 3184 X=X/T1 3190 A1=F=H1=0 3200 RETURN 3210 GOSUB F-9 OF 3670,3690,3810,3830,3950 3220 GOTO 3182 3230 X=ABS(X) 3240 RETURN 3250 X=X*T1 3260 GOTO 4-2*(A1=0)-(H1=0) OF 3350.3330.3310.3290 3290 X=LOG(X+SOR(X+2-1)) 3300 RETURN 3310 X=ATN(SQR(1-X+2)/X) 3320 RFTURN 3330 X=(EXP(X)+FXP(-X))/2 3340 RETURN 3350 X=COS(X) 3360 RETURN 3370 X=X*T1 GOTO 4-2*(A1=0)-(H1=0) OF 3470,3450,3430,3410 3380 3410 X=(L0G(X+1)-L0G(X-1))/X 3420 RETURN 3430 X=ATN(X = ATN(1/X)3440 RETURN 3450 X=(EXP(X)+EXP(-X))/(EXP(X)-EXP(-X)) 3460 RFTURN 3470 X=1/TAN(X) 3480 RETURN 3490 X=X*T1 3500 GOTO 4-2*(A1=0)-(H1=0) OF 3590,3550,3570,3530 3530 X=LOG((1/X)+SQR((1/X+2)+1)) 3540 RETURN 3550 X=2/(EXP(X)-EXP(-X)) 3560 RETURN 3570 X=ATN(1/SQR(X+2+1)) 3580 RETURN 3590 X=1/SIN(X) 3600 RETURN 3610 X=EXP(X) 3620 RETURN 3630 X=INT(X) 3640 RETURN 3650 X=LOG(X) 3660 RETURN 367Ø X=RND(-X) 3680 RETURN 3690 X=X*T1 3700 GOTO 4-2*(A1=0)-(H1=0) OF 3790,3770,3750.3730 3730 X = LOG((1/X) + SQR((1/X+2)-1))3740 RETURN 3750 X=ATN(SQR(X+2-1)) 3760 RETURN X=2/(EXP(X)+EXP(-X))3770 3780 RETURN 3790 X=1/COS(X)3800 RETURN 3810 X=SGN(X) 3820 RETURN 3830 X=X+T1 3840 GOTO 4-2*(A1=0)-(H1=0) OF 3930.3910.3890.3970 3870 X=LOG(X+SQR(X+2+1)) 3880 RETURN 3890 X=ATN(X/SQR(1-X+2))3900 RETURN 3910 X = (EXP(X) - EXP(-X))/23920 RETURN 3930 X=SIN(X) 3940 RETURN 3950 X=X+T1 GOTO 4-2*(A1=0)-(H1=0) OF 4050.4030.4010.3990 3960 3990 X = (LOG(1+X) - LOG(1-X))/2

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```
4000 RETURN
4010 X=ATN(X)
4020 RETURN
4030 X=(EXP(X)-EXP(-X))/(EXP(X)+EXP(-X))
4040 'RETURN
4050 X=TAN(X)
4060 RETURN
4070 REM GRAPHING ROUTINE
4080 Q3=P
4085 P2=1
4090 PRINT "LOWER LIMIT OF X";
4100
      INPUT G2
4110 PRINT "UPPER LIMIT OF X";
4120 INPUT G3
4130 PRINT "X INCREMENT";
4140 INPUT G4
4150 PRINT "X OFFSET";
4160 INPUT G5
4170 PRINT "Y SCALING FACTOR";
4180 INPUT G6
      GOSUB 700
4182
4184
      GOSUB 1010
4186 B3=2+B1
4190 IF G6 <> 0 THEN 4210
4200 G6=.85
4210 FOR X7=INT(G2/G4)*G4 TO INT(G3/G4)*G4 STEP G4
4220 FOR G7=1 TO 72
4230 A$[G7,G7]=" "
4240 NEXT G7
4250 G8=0
4260
      IF ABS(2*G5)>35 THEN 4290
4270 68=35+2*65
4280 A$[G8+G8]="."
4290 IF ABS(X7)>.00001 THEN 4360
4300 A$[10,10]="Y"
4310 FOR G7=11 TO 61 STEP 2
4320 A$[G7,G7+1]=". "
4330 NFXT G7
4340
     A$[62,62]="Y"
4350 G8=63
4360 FOR B0=1 TO B3
4365 P=Q3
4370 V[33]=X7
4380 GOSUB 700
4390 GOSUB 1010
4400 Y5=INT (35+2*V[34]*G6+65)
4410 IF Y5>72 OR Y5<1 THEN 4425
4415 G8=G8 MAX Y5
4420 A$[Y5,Y5]="*"
4425 NEXT BØ
4430 PRINT A$[1+G8 MIN 72]
4440 NEXT X7
4445 P2=0
4450 GOTO 910
4460 REM PRIME FACTORING ROUTINE
4470
     GOSUB 1400
4480 X=INT(ABS(X))
4490 IF X=0 THEN 4700
4500
     R5=SQR(X)
4510
      C3=Ø
4520
     X5=2
4530 GOTO 4590
4540 C3=0
4550 IF X5>2 THEN 4570
4560 X5=1
4570 X5=X5+2
4580 IF R5<X5 THEN 4700
4590 Q3=X/X5
4600 IF Q3 <> INT(Q3) THEN 4640
4610 X=Q3
4620
     C3=C3+1
4630 IF X>1 THEN 4590
4640 IF C3=0 THEN 4550
4650 IF C3=1 THEN 4680
4660 PRINT X5;"+";C3;"*";
4670 GOTO 4690
468Ø
     PRINT X5;"*";
4690 IF X>1 THEN 4540
```

January 1972 A301-36131A 4700 PRINT X 4710 GOTO 910 PRINT "LOWER LIMIT OF SEARCH"; 4720 INPUT Z8 4730 4740 PRINT "UPPER LIMIT OF SEARCH"; 4750 INPUT Z9 4760 Q5=P 4770 V[33]=Z8 478Ø 17=1 4790 Q3=Ø 4800 P=Q5 GOSUB 700 4810 4820 GOSUB 1010 IF V(34) <> Ø THEN 4870 4830 PRINT V(33); 4840 V[33]=INT(1+V[33]) 4850 4860 GOTO 4780 V[33]=V[33]+17 4870 488Ø Y5=V[34] 4890 P=Q5 GOSUB 700 4900 4910 GOSUB 1010 IF V[34]=0 THEN 4840 IF SGN(V[34]) <> SGN(Y5) THEN 5000 4920 4930 4940 IF Q3=0 THEN 4980 4950 17=17/2 4960 03=03+1 4970 IF Q3>25 THEN 4840 IF V(33)>Z9 THEN 5050 4980 4990 GOTO 4870 5000 17=17/2 5010 V[33]=V[33]-17 5020 Q3=Q3+1 IF 03>25 THEN 4840 5030 5040 GoT0 4890 5050 PRINT 5060 GOTO 910 5070 END CALPLT 10 COM X.V[36] RFM 11 *** HP TIME-SHARED BASIC PROGRAM LIBRARY **************** REM 12 13 RFM CALPLT: KEYBOARD ENTRY CALCULATOR PROGRAM WITH 7200A 14 REM GRAPHIC PLOTTER OUTPUT 15 REM 36131 (A301) REV A -- 7/71 (PART 2 OF 2) 16 REM 17 REM *** CONTRIBUTED PROGRAM ******************** 18 REM PEM *** CALCOM **** 6/1/71 VERSION BY STEVE POULSEN OF OMST 20 DIM P[70],A\$[72],B\$[72],S\$[52],C\$[37],F\$[45] 40 \$\$="+-*/*%<>!()\?0123456789ABCDEFGHTJKLMNOPQRSTUVWXYZ." 50 C\$="BASDEGFACGRAHELLISQUARADSAMSCRSTOZER" 60 F\$="ABSARCCOSCOTCSCEXPHYPINTLOGRNDSECSGNS1NTAN" 70 80 MAT P=ZFR 90 N3=0 100 MAT V=ZER 120 B=10 130 M1=01=0=01=F1=02=I1=D1=F=S1=A1=H1=P2=S3=X=Ø 140 P7=B1=B0=0 150 P=T1=L1=N1=02=L=1 160 PRINT "INTERPRETIVE CALCULATOR" 170 PRINT "NNN" 180 PRINT "[0] "; 19Ø T2=100 200 ENTER T2+T2+B\$ 210 IF T2 <> -256 THEN 240 PRINT "GGGG"; 220 GOTO 190 230 240 P=} 250 M1=LEN(B\$) 260 PRINT 270 IF P>M1 THEN 180 IF B\$[P,P] <> " " THEN 310 280 S90 P=P+1 300 GOTO 270 310 IF P+2>M1 THEN 420

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1

```
320 01=0
330 FOR Q=1 TO 36 STEP 3
    IF B$[P,P+2] <> C$[Q,Q+2] THEN 400
340
    01 = INT(Q/3) + 1
350
360 P=P+1
370
    IF P>M1 THEN 400
    IF B$[P,P]="\" THEN 400
380
    IF B$(P+P) <> " " THEN 360
390
400
     NEXT Q
     IF 01 <> 0 THEN 450
410
    GOSUB 700
420
430
     GOSUB 1010
440
     GOTO 910
     GOTO 01 OF 460,510,4470,4080,680,530,680,600,620,650,670,4720
450
460
     GOSUB 1400
470
     IF X>1 AND X<37 THEN 490
480
    X=10
490
    B=INT(X)
500
    GOTO 910
     T1=3.14159/180
510
520
    GOTO 910
    FOP Q7=B+14 TO LEN(S$)-1
IF V[Q7-]4]=0 THEN 580
530
540
550 PRINT S$[Q7.Q7].
560 X=V[Q7-14]
570
     GOSUB 1010
     NEXT Q7
580
590
     GOTO 910
600
     T1=1
     GOTO 910
610
620
     8$=A$
630
     53=1
640
     GOTO 24Ø
650
     MAT V=ZER
660
    GOTO 910
670
     STOP
     PRINT "NOT YET IMPLEMENTED"
680
     GOTO 910
690
700
     Q=P-1
     Q = Q + 1
710
720 El=0
730
     IF Q>M1 THEN 890
     IF B$[Q,Q]="\" THEN 890
740
     IF B$[Q,Q] <> "=" THEN 710
750
760
     Q2=Q
770
     Q=Q-1
     IF Q<P THEN 830
780
     IF B$[Q+Q]=" " THEN 770
792
     FOP Q1=14+8 TO LEN(S$)-1
800
810
     [F B$[Q,Q]=5$[Q],Q1] THEN 870
820
     NEXT Q1
830
     P=0
840
     GOSUB 980
850
     PRINT "ILLEGAL VARIABLE ON LEFT OF EQUAL SIGN"
860
     GOTO 910
870
     E1=Q1
880
     P=Q2+1
890
     GOSUB 1400
 900
     RETURN
910
     A$=B$
920
     IF B$[P,P] <> "\" THEN 950
 930 P=P+1
 940 GOTO 270
 95Ø
     P=P+1
 962
     IF P>M1 THEN 180
 970
      GOTO 920
     PRINT BS
PRINT TAB(P-1);"+"
 980
 990
 1000 RETURN
 1010
       E1=E1-14
       IF E1 <= .0001 THEN 1060
 1020
 1030
       V[E]]=X
 1040
       E1=Ø
 1050
       RETURN
 1060
       IF B <> 10 THEN 1090
 1070
       PRINT X
 1080
       RETURN
      IF X >= 0 THEN 1120
 1090
```

January 1972 A301-36131A 1100 PRINT "-"; 1110 X=ABS(X) 1120 I1=INT(X)1130 D1=X-I1 1140 IF X <> 0 THEN 1170 1150 PRINT "0" 1160 RETURN 1170 IF ABS(INT(LOG(X)/LOG(B)))<70 THEN 1200 1180 PRINT X;"(BASE 10)" 1190 RETURN 1200 A\$=" 1210 B1=60 1550 X=11 1230 B1=B1-1 1240 Q=X-INT(X/B)*B 1250 A\$[B1,B1]=S\$[Q+14,Q+14] 1260 X=INT(X/B) 1270 IF X>0 AND B1>2 THEN 1230 1280 X=D1 1290 A\$=A\$[B1+B1+LEN(A\$)] 1300 B1=LEN(A\$) 1310 IF D1=0 THEN 1380 1320 A\$[B1+B1]="•" 1330 Q=INT(X*B) 1340 B1=B1+1 1350 A\$[B1+B1]=S\$[Q+14+Q+14] 1360 X=X*B-Q 1370 IF B1<72 AND X <> 0 THEN 1330 1380 PRINT AS 1390 RETURN 1400 P=P-1 1410 N1=L1=1 1415 B1=0 1420 X=S1=P7=L=Ø 1430 P=P+1 1440 IF P <= M1 THEN 1520 1450 02=0 1460 GoSUB 2690 1470 GoSUB 3150 1480 IF L1 <= 1 THEN 1510 1490 GOSUB 980 1500 PRINT "MISSING RIGHT PARENTHESIS" 1510 RETURN 1520 IF B\$[P,P]=" " THEN 1430 1530 FOR Q=1 TO LEN(S\$) 1540 IF B\$(P+P)=S\$(Q+Q) THEN 1590 1550 NEXT Q 1560 GoSUB 980 1570 PRINT "ILLEGAL CHARACTER" 1580 GOTO 1430 1590 C=Q 1600 IF C=12 THEN 1450 1610 IF C <> 11 THEN 1810 1620 02=0 1630 GASUB 2690 165Ø N1=2 1660 IF L1>1 THEN 1700 1670 GnSUB 980 1680 PRINT "EXTRA RIGHT PARENTHESIS" 1690 GOTO 1430 1700 GOSUB 1770 1710 H1=INT(A/10) 1720 A]=A-H]*10 1730 G0SUB 1770 1740 L=INT(A) 1750 F=(A-L)*100 1755 GOSUB 3150 1758 GOSUB 2690 1760 GOTO 1430 1770 IF L1 <= 1 THEN 1670 1780 A=P[L]] 1790 L1 = L1 - 11800 RETURN 1805 IF L=0 THEN 1890 1810 IF C <> 10 THEN 2040 1820 A=X 1830 X=Ø

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1840 L=L+1 GnSUB 1970 1850 1860 A=02 1870 02=0 GOSUB 1970 1880 A=L+F/100 1890 1900 F=L=Ø 1910 GOSUB 1970 1920 A=H1*10+A1 1930 GOSUB 1970 1940 H]=A]=0 1950 N1=1 1960 GOTO 1420 1970 L1=L1+1 IF L1<70 THEN 2020 1980 GOSUB 980 1990 PRINT "EXPRESSION TOO COMPLEX" 2000 2010 GOTO 1620 2020 P[[]]=A 2030 RETURN GOSUB N1 OF 2060,2550 2040 2050 GnT0 1430 IF C=50 THEN 2150 2060 1F C<14 OR C>13+B THEN 2250 2070 IF P7>0 THEN 2120 2080 2090 X=X*B+C-14 S1=N1=1 2100 2110 RETURN X=X+B+(-P7)*(C-14) 2120 2130 P7=P7+1 2140 GOTO 2100 IF P7>0 THEN 2200 2150 2160 P7=1 2170 S1=1 2180 N1=1 2190 RETURN GOSUB 980 PRINT "ILLEGAL DECIMAL POINT" 2200 2210 2220 GOTO 2160 2230 N1=1 2240 RETURN 2250 IF S1 <> 1 THEN 2300 P=P-1 2260 2270 S]=P7=Ø 2280 N1=2 2290 RETURN IF C<13+B OR C>50 THEN 2490 2300 2310 IF P+2>M1 THEN 2350 2320 FOR F=1 TO 14*3-1 STEP 3 2330 IF B\$[P+P+2]=F\$[F+F+2] THEN 2380 2340 NEXT E 2350 F = Ø 2360 X = V[C - 14]2370 GOTO 2270 P=P+2 2380 2390 F=INT(F/3)+1 2400 IF F <> 2 THEN 2440 2410 F=0 2420 A 1 = 1 2430 GOTO 2230 IF F <> 7 THEN 2230 2440 2450 F=Ø 2460 H1=1 GOTO 2230 2470 2480 F=0 IF C <> 13 THEN 2530 2490 PRINT "INPUT DATA"; 2500 INPUT X 2510 2520 GOTO 2270 2530 X = Ø 2540 GOTO 2260 2550 P7=S1=Ø 2560 IF C <> 9 THEN 2640 2570 Q = 12580 FOR Q1=1 TO X 2590 Q=Q#Q] 2600 NEXT Q1 2610 X=Q

CALCOM/CALPLT, page 16 January 1972 A301-36131A 2620 N2=2 2630 RETURN 2640 IF C>8 THEN 2670 2650 02=C 2660 GOTO 2690 2670 02=3 2680 P=P-1 2690 IF L>0 THEN 2800 2700 IF 02=0 THEN 2790 2710 A=X 2720 X=0 2730 L=L+1 2740 GOSUB 1970 275Ø A=02 2760 02=0 2770 GnSUB 1970 2780 N1=1 2790 RETURN 2800 GOSUB 1770 2810 IF INT((A+1)/2) >= INT((02+1)/2) THEN 2840 2820 GOSUB 1970 2830 GOTO 2710 2840 07=A 2850 GOSUB 1770 2860 L=L-1 2870 N3=A 288Ø GOSUB O7 OF 2900,2920,2940,2960,3030,3080,3110,3130 2890 GOTO 2690 2900 X=N3+X 2910 RFTURN 2920 X=N3-X 2930 RETURN 2940 X=N3#X 2950 RETURN 2960 IF X#0 THEN 3010 2970 IF P2#0 THEN 2990 2980 PRINT "DIVISION BY ZERO" 2990 X=1.E+30 3000 RETURN 3010 X=N3/X 3020 RETURN 3030 IF N3>0 THEN 3040 3032 IF X=INT(X) THEN 3040 IF P2>0 THEN 2990 3034 3036 PRINT "NEGATIVE NUMBER TO REAL POWER - - WARNING ONLY" 3038 N3=ABS(N3) 3040 X=N3+X 3050 RETURN 3060 X = 1 RETURN 3070 3080 IF N3=0 OR X=0 THEN 3060 3082 X Ø = 1 3083 GOTO 2*(N3#INT(N3))+(P2>0)+1 OF 3084,3084,3086,2990 $X_{9}=1+4*((N_{3}/2)=INT(N_{3}/2))+2*SGN(1+SGN(X))+(P_{2})$ 3084 GOTO X9 OF 3098,3098,3094,3094,3086,2990,3094,3090 3085 3086 PRINT "ROOT OF NEGATIVE NUMBER - - WARNING ONLY" 3088 GOTO 3094 3090 81=81+1 3092 $X_0=1-2*((B_0/(2+B_1))=INT(B_0/(2+B_1)))$ 3094 X=ARS(X)+(1/N3)*X0 3096 RETURN 3098 XØ=-1 3099 GOTO 3094 3100 RETURN 3110 X=X MIN N3 3120 RETURN X=X MAX N3 3130 3140 RETURN 3150 IF F <= 0 THEN 3190 IF A1=0 THEN 3160 3152 3154 X=X/T] 3160 F=INT(F*10+.5)/10 3170 IF F>9 THEN 3210 GOSUB F OF 3230,3240,3250,3370,3490,3610,3240,3630,3650 3180 3182 IF A1=0 THEN 3190 3184 X=X/Tl 3190 A1=F=H1=Ø 3200 RETURN

```
3210 GOSUB F-9 OF 3670,3690,3810,3830,3950
3220 GoTO 3182
3230
     X = ABS(X)
3240 RETURN
3250 X=X+T1
3260 GOTO 4-2*(A1=0)-(H1=0) OF 3350,3330,3310,3290
3290 X=LOG(X+SQR(X+2-1))
3300 RETURN
3310 X=ATN(SOR(1-X+2)/X)
3320 RETURN
3330 X=(EXP(X)+EXP(-X))/2
3340 RETURN
3350 X=COS(X)
3360
     RETURN
3370 X=X+T1
3380 GOTO 4-2*(A1=0)-(H1=0) OF 3470,3450,3430,3410
3410
     X=(LOG(X+1)-LOG(X-1))/X
3420 RETURN
3430 X=ATN(1/X)
3440 RETURN
3450 X=(EXP(X)+FXP(-X))/(EXP(X)-EXP(-X))
3460 RETURN
3470 X=1/TAN(X)
3480
     RETURN
3490 X=X*T1
3500 GOTO 4-2*(A1=0)-(H1=0) OF 3590,3550,3570,3530
3530
     X = LOG((1/X) + SQR((1/X+2)+1))
3540 RETURN
3550 X=2/(EXP(X)-EXP(-X))
3560 RFTURN
3570 X=ATN(1/SQR(X+2-1))
3580 RETURN
3590 X=1/SIN(X)
3600 RETURN
3610 X=EXP(X)
                                                  Computer
3620 RETURN
                                                  Museum
3630
     X = INT(X)
3640 RETURN
3650 X=LOG(X)
3660 RETURN
3670 X=RND(-X)
3680 RETURN
3690
     X=X*T1
3700 GOTO 4-2*(A1=0)-(H1=0) OF 3790,3770,3750,3730
3730 X=LOG((1/X)+SQR((1/X+2)-1))
3740 RFTURN
3750 X=ATN(SQR(X+2-1))
3760 RETURN
3770
     X=2/(EXP(X)+EXP(-X))
3780 RETURN
3790 X=1/COS(X)
3800 RFTURN
3810
     X=SGN(X)
3820 RETURN
3830 X=X*T1
3840 GOTO 4-2*(A1=0)-(H1=0) OF 3930,3910,3890,3870
3870 X=LOG(X+SQR(X+2+1))
3880 RETURN
3890
     X = ATN(X/SQR(1-X+2))
3900 RETURN
3910 X=(EXP(X)-EXP(-X))/2
3920
     RFTURN
3930 X=SIN(X)
3940 RETURN
3950
     X=X#T1
3960 GOTO 4-2*(A1=0)-(H1=0) OF 4050,4030,4010,3990
3990 X = (LOG(1+X) - LOG(1-X))/2
4000 RFTURN
4010 X=ATN(X)
4020 RETURN
4030 X=(EXP(X)-FXP(-X))/(EXP(X)+EXP(-X))
4040
     RETURN
4050 X=TAN(X)
4060
     RFTURN
4070 RFM GRAPHING ROUTINE
4080 Q3=P
4085 P2=1
4090 PRINT "LOWER LIMIT OF X";
```

January 1972 A301-36131A 4100 INPUT G2 PRINT "UPPER LIMIT OF X"; 4110 4120 INPUT G3 4130 PRINT "X INCREMENT"; 4140 INPUT G4 4150 PRINT "X OFFSET"; 4160 INPUT G5 PRINT "Y SCALING FACTOR"; 4170 4180 INPUT G6 4182 GnSUB 700 4184 GOSUB 1010 4186 B3=2+B1 4190 85=9999/(G3-G2) 4192 B6=G6*85 4194 87=+G2*85 4196 B8=5000+G5*B6 4200 PRINT "PLTLON";100; INT(B8); "ON";5000; INT(B8); "ON"9900; INT(B8) 4205 PRINT "PLTTONPLTLON"; INT (B7); 100; "ON"; INT (B7); 5000; "ON"; INT (B7); 9900 4207 PRINT "PLTTONPLTL" 4210 FOR X7=INT (G2/G4) *G4 TO INT (G3/G4) *G4 STEP G4 4220 FOR G7=1 TO 72 A\$[G7+G7]=" " 4230 4240 NFXT G7 4250 G8=Ø 4260 IF ABS(2*G5)>35 THEN 4290 4270 G8=35+2*G5 4280 A\$[G8,G8]="." 4290 IF ABS(X7)>.00001 THEN 4360 4300 A\$[10,10]="Y" 4310 FOR G7=11 TO 61 STEP 2 4320 A\$[G7+G7+1]=". " 4330 NEXT G7 4340 A\$[62,62]="Y" 435Ø G8=63 4360 FOR BØ=1 TO B3 4365 P=Q3 4370 V[33]=X7 4380 GOSUB 700 4390 GOSUB 1010 4400 Y5=INT(35+2*V[34]*G6+G5) IF Y5>72 OR Y5<1 THEN 4425 4410 4415 G8=G8 MAX Y5 4420 A\$[Y5+Y5]="*" 4425 NEXT BØ 4430 PRINT INT(85*X7+87); INT(88+V[34]*86) 4440 NEXT X7 4441 PRINT "PLTT" 4445 P2=0 4450 GOTO 910 4460 RFM PRIME FACTORING ROUTINE 4470 GOSUB 1400 4480 X=INT(ABS(X)) 4490 IF X=0 THEN 4700 4500 R5=SQR(X) 4510 C3=0 4520 X5=2 4530 GOTO 4590 4540 C3=0 4550 IF X5>2 THEN 4570 4560 X5=1 4570 X5=X5+2 4580 IF R5<X5 THEN 4700 4590 Q3=X/X5 4600 IF Q3 <> INT(Q3) THEN 4640 4610 X=Q3 4620 C3=C3+1 4630 IF X>1 THEN 4590 4640 IF C3=0 THEN 4550 4650 IF C3=1 THEN 4680 4660 PRINT X5;"+";C3;"*"; 4670 GOTO 4690 4680 PRINT X5;"*"; 4690 IF X>1 THEN 4540 4700 PRINT X 4710 GOTO 910 4720 PRINT "LOWER LIMIT OF SEARCH"; 4730 INPUT Z8 4740 PRINT "UPPER LIMIT OF SEARCH";

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```
4750 INPUT Z9

4760 Q5=P

4770 V(33)=Z8

4780 I7=1

4790 Q3=0

4800 P=Q5

4810 GOSUB 700

4820 GOSUB 1010

4830 IF V(34) <> 0 THEN 4870

4840 PRINT V(33);

4850 V(33)=INT(1+V(33))

4860 GOTO 4780

4870 V(33)=V(33)+I7

4880 Y5=V(34)

4890 P=Q5

4900 GOSUB 700

4910 GOSUB 1010

4920 IF V(34)=0 THEN 4840

4930 IF SGN(V(34)) <> SGN(Y5) THEN 5000

4940 IF Q3=0 THEN 4840

4950 I7=I7/2

4960 Q3=Q3+1

4970 IF Q3>25 THEN 4840

4980 IF V(33)=V(33)-I7

5020 Q3=Q3+1

5030 IF Q3>25 THEN 4840

5040 GOTO 4890

5050 PRINT

5060 GOTO 910

5070 END
```

-

CONTRIBUTED PROGRAM **BASIC**

TITLE:	A GOLF GAME	GOLF A903-36102A
DESCRIPTION:		
DESCRIPTION:	This program is a game of computerized golf in which one player against obstacles such as sandtraps and slicing with numbers.	plays
INSTRUCTIONS:	Input variables as follows:	
	Line 9 input H up to 2 digits Line 19 input T up to 1 digit Line 49 input C up to 2 digits Line 115 input W up to 3 digits Line 169 input I up to 3 digits Line 195 input A\$ up to 9 characters, a'yes'or'no'answer	
SYSTEM SPECIFICATIONS:	2000A and Teletype	
SPECIAL CONSIDERATIONS:	None	
ACKNOWLEDGEMENTS:	Richard Nelson Bloomington, Minnesota	

```
GOLF, page 2
December 1970
A903-36102A
RUN
GET-GOLF
RUN
GOLF
WELCOME TO THE TIES TIMESHARING 18 HOLE CHAMPIONSHIP COURSE
TO GET A DESCRIPTION OF CLUBS, ETC. TYPE Ø FOR A CLUB NK. WHEN REQUESTED
WHAT IS YOUR HANDICAP ?10
DIFFICULTIES AT GOLF INCLUDE:
   Ø=HOOK, 1=SLICE, 2=POOR DISTANCE, 4=TRAP SHOTS, 5=PUTTING
WHICH IS YOUR WORST ?0
READY TO GO ?YES
YOU ARE AT TEE OFF HOLE 1 . DISTANCE 361 YARDS PAR 4
ON YOUR RIGHT IS ADJACENT FAIRWAY.
ON YOUR LEFT IS ADJACENT FAIRWAY.
WHAT CLUB DO YOU WANT ?0
                          HERE'S YOUR BAG OF CLUBS
  WOODS (FULL SWING ONLY)
     1
         DRIVER
     2
         BRASSIE
         SPOON
     3
  IRONS (FULL SWING ONLY)
12 TWO IRON
         NINE IRON
     19
  IRONS (LESS THEN FULL SWING)
     22
         TWO IRON - PARTIAL SWING
     ٠
     29
          NINE IRON - PARTIAL SWING
WHEN YOU REACH THE GREEN IT WILL BE ASSUMED THAT YOU ARE
USING A PUTTER. THE PUTT POTENCY NO. REFERS TO THE STRENGTH
WITH WHICH THE BALL IS PUTTED. USE NUMBERS GREATER THAN
ZERO, INCREASING THE NUMBER FOR GREATER DISTANCE.
YOU WILL BE ASKED FOR 'PERCENT FULL SWING' ON CLUBS 22-29.
THIS SHOULD BE A NUMBER FROM 1 TO 99.
WHAT CLUB DO YOU WANT ?1
YOU HOOKED-
          SHOT WENT 247 YARDS - IS 118 YARDS FROM HOLE.
BALL IS 31
            YARDS OFF LINE IN ROUGH.
WHAT CLUB DO YOU WANT ?27
PERCENT FULL SWING ?65
SHOT WENT 98
              YARDS - IS 22
                              YARDS FROM HOLE.
           YARDS OFF LINE IN TRAP.
BALL IS 10
WHAT CLUB DO YOU WANT ?29
PERCENT FULL SWING ?80
ON GREEN 1
             FEET FROM PIN. PUT POTENCY NUMBER ?1
PASSED BY CUP.
             FEET FROM PIN. PUT POTENCY NUMBER ?1
ON GREEN 2
YOU H*O*L*E*D IT
YOUR SCORE ON HOLE 1
                      WAS 5
READY TO GO ?NO
TOTAL SCORE FOR 1
                    HOLES WAS 5
      OVER PAR
 1
DONE
```

```
store 5
                                                                             GOLF, page 3
                                                                             December 1970
LISTING
                                                                             A903-36102A
GOLE
   DIM L[11]+A$[9]
1
   PRINT "NWELCOME TO THE DESCENTION OF A HOLE CHAMPIONSHIP COURSE ""
2
3
   GOSUB 234
4
   X=3
5
   N=.8
   S1=S2=T5=0
6
7
   F=1
  PRINT "CHANNEN WHAT IS YOUR HANDICAP ";
8
                                                                   Computer
9
   INPUT H
   IF HAND OR HAN THEN 220
                                                                   Museum
1ø
   IF H>9 THEN 14
11
    PRINT "OH-OH, A HOT SHOT!"
12
    GOTO 16
13
    IF H<28 THEN 16
14
    PRINT "ANYONE FOR TENNIS?"
15
    PRINT "DIFFICULTIES AT GOLF INCLUDE:"
16
              g=HOOK, 1=SLICE, 2=POOR DISTANCE, 4=TRAP SHOTS, 5≖PUTTING"
    PRINT "
17
    PRINT "WHICH IS YOUR WORST ";
18
    INPUT T
19
    IF T>5 OR T 0 OR T=3 THEN 18
21
    FOR Z=1 TO (H+1)/(T+1)*10
21
    R=RND()
22
23
    NEXT Z
    J=Q=K=L[1]=Ø
 24
 25
    S2=S2+S1
 26
    IF F=1 THEN 40
    PRINT "WYOUR SCORE ON HOLE"F-1"WAS"S1
 27
    GOTO P-S1+3 OF 39,39,31,33,35
 28
    PRINT "KEEP YOUR HEAD DOWN."
 29
 30
     GOTO 39
    PRINT "A PAR. NICE GOING."
 31
    GOTO 39
 32
    PRINT "A BIRDIE, AND TWEET-TWEET TO YOU."
 33
 34
    GOTO 39
    IF P=3 THEN 38
 35
    PRINT "A GREAT BIG EAGLE."
 36
 37
     GOTO 39
    PRINT "A HOLE IN +#0+#N+#E+."
 38
    IF F=19 THEN 208
 39
    S1=Ø
 40
     IF S1=0 THEN 193
 41
     IF L[1]<1 THEN 146
 42
 43
     X=1
     IF L[1]>5 THEN 15#
 44
     PRINT "WSHOT WENT"D1"YARDS - IS"D2"YARDS FROM HOLE."
 45
     PRINT "BALL IS"INT (0) "YARDS OFF LINE IN ";
 46
 47
     GOSUB 217
     PRINT "WWHAT CLUB DO YOU WANT "
 48
     INPUT C
 49
     IF C THEN 70
FOR T6=1 TO 69
 5ø
 51
     PRINT "-";
 52
 53
     NEXT T6
 54
     PRINT
     IF C=9 THEN 48
 55
     PRINT "HERE'S YOUR BAG OF CLUBS
 56
                                                          SPOON DAT
     PRINT "
                                   2 BRASSIE
                                                     3
 57
                 1
                     DRIVER
                                            12 TWO IRON
                                                                           ."
     PRINT "
 58
              IRONS (FULL SWING ONLY)
                                                                   BM
     PRINT "
 59
                       NINE IRONONN IRONS (LESS THEN FULL SWING)"
                 19
                       TWO IRON - PARTIAL SWINGON
NINE IRON - PARTIAL SWINGONWW"
     PRINT "
                  22
 61
                                                       . 014
     PRINT "
                 29
 61
     PRINT "WHEN YOU REACH THE GREEN IT WILL BE ASSUMED THAT YOU ARE"
 62
     PRINT "USING A PUTTER. THE PUTT POTENCY NO. REFERS TO THE STRENGTH"
 63
     PRINT "WITH WHICH THE BALL IS PUTTED. USE NUMBERS GREATER THAN"
 64
     PRINT "ZERO, INCREASING THE NUMBER FOR GREATER DISTANCE.ON"
 65
     PRINT "YOU WILL BE ASKED FOR 'PERCENT FULL SWING' ON CLUBS 22-29."
 66
 67
     PRINT "THIS SHOULD BE A NUMBER FROM 1 TO 99."
 68
     C=9
 69
     GOTO 51
     IF C<1 OR C>29 THEN 76
 7ø
     IF C>3 THEN 78
 71
 72
     IF L[1]<5 OR C=14 OR C=23 THEN 81
 73
     GOTO 76
 74
     S1=S1-1
 75
     W=1
 76
     GOSUB 234
 77
     GOTO 48
```

78

IF C<12 THEN 76

```
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79
    C=C-6
80
    GOTO 72
81
    S1=S1+1
82
    W=1
    IF C>13 THEN 114
IF F/3=INT(F/3) THEN 118
83
84
85
    IF C<4 THEN 87
                                   27
                                            27
86
    GOTO 88
    IF L[1]=2 THEN 96
87
    IF S1>7 THEN 99
88
    D1=INT(((3)-H)*2.5+187-((30-H)*.25+15)*C/2)+25*RND(())
89
90
    D1=INT(D1+W)
91
    IF T=2 THEN 148
    0=(RND(0)/.8)*(2+++16)*ABS(TAN(D1*.0035))
92
93
    D2=INT (SQR(0+2+ABS(D-D1)+2))
94
    IF D-D1<0 THEN 101
95
    GOTO 1Ø3
96
    PRINT "YOU DUBBED IT."
97
    D1=35
98
    GOTO 92
99
    IF D<2,00 THEN 161
100
     GOTO 89
101
     IF D2<20 THEN 103
     PRINT "TOO MUCH CLUB. YOU ARE PAST HOLE."
102
103
     B=D
     D=02
104
     IF D2>27 THEN 128
IF D2>20 THEN 141
105
106
     IF D2>.5 THEN 143
107
1.08
     L[1]=9
1,09
     GOTO 182
110
     IF (72+((H+1)/.85))/18<S2+Q+(1#+(F-1)/18) THEN 85
111
     Q=Q+1
112
     IF S1/2#INT(S1/2) THEN 124
     GOTO 96
113
114
     PRINT "PERCENT FULL SWING ";
115
     INPUT W
116
     W=W/1,00
117
     T7=Ø
     GOSUB (W>0 AND W<1)+1 OF 234
IF T7 THEN 114
118
119
     IF L[1]=5 THEN 160
120
121
     IF C=14 THEN 88
122
     C=C-1Ø
123
     GOTO 88
     IF D<95 THEN 96
124
     PRINT "BALL HIT TREE - BOUNCED INTO ROUGH"D-75"YARDS FROM HOLE."
125
126
     D=D-75
                  27
     GOTO 48
IF 0<00 OR J>0 THEN 146
127
128
     IF T># THEN 135
129
     IF (S2+1)/15=INT((S2+1)/15) THEN 136
130
     PRINT "YOU HOOKED-";
131
132
     L[1]=L[3]
133
     IF 0>45 THEN 139
134
     GOTO 41
     IF (S2+1)/15=INT((S2+1)/15) THEN 131
135
     PRINT "YOU SLICED-";
136
137
     L[1]=L[2]
138
     GOTO 133
139
     PRINT "BADLY."
     GOTO 41
140
141
     L[1]=5
142
     GOTO 41
143
     L[1]=8
     D2=INT(D2+3)
144
145
     GOTO 169
146
     L[]]=]
147
     GOTO 41
148
     D1=INT(.85*D1)
149
     GOTO 92
150
     IF L[1]>6 THEN 158
     PRINT "YOUR SHOT WENT INTO WATER."
151
152
     S1=S1+1
153
     PRINT "PENALTY STROKE ASSESSED. HIT FROM PREVIOUS LOCATION."
154
     J=J+1
155
     11]=1
156
     D=B
157
     GOTO 48
158
     PRINT "YOUR SHOT WENT OUT OF BOUNDS."
```

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```
159 GOTO 152
160 IF T=3 THEN 163
161 D2=1+(3*INT((8,0/(4,0-H))*RND(0)))
162
     GOTO 169
163
     IF RND(0)>N THEN 167
164
     N=N+.2
     PRINT "SHOT DUBBED, STILL IN TRAP."
165
166
     GOTO 48
167
     N=.8
168
     GOTO 161
     PRINT "ON GREEN"D2"FEET FROM PIN. PUT POTENCY NUMBER ":
169
17,8
    INPUT I
171
     T7=10
172
     GOSUB 1.E+11+1 OF 234
173
     IF T7 THEN 169
174
     S1=S1+1
175
     IF S1+1-P>(H*.#72)+2 THEN 182
    IF K>2 THEN 182
176
177
     K=K+1
     IF T=4 THEN 188
D2=D2-I*(4+2*RND(0))*1.5
178
179
180
     IF D2<-2 THEN 19,8
181
     IF D2>2 THEN 185
     PRINT "YOU H#+08+L#+E8+D IT"
182
183
     F=F+1
184
     GOTO 24
185 PRINT "PUTT SHORT."
    D2=INT(D2)
186
187
     GOTO 169
188
    D2=D2-I#(4+RND(@))+1
189
     GOTO 18Ø
190
     PRINT "PASSED BY CUP."
191
     D2=-D2
192
     GOTO 186
193
     READ D,P,L[2],L[3]
194
     PRINT "MREADY TO GO ";
     INPUT AS
195
     IF A$="NO" THEN 208
196
197
     T5=T5+P
198
     PRINT "YOU ARE AT TEE OFF HOLE"F", DISTANCE"D"YARDS PAR"P
     PRINT "NON YOUR RIGHT IS ";
199
200
     X=2
201
     GOSUB 217
2ø2
     PRINT "ON YOUR LEFT IS ";
     GOSUB 217
203
204
     GOTO 48
205
     DATA 361,4,4,2,389,4,3,3,286,3,4,2,588,5,7,2,488,4,2,4,359,4,6,4
2.06
     DATA 424,44,492,388,44,44,196,3,7,2,44 0 4,47,2,560,5,7,2,132,3,2,2
267
     DATA 357,4,4,4,294,4,2,4,475,5,2,3,375,4,4,2,180,3,6,2,550,5,6,6
2ø8
     PRINT "MOTAL SCORE FOR"F-1"HOLES WAS"S2
     IF 52-15 THEN 212
209
210
     PRINT "PAR GAME"
211
      END
212
     IF S2-T5>9 THEN 215
PRINT - (S2-T5) "UNDER PAR"
213
214
     END
215
     PRINT S2-T5"OVER PAR"
216
     END
     GOTO LIXI OF 222,224,226,228,238,232
217
     PRINT "OUT OF BOUNDS."
218
     RETURN
                                        27
219
220
     PRINT "PGA RULES HANDICAP=0-30"
221
      GOTO 8
222
     PRINT "FAIRWAY."
223
     RETURN
224
      PRINT "ROUGH."
225
     RETURN
     PRINT "TREES."
226
227
     RETURN
228
     PRINT "ADJACENT FAIRWAY."
229
     RETURN
230
     PRINT "TRAP."
231
     RETURN
232
     PRINT "WATER."
233
     RETURN
      PRINT "TO GET A DESCRIPTION OF CLUBS, ETC. TYPE & FOR A CLUB NO. WHEN REQUESTED"
234
235
      T7=9
236
      RETURN
```

237 END

·

CONTRIBUTED PROGRAM **BASIC**

TITLE:	PERFORMS LEAST-SQUARES FIT	CURFIT A404-36038B
DESCRIPTION:	This program performs a least squares curve fit to the functions: 1. $Y = A + B(X)$ 2. $Y = A \exp (B * X)$ 3. $Y = A (X^B)$ 4. $Y = A + B/X$ 5. $Y = 1/(A + B * X)$ 6. $Y = X/(A + B * X)$ 7. $Y = A + B * Log(X)$	following
INSTRUCTIONS: SYSTEM SPECIFICATIONS: SPECIAL CONSIDERATIONS:	Before running the program enter the following data beg 9900 DATA N 9901 DATA X_1 , Y_1 , X_2 , Y_2 - - - - - - - - - - - - -	endent variable. for the six on he wishes). A zero (Ø) asion of variables adent variable for each
ACKNOWLEDGEMENTS:	Jerry L. Mulcahy Raychem Corporation	

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STORE 17

RUN CURFIT

	- · - ·	_								
9900	DATA									
9901			12.78							
			12.53							
			12.08							
			11.57							
9905			11•19							
9906			10.91							
9907	DATA	8.44	10.73							
9999	END									
		1	LEAST SQ	UARES C	URVES FIT					
										
CURVE	TYPE		INDEX	OF	A		в			
		1	DETERMIN	ATION						
1 • Y=.	A+(B*)	x)	•979167	,	165.023		-18.2	981		
2. Y=	A*EXP	(B*X)	• 981411		5.64762E+0		-1.56			
3. Y=	A* (X+1	3)	.937287		5.35430E+1		-12.6			
4• Y=	A+ (B/)	c)	.988257		-142.787	• •	1294			
5• Y=	1/(A+E	3*X)	.985601		-1.03558		•133			
6. Y=	X/ (A+E	3×X)	• 991327		-9-45113		T•213			
7• Y=	A+B*L()G(X)			326.308		-148	577		
							140			
MEAN	AND S1	TANDAI	RD DEVIA	TION OF	RAW DATA					
			MEAN				• • • •			
x			MEAN 8.38		STANDARD DE		ION			
Ŷ			11.6843		4.32637E-0 .800022	92				
-					•000022					
DETA I	LS FOR	R CUR	VE TYPE?	4						
					C FUNCTION.	. тн	E RESI			
	OF A	LÉAS	T-SQUARE	S FIT O	F ITS LINEA	30 T0				
	(SOR)	LED II	N ORDER	OF ASCE	NDING VALUE	FS OF	Y)			
			LLOWS		SING VALUE	C3 OF	~)			
X-ACT	11.1									
X-ACT	UAL		Y-ACTUAL		Y-CALC		PCT I	DIFFER		
8.32			12.78		12.7947					
8.34			12.53		12.4216	•	-•1	-		
8.36			12.03		-			• 8		
8+38			11.57		12.0503			•2		
8.4			11.19		11.6808		-•9			
8.42			10.91		11.313		-1			
8.44			10.73		10.9469 10.5826	•	-•3	1.3		
					1000020			1+5		
DETAII	S FOR	CURV	E TYPE?	ø						
DONE										
LISTIN	١G									
CURFI	T									
0.000				CHARLED	BASIC PROG			/~*****		10 T
			nr (1MC	JUNUT	BHSIC PROG		TOVAL			
8902-	RFM	ed services	CURF	IT: LEA	ST SQUARES	CURVI	EFIT	angestesse -		
8903	RFM	and the second					· • •			
8904	RFM	aliter de la c	6038	REV B	3/72	alaratis de las	n en e			
8905	RFM	-		=						
8906~	RPM	****	CONTRIB	UTED PR	0GRAM ****	****	*****	******	********	***
9000~	RFM	****	CURFT	T ****	MATHEMAT	TICS 1	PROGR	AM ***		
.9461	BEM	****	****VERST	0N-1-+	**** 7731/	/69	****	ann ann a' Guidh Mhàir an		
9002			T SQUARE							
					•V[200]•A[7	7],8[7),c[7	7]+5[6]	•F[7]	
9004										
	PRINT									
9006	-		D N							
9007										
9008										
9009										
9010										
9011	PDTN1	- 00 H	I FAST	SQUARES	CURVES FIT	T **				
9012			, CLADI	JUVANEJ	SOUTED I II	•				
			RVE TYPE	1.1 TN	DEX OF",	Δ.11		311		
	-		•"DETERM			~ · ·	, L	-		
9015		-	, genenn	****** 1 ON						
/ u i J	• • • • • •									

```
9016 FOR I=1 TO 7
9017 MAT S=ZER
      GoSUB 9135
9018
      IF (I-5)*(I-6)=0 THEN 9037
9019
9020
     IF (I-2)*(I-3)=0 THEN 9030
     FOR J=1 TO N
LET V[J]=Y[J]
9021
9022
9023
     GnSUB 9110
9024
      NEXT J
9025
      Y1=S[3]/N
9026
      Y2=SQR((S[5]-(S[3]+2/N))/(N-1))
9027
      IF I=1 THEN 9047
9028
      IF I=7 THEN 9052
      GoTO 9058
9029
9030 FOR J=1 TO N
9031
      IF Y[J] <= 0 THEN 9044
     LET V(J)=LOG(Y(J))
9032
9033
      GOSUB 9110
      NEXT J
9034
9035
      IF I=3 THEN 9052
9036
      GOTO 9047
9037
      FOR J=1 TO N
      IF Y[J]=0 THEN 9044
9038
9039
      LET V[J]=1/Y[J]
      GoSUB 9110
9040
9041
      NEXT J
9042 IF I=6 THEN 9058
9043
      GOTO 9047
9044
      PRINT "CAN'T FIT"
9045 LFT F[1]=0
9046
      GoTO 9065
9047 FOR J=1 TO N
9048 LET U[J]=X[J]
9049
      GnSUB 9113
9050
      NFXT J
9051
      GOTO 9063
9052
      FOR J=1 TO N
9053
      IF X[J] <= 0 THEN 9044
9054
      LFT U(J)=LOG(X(J))
9055
      GnSUB 9113
      NFXT J
GOTO 9063
9056
9057
9058
      FOR J=1 TO N
9059
      IF X[J]=0 THEN 9044
9060
      LET U(J)=1/X(J)
9061
      GoSUB 9113
      NFXT J
9062
9063
      G0SUB 9182
9064
      PRINT C[1]+A[1]+B[1]
      NEXT I
9065
9066
      PRINT
      PRINT
9067
9068
      PRINT "MEAN AND STANDARD DEVIATION OF RAW DATA"
9069
      PRINT
9070
      PRINT " "," MEAN ","STANDARD DEVIATION"
9071
      PRINT "X"+X1+X2
9072
      PRINT "Y",Y1,Y2
9073
      GnSUB 9120
9074
      PRINT
9075
      PRINT
9076
      PRINT
9077
      PRINT "DETAILS FOR CURVE TYPE";
9078
      INPUT I
9079
      IF I=0 THEN 9207
9080
      LET K=I
9081
      IF F[I]=1 THEN 9085
9082
      G0SUB 9135
      PRINT " COULD NOT BE FIT."
9083
9084
      GOTO 9074
9085
      GoSUB 9156
9086
      IF (I-1)*(I-5)*(I-6)#0 THEN 9096
      FOR J=1 TO N
LET Y=A[I]+B[I]*X[J]
9087
9088
9089
      IF I=1 THEN 9093
9090
     LET Y=1/Y
9091
      IF I=5 THEN 9093
9092
     LFT Y=X[J]+Y
9093 GOSUB 9197
```

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9094 NEXT J
     GOTO 9074
9095
9096
      FOR J=1 TO N
      IF I=2 THEN 9106
IF I=3 THEN 9104
9097
8000
9099 IF I=4 THEN 9102
9100 LET Y=A(7)+B(7)+LOG(X(J))
9101
      GOTO 9107
9102
     LET Y=A(4)+B(4)/X(J)
9103
     GOTO 9107
9104
      LET Y=A[3]*(X[J]+B[3])
9105
      GOTO 9107
9106
      LET Y=A(2)*EXP(B(2)*X(J))
9107
      GOSUB 9197
9108
      NEXT J
9109
      GOTO 9074
     LET S[5]=S[5]+V[J]+2
LET S[3]=S[3]+V[J]
9110
9111
9112 RETURN
9113 LET S(1)=S(1)+U[J]
9114
     LET S[2]=S[2]+U[J]+2
9115
     IF 1>1 THEN 9118
9116
     X1=S[1]/N
9117
      X_2=SQR((S[2]-(S[1]+2/N))/(N-1))
9118
     LET S[4]=S[4]+U[J]+V[J]
9119
     RETURN
9120 FOR I=1 TO N-1
9121
      LET M=I
9122
     FOR J=I+1 TO N
9123
      IF X[M] <= X[J] THEN 9125
9124
      LET M=J
9125 NEXT J
9126
      IF M=I THEN 9133
9127 LET P=X(M)
9128 LET Q=Y(M)
9129 LET X(M)=X(I)
9130 LET Y(M)=Y[1]
9131
      LET X[I]=P
9132 LET Y[]=Q
      NEXT I
9133
9134
      RETURN
9135 LET K=I
9136
      IF K=1 THEN 9154
9137
      IF K=2 THEN 9152
9138
      IF K=3 THEN 9150
9139
      IF K=4 THEN 9148
9140
      IF K=5 THEN 9146
      IF K=6 THEN 9144
9141
      PRINT "7. Y=A+B+LOG(X)";
9142
9143
      RETURN
     PRINT "6. Y=X/(A+B*X) ";
9144
9145 RETURN
9146 PRINT "5. Y=1/(A+B*X) ";
9147
     RETURN
9148 PRINT "4. Y=A+(B/X)",
9149 RETURN
9150 PRINT "3. Y=A*(X+B)".
9151
     RETURN
9152 PRINT "2. Y=A*EXP(B*X)";
9153
      RETURN
      PRINT "1. Y=A+ (B*X)",
9154
9155 RETURN
9156
      PRINT "
                 9157 GOSUB 9136
9158 PRINT " IS A";
9159
      IF K=1 THEN 9165
9160 IF K=2 THEN 9167
9161 IF K=3 THEN 9169
9162 IF K=7 THEN 9171
9163 PRINT " HYPERBOLIC";
      GOTO 9172
9164
9165
      PRINT " LINEAR";
9166
      GoTO 9172
9167
      PRINT "N EXPONENTIAL"
      GoTO 9172
9168
9169
      PRINT " POWER";
```

```
9170 GoTO 9172
9171 PRINT " LOGARITHMIC";
9172 PRINT " FUNCTION. THE RESULTS"
9173 IF K=1 THEN 9175
9174
     PRINT "
                   OF A LEAST-SQUARES FIT OF ITS LINEAR TRANSFORM"
9175 PRINT "
                    (SORTED IN ORDER OF ASCENDING VALUES OF X)"
9176
     PRINT "
                   ARE AS FOLLOWS:"
9177
     PRINT
9178 PRINT "X-ACTUAL", "Y-ACTUAL", "Y-CALC", PCT DIFFER"
9179 PRINT
9180
     RETURN
9181
     PRINT
9182 LET B=(N*S[4]-S[1]*S[3])/(N*S[2]-(S[1]+2))
9183 LET A=(S[3]-B*S[1])/N
9184 LET S1=S[5]-(S[3]+2)/N
9185 LET S2=(B+2)*(S[2]-(S[1]+2)/N)
9186 LET C[[]=S2/S]
9187 IF (I-1)*(I-4)*(I-5)*(I-7)=0 THEN 9194
9188 IF (I-2)*(I-3)=0 THEN 9192
9189 LET A[6]=B
9190
     LET B(6)=A
9191
      RETURN
9192 LET A[I]=EXP(A)
9193 GOTO 9195
      LET A[I]=A
9194
9195 LFT B(I)=B
9196 RETURN
9197
      PRINT X(J)+Y(J)+Y+
9198
      LET D=Y(J)-Y
      LET_D=.1*SGN(D)*INT(1000*ABS(D/Y))
9199
9200
     IF D<0 THEN 9205
9201 IF D>0 THEN 9204
9202 PRINT "
                    øu
9203
      RETURN
9204 PRINT "
                    9205 PRINT D
9206
      RETURN
9207
      STOP
9900 DATA 7
9901 DATA 8.32,12.78
9902
      DATA 8.34.12.53
9903 DATA 8.36,12.08
9904
      DATA 8.38.11.57
9905
      DATA 8.4,11.19
9906
      DATA 8.42,10.91
9907
      DATA 8.44.10.73
9999
      END
```

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