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BASIC SOFTWARE LIBRARY

VOLUME I

BUSINESS AND RECREATIONAL

by R. W. BROWN

BASIC SOFTWARE LIBRARY

VOLUME I

BUSINESS

AND

RECREATIONAL

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INTRODUCTION

The programs presented here are set out for the individual who has a specific need in mind. Because a detailed discussion of these programs would require a text several times the present size of this Library it has been omitted. Individuals who have a specific requirement will have to be at least knowledgeable in the area the program is written about; ie: Statistical programs require the user to be familiar with the terms mean, median, etc. This is because the programs are written in the vernacular of their subject matter. With this knowledge alone, no programming experience on the part of the user is required in order to use any of these programs in most systems. Once it is determined that a particular program may be useful the user merely types in a copy of the BASIC source code exactly as it appears in the program listing. Then follow the instructions for running the program as presented in the Instruction portion of the write up, immediately preceding the program. Also included in the write ups are statements that appear in the source code which may possibly need to be changed to run in the user's computer system; ie: RND statements may have to be changed to FRAND in order to compile in certain systems.

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A Complete Business System

PREFACE

The information contained in these pages represents the culmination of a very large project. That of compiling a versatile and complete Software Library that will be of use to a large number of diverse individuals. The programs presented here when combined in a system will represent a very powerful library bank. Such a work as this has been attempted in the past in such areas as cook books, electronic source books, mathematical tables and even computer games. But to date such a collection as this has yet to be offered to the average individual to use as he chooses. The word "at - temped" was used as no work is ever considered complete by everyone regar dless of its thoroughness.

The programs presented here were chosen for their uniqueness and general usefulness. There should be at least one program included that will be of use to every type of individual whether they have access to a computer or not. Computers are a wonderful and very useful tool. Through this Library I hope to interest more people into becoming involved with computers. The Library is written so that little or no computer programming experience is required to invoke any of the programs. The programs that are present- ed here are all written in the computer language called BASIC. Each pro - gram has been successfully run on a G.E. 635 computer. The entire source code is presented as well as a short narrative page which defines the pro gram, tells who might be interested in using it, a brief set of instruc- tions or how to get them and then any limitations in the program are no- ted. In the limitations section the storage length in K Bytes is given so the prospective user will know how much memory to allow for the program. Where possible the amount of memory space required for full execution is given for the programs, this space is independent of the space already oc cupied by your BASIC compiler.

The programs are broken down into five sections or parts. Each part deals with a specific type of program. Part 1 contains business type programs. These programs will be of interest to individuals who have businesses, play the stock market, balance their own checkbooks, do installment buy- ing, figure taxes, etc. There are a total of 20 programs in this section. Part 2 is the lighter side of the Library as it contains 16 games and 12 picture programs. No computer library is complete without some fun. Among the games presented in this section is one called Checkers. The game is rather long but it is virtually machine independent as it doesn't use over lay techniques or use files. Most of the other games included here are as exciting as this version of Checkers. Each was chosen so as not to mimic others that the reader may have seen. The pictures are as unusual in their own way as are the games. Most of the pictures are spread over several pa ges, this was done not only so the reader will need to run the program to see the details of a particular picture but also in the hopes of getting as many of these programs into use as possible. As the picture programs are very simple it is an easy place for the novice to start learning about programming.

Part 3 is comprised of Math and Engineering programs. Some of these programs will be of use to high school students, professional people, sailors, engi- neers, astronomers, airplane pilots, etc. Most of these programs are very

technical but they can perform every day calculations quickly and easily and they are extremely simple to use. There are 23 general usage programs presented in this section.

Part 4 is made up of Plotting and Statistical Analysis programs. These programs can be readily utilized by a number of people in widely different disciplines from fishermen to statisticians. The data gathered may be from a poll, a census, a test sample or even the number of fish caught on various days. The stat programs will be of invaluable aid to anyone who gathers data of any kind. The plotting routines will be of use to most of the people who use the stat programs or programs in Parts 1 and 3. The plotting is done on any standard teletype or terminal and does not require a special plotter or plotting terminal. There are a tot al of five direct plotting programs and 18 stat programs in this section.

All of the programs presented here may be run by simply typing the source code as listed, exactly as it is, into your computer. Now before the program will run it will have to be converted into machine code. This is done automatically and requires no forethought except to make certain the operating system you are working in is BASIC. In the larger computer systems you are asked what system you want — to this type BASIC; the smaller sys tems only have BASIC, in these you are O.K.

Immediately following Part 4 is Appendix A. Here, all of the Basic Statements used throughout these pages are defined. Each statement is explained sufficiently well to enable one unfamiliar with this subset to modify any necessary statements so that the program or programs will compile and execute with the Basic compiler or interpreter available with their particular computer. Most of the Basic compilers available today, that require more then 10K Bytes of storage, will execute all of the programs presented in these volumes with the possible exception of a few of the games and the program "Variable". Multiple line statements are not used in most of the programs and only a few programs use string manipulations extensively. A few of the programs may require more on line storage then is available on some of the small micro computer systems; these longer programs will not be executable due to the limited amount of memory. However most of the programs will execute in 10K Bytes of memory or less, thereby making most of the programs in this Library executable in virtually any Basic speaking computer without any required modifications.

Volume III is comprised of ADVANCED BUSINESS programs, part 5. This volume as well as subsequent volumes are intended to make this Library complete and useful to all individuals.

Each of these programs are written in a subset of the Dartmouth language. The specific subset is that which was used by General Electric on their 635 systems. These programs have operated without problem on a variety of small and large machines even several of the new micro computers. The pro grams that use string manipulations may require slight modifications before fully executing on some systems. These programs are mainly found in Part 2 — Games.

All of the programs in this Library were written or edited by the author. All of the programs edited by him were given for inclusion, "swapped" for traded, or made public. A few of the original authors of the "swaps" are not known, for this I apologize. The others, unless specifically mentioned in the text, are presented here. In addition I would like to thank the fol lowing for their cooperation in making this work possible.

ACKNOWLEDGMENTS

MY WIFE MARY AND MY FAMILY

DONALD ALVAREZ

DAVE BEETLE

MORTON BERGER

COPY CAT INC

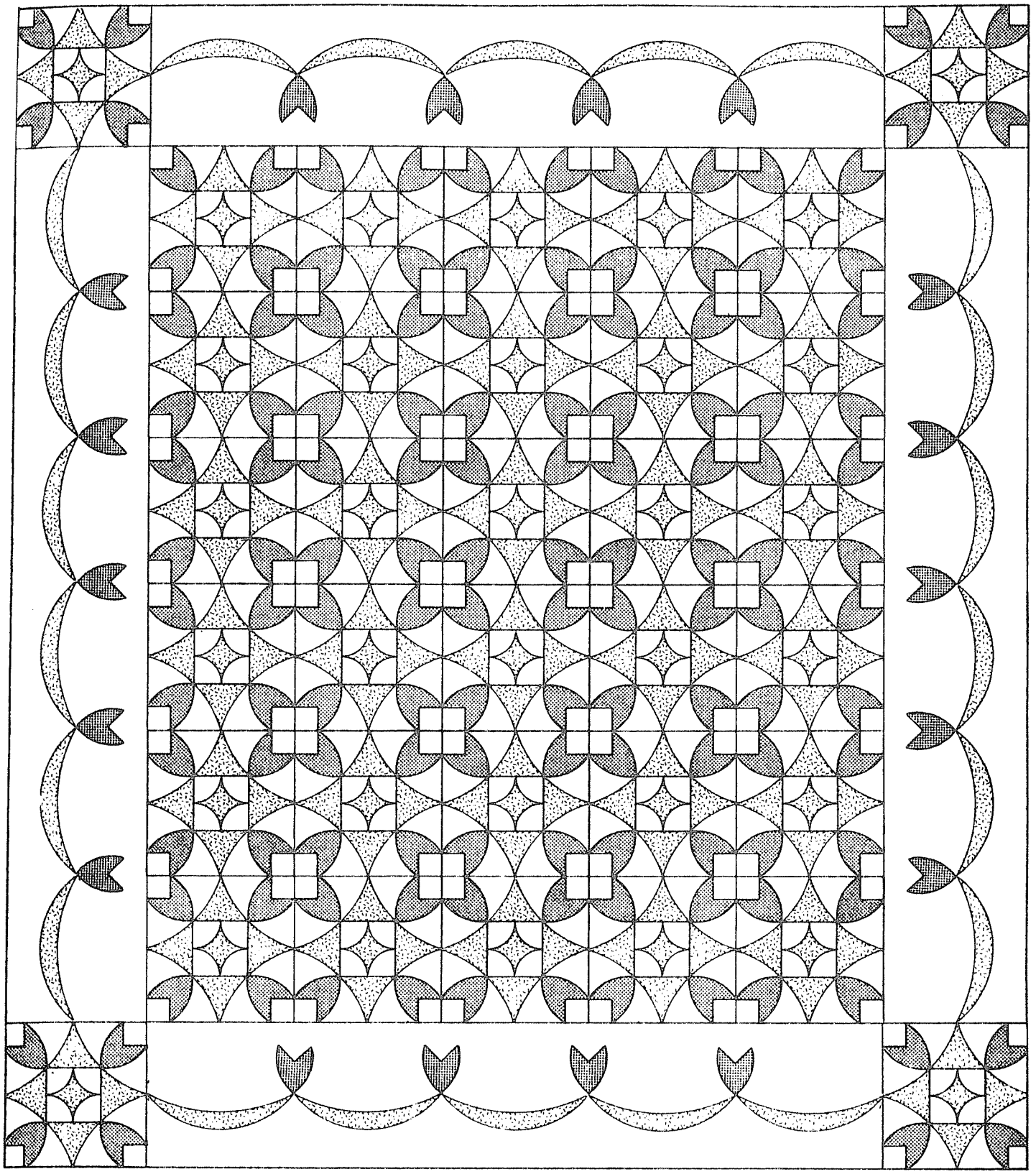
GE TIMESHARING

BILL JONES

GEORGE LONG

TOM ROSE

ARTWORK COURTESY OF MELISSA



PART 1

BUSINESS

AND

PERSONAL

BOOKKEEPING

BOND:

DESCRIPTION

This program is used to compute the price and accrued interest for bond accounting. The acquisition cost of a bond includes its purchase price plus its accrued interest. If the purchaser holds the bond until it is mature he expects to receive interest payments on a regular basis. These interest payments are called "coupon" payments. At maturity the price of the bond is called "par" and is the same as the face value of the bond. In the event the terms of the bond allow it to be called before maturity the purchaser will only receive interest up to the call date.

USERS

Anyone who buys, sells, or trades in bonds of any nature could use this program. This would include businessmen, workers, housewives, retirees, almost anyone who has money to invest.

INSTRUCTIONS

Type RUN, the program will then ask you if you want instructions. There are three possible valid responses to this prompt.

1. YES - it will print a description of the data inputs.

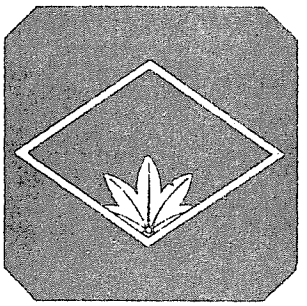
2. NO - it will ask for the five inputs.

3. DATA - it will print what data is present in the program.

All data is expressed per hundred dollars per bond value.

LIMITATIONS

Bond will require 2K Bytes of memory for storage and 1K Bytes additional memory for execution. The total memory requirement for execution will be 3K Bytes or less in most systems. This program should execute without problems in most Basic speaking computers. The sample problem shows how to determine the final price of a bond that has an annual coupon of $6 a year, a principal payment of $100 at maturity, and matures in 12 years 5 months at 5.5% interest.



```
RUN
```

```
10REM THIS BASIC PROGRAM COMPUTES THE PRICE AND ACCRUED INTEREST
20REM OF A BOND
25REM
25REM*****************************************************************************
30REM
100REM THIS PROGRAM COMPUTES THE PRICE AND ACCRUED INTEREST FOR
110REM A BOND WITH A COUPON OF  C  DOLLARS A YEAR, REDEMPTION
120REM AT  R  DOLLARS, AND A MATURITY OF  M1  YEARS AND  M2
130REM MONTHS (M2 NEED NOT BE AN INTEGER), SELLING TO YIELD  Y  .
133REM       *****          *********          *********
138REM LINE 150 CONTAINS SAMPLE DATA STATEMENTS.
140REM  ******************  MAIN PROGRAM  **********************
145REM
150 DATA 6,100,12,5,.055
160REM
170 PRINT "DO YOU WANT INSTRUCTIONS FOR ENTERING DATA";
180 INPUT A$
190 PRINT
200 IF A$="DATA" THEN 420
210 IF A$="NO" THEN 370
220 PRINT "ENTER THE FOLLOWING ITEMS OF DATA"
230 PRINT
240 PRINT "ITEM 1";TAB(12);"ANNUAL COUPON IN DOLLARS";TAB(40);
250 INPUT C
260 PRINT
270 PRINT "ITEM 2";TAB(12);"PROCEEDS ON REDEMPTION";TAB(40);
280 INPUT R
290 PRINT
300 PRINT "ITEMS 3 & 4";TAB(12);"MATURITY IN YEARS, MONTHS";TAB(40);
310 INPUT M1,M2
320 PRINT
330 PRINT "ITEM 5";TAB(12);"YIELD TO MATURITY";TAB(40);
340 INPUT Y
350 PRINT
360 GO TO 440
370 PRINT "ENTER ITEMS 1 THROUGH 5";
380 INPUT C,R,M1,M2,Y
390 PRINT
400 GO TO 440
410REM
420 READ C,R,M1,M2,Y
430 DATA 6,100,12,5,.055
440 PRINT "COUPON";C,"REDEMPTION AT";R
450 PRINT "MATURITY",M1;"YEARS",M2;"MONTHS"
460 PRINT "YIELD";Y
```

```
470 PRINT
478REM NUMBER OF COUPON PERIODS TO MATURITY
480 LET M3=M1*2+M2/6
488REM NUMBER OF WHOLE COUPON PERIODS TO MATURITY
490 LET M4=INT(M3)
498REM TIME TO NEXT COUPON
500 LET M5=M3-M4
508REM PRESENT VALUE OF FUTURE COUPONS
510 LET V1=C/2*(1-(1+Y/2)↑(-M4))/(Y/2)
518REM P.V. OF PRINCIPAL AT TIME OF NEXT CPUPON
520 LET V2=R/(1+Y/2)↑(M4)
528REM P.V. OF BOND NOW
530 LET P=(V1+V2+C/2)/((1+Y/2)↑M5)-(C/2)*(1-M5)
540 PRINT "PRICE";P;"ACCR INT";C/2*(1-M5)
550 END
```

```
BOND


RUN

DO YOU WANT INSTRUCTIONS FOR ENTERING DATA ?YES

ENTER THE FOLLOWING ITEMS OF DATA

ITEM 1        ANNUAL COUPON IN DOLLARS        ?6

ITEM 2        PROCEEDS ON REDEMPTION          ?100

ITEMS  3 & 4 MATURITY IN YEARS, MONTHS        ?12,5

ITEM 5        YIELD TO MATURITY               ?.055

COUPON            6     REDEMPTION AT     100
MATURITY          12    YEARS             5  MONTHS
YIELD    .055

PRICE              104.4505      ACCR INT             .50000002
```

BUILDING:

DESCRIPTION

Building is used to analyze the cost feasibility of building design proposals. This program analyzes the major costs of the building and projects them over the useful life of the building. It will enable the designer to see how various changes will effect the total cost, and the minimum rent required to make the building feasible.

USERS

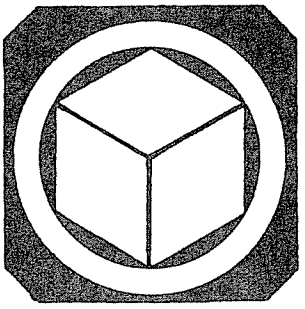
Persons planning on designing a building or dwelling. This would include people who would like to build their own home and would like to get the most return for their money and time.

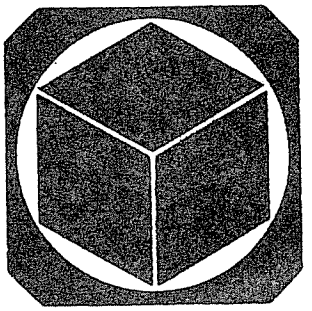
INSTRUCTIONS

This program is well documented and will give full details on how to enter data and the type of information required during execution. All necessary inputs will be prompted.

LIMITATIONS

There should be no problems encountered in running this program on most systems as long as there is sufficient memory available for storage and execution. The program requires 7K Bytes for storage and will store and execute in 12K Bytes of memory.





BUILDING

```
10 DIM I(70),P(70),R(70),A(70),M(70)
12 PRINT "PROGRAM FOR BUILDING COST ANALYSIS"
14 PRINT "DO YOU WANT INSTRUCTION? ANSWER 1 FOR YES AND 0 FOR NO"
16 INPUT Q1
18 IF Q1=1 THEN 26
20 IF Q1 =0 THEN 72
22 PRINT "PLEASE REPLY WITH 1 OR 0. 1 FOR YES , 0 FOR NO."
24 GO TO 16
26 PRINT "THIS PROGRAM ANALYZES THE FEASIBILITY FOR BUILDING DESIGN PROPOSALS."
28 PRINT "THE PROGRAM ESSENTIALLY KEEPS TRACK OF THE MAJOR BUILDING COSTS"
30 PRINT "AND PROJECTS THEM OVER THE LIFE OF THE BUILDING.  THE PROGRAM"
32 PRINT "ALLOWS THE DESIGNER OR BUILDER TO SEE THE EFFECT OF CHANGES IN"
34 PRINT "CONSTRUCTIONS COSTS, OPERATING COSTS, FINANCING COSTS AND RE-"
35 PRINT "PLACEMENT COSTS ON THE TOTAL COST OVER THE LIFE OF THE BUILDING"
36 PRINT"

        "
38 PRINT "THE INPUT REQUIRED FOR THIS PROGRAM IS AS FOLLOWS:"
40 PRINT "MAJOR CAPITAL COSTS OF THE PROJECTS"
42 PRINT "             1.BUILDING CONSTRUCTION COSTS."
44 PRINT "             2.LAND COST."
46 PRINT "             3.LAND DEVELOPMENT COST."
48 PRINT "             4.EQUIPMENT COST."
50 PRINT "FINANCING DETAILS"
52 PRINT "             1.MORTGAGE OR BOND FINANCING."
54 PRINT "             2.AMOUNT OF TOTAL CAPITAL COST TO BE FINANCED."
56 PRINT "             3.LENGTH OF FINANCING PERIOD."
58 PRINT "             4.INTEREST RATE."
60 PRINT "ANNUAL OPERATION COST"
62 PRINT "             1.INSURANCE COST."
64 PRINT "             2.UTILITY COST AND AIR-CONDITIONING COST."
66 PRINT "             3. PROPERTY TAX AND BUILDING SERVICE COST."
68 PRINT "             4.MAINTENANCE AND REPAIR COST (2% ANNUAL INCREASE"
70 PRINT"                ALLOWED FOR AGING OF STRUCTURE)"
72 PRINT "SALVAGE VALUE OF THE BUILDING AT THE END OF ITS LIFE."
73 PRINT"

        "
74 FOR T=0 TO 70
76 LET I(T)=0
78 LET P(T)=0
80 LET R(T)=0
82 LET A(T)=0
```

```
84 LET M(T)=0
86 NEXT T
110 PRINT "INPUT MAJOR CAPITAL COST $ VALUE AFTER ?"
120 PRINT
130 PRINT "BUILDING CONSTUCTION COSTS.";
140 INPUT C1
150 PRINT "LAND COST.....";
160 INPUT C2
170 PRINT "LAND DEVELOPMEMT.....";
180 INPUT C3
190 PRINT "EQUIPMENT COST.....";
200 INPUT C4
210 LET C=C1+C2+C3+C4
220 PRINT
230 PRINT "TOTAL CAPITAL COSTS=$"C
240 PRINT
250 PRINT "IS THE PROJ TO BE FINANCED BY: 1=MORT., 2=BONDS."
260 INPUT A
270 IF A>1 THEN 550
280 PRINT "WHAT AMOUNT IS TO BE BORROWED, LENGTH OF PERIOD, AND"
290 PRINT "INTEREST RATE  INPUT BY TYPING $ AMOUNT, YEARS, PERCENT"
300 INPUT C5,L1,R1
310 LET R1=R1/100
320 LET R=C5*(R1*(1+R1)↑L1/((1+R1)↑L1-1))
330 PRINT
340 PRINT "UNIFORM ANNUAL PAYMENT REQUIRED =$"R
350 PRINT
360 PRINT "DO YOU WANT FINANCING TABLE PRINTED TYPE 1 YES 2 NO"
370 INPUT X4
380 PRINT
390 PRINT "YEAR", "   INTEREST", "    PRINCIPAL", "      BALANCE"
400 PRINT " 0","      ", "  ",              C5
410 LET C6=0
420 LET P1=0
430 FOR T=1 TO L1
440 LET I(T)=(C5-C6)*R1
450 LET P(T)=R-I(T)
460 LET C6=C6+P(T)
470 LET P1=C5-C6
480 IF T<>L1 THEN 500
490 LET P1 =0
500 IF X4<>1 THEN 520
510 PRINT T, I(T),P(T),P1
520 NEXT T
530 PRINT
540 GO TO 890
550 PRINT "WHAT IS THE TOTAL AMOUNT OF THE BOND ISSUE,THE LENGTH OF"
560 PRINT "THE TOTAL PERIOD, AND THE INTEREST RATE, INPUT BY TYPING"
570 PRINT "$ AMOUNT, YEARS, PERCENT";
580 INPUT C5,L1,R1
590 PRINT
```

```
600 PRINT "WHAT IS THE YEAR THE FIRST BONDS ARE DUE, AND THE TIME"
610 PRINT "IN YEARS BETWEEN THE NEXT DUE DATES   TYPE YEARS,YEARS";
620 INPUT L2,L3
630 FOR T=0 TO L2
640 LET I(T)=C5*(R1/100)
650 LET P(T)=0
660 NEXT T
670 PRINT
680 PRINT
690 LET C7=C5/((L1-L2)/L3+1)
700 LET C6=0
710 LET X=L2
720 FOR T=L2 TO L1
730 IF T=X THEN 770
740 LET P(T)=0
750 LET I(T)=(C5-C6)*(R1/100)
760 GO TO 810
770 LET C6=C6+C7
780 LET X=X+L3
790 LET P(T)=C7
800 GO TO 750
810 IF T<>L1 THEN 830
820 LET I(T)=0
830 NEXT T
840 PRINT "YEAR","PRINCIPAL", "INTEREST", "TOTAL"
850 FOR T=1 TO L1
860 PRINT T,P(T),I(T),P(T)+I(T)
870 NEXT T
880 PRINT
890 PRINT "R E P L A C E M E N T  S E C T I O N"
900 PRINT
910 PRINT "WHAT IS THE TOTAL LIFE OF THE BUILDING";
920 INPUT L
930 PRINT "IS THE COST OF REPLACMENT TO BE COVERED BY A SINKING FUND?"
940 PRINT "TYPE 1 YES 2 NO (INTEREST RATE 4 PERCENT)";
950 INPUT X3
960 PRINT
970 LET R4=0
980 FOR T=0 TO L
990 LET A(T)=0
1000 LET R(T)=0
1010 NEXT T
1020 PRINT " INPUT THE $ VALUE AND THE LIFE OF EACH ITEM TO BE REPLACED"
1030PRINT"IF ALL ITEMS TO BE REPLACED HAVE BEEN ENTERED TYPE 0,0 AFTER?"
1040 PRINT
1050 PRINT "FIRST ITEM $ VALUE, LIFE IN YEARS DONT FORGET THE COMMA"
1060 GO TO 1080
1070 PRINT "          NEXT ITEM $ VALUE, LIFE IN YEARS"
1080 INPUT A,T1
1090 IF A=0 THEN 1220
1100 IF X3<>1 THEN 1160
```

```
1110 LET R3=A*(.04/((1.04)↑T1-1))
1120 LET R4=R3+R4
1130 FOR T=1 TO INT(L/T1)*T1
1140 LET R(T)=R(T)+R3
1150 NEXT T
1160 FOR T=0 TO L STEP T1
1170 IF T=0 THEN 1190
1180 LET A(T)=A(T)+A
1190 NEXT T
1200 GO TO 1070
1210 PRINT
1220 IF X3<>1 THEN 1240
1230 PRINT "UNIFORM ANNUAL SINKING FUND PAYMENT FOR REPLACMENT=$"R4
1240 PRINT "A N N U A L  O P E R A T I O N  C O S T  S E C T I O N"
1250 LET C9=0
1260 PRINT
1270 PRINT "WHAT IS THE ANNUAL COST OF THE FOLLOWING ITEMS"
1280 PRINT "INPUT BY TYPING $ VALUE AFTER ?"
1290 PRINT
1300 PRINT "INSURANCE COST ..............";
1310 GO SUB 1480
1320 PRINT "UTILITY COST.................";
1330 GO SUB 1480
1340 PRINT "AIR CONDITIONING COST........";
1350 GO SUB 1480
1360 PRINT "PROPERTY TAXES...............";
1370 GO SUB 1480
1380 PRINT "BUILDING SERVICE COST........";
1390 GO SUB 1480
1400 PRINT "MAINTENANCE AND REPAIR......";
1410 INPUT M1
1420 FOR T=1 TO L
1430 LET M(T)=M1*(1+(T-L/2)*.02)
1440 NEXT T
1450 PRINT "AVERAGE TOTAL ANNUAL OPERATION COST =$"C9+M1
1460 PRINT
1470 GO TO 1510
1480 INPUT C8
1490 LET C9=C9+C8
1500 RETURN
1510 PRINT "D E P R E C I T A T I O N  IS COMPUTED ON STRAIGHT LINE"
1520 PRINT "BASIS. WHAT IS THE SALVAGE VALUE OF THE BUILDING AT YEAR"L
1530 INPUT S1
1540 LET D3=(C1+C4-S1)/L
1550 PRINT "ANNUAL DEPRECITATION="D3
1560 PRINT "I N T E R E S T  L O S T  S E C T I O N"
1570 PRINT
1580 PRINT "WHAT AMOUNT OF MONEY INVESTED IN THE PROJECT SHOULD BE"
1590 PRINT "USED FOR THE INTEREST LOST COMPUTATION";
1600 PRINT
1610 INPUT H1
```

```
1620 IF H1<>C-C5 THEN 1690
1630 READ I2
1640 LET F1=H1*(I2/100)*L
1650 PRINT "INTEREST LOST AT "I2"% INTEREST RATE =$"F1
1660 IF I2=4 THEN 1740
1670 GO TO 1630
1680 DATA 8,6,4
1690 PRINT "$"H1" IS NOT THE CORRECT VALUE. THE AMOUNT REQUIRES=$"C-C5
1700 PRINT "WHICH IS THE TOTAL COST OF THE PROJECT $"C"LESS THE"
1710 PRINT "AMOUNT FINANCED $"C5 "INPUT THE CORRECT VALUE AFTER";
1720 PRINT
1730 GO TO 1610
1740 PRINT
1750 PRINT "DO YOU WANT THE TABLE PRINTED OUT  TYPE 1 YES 2 NO"
1760 INPUT X4
1770 LET T6=0
1780 LET R6=0
1790 LET R5=0
1800 LET E=H1
1810 LET M5=0
1820 FOR T=1 TO L
1830 LET R=I(T)+P(T)
1840 IF T<=L1 THEN 1870
1850 LET P(T)=0
1860 LET R=0
1870 IF X3<>1 THEN 1900
1880 LET K=0
1890 GO TO 1910
1900 LET K=A(T)
1910 LET T5=R+R(T)+M(T)+C9+K+D3
1920 LET E=E+P(T)-D3
1930 IF X4<>1 THEN 2010
1940 PRINT
1950 PRINT"*** YEAR"T"***"
1960 PRINT"LOAN PAYMENT"R
1970 PRINT"REPLACEMENT"A(T)
1980 PRINT"OPERATING EXPENSE"M(T)+C9
1990 PRINT"EQUITY"E
2000 PRINT"ANNUAL COST"T5
2010 LET T6=T6+T5
2020 LET R6=R6+R
2030 LET R5=R5+R4
2040 LET M5=M5+M(T)+C9
2050 NEXT T
2060 PRINT
2070 PRINT "TOTAL LOAN PAYMENTS.....=$"R6
2080 PRINT "TOTAL SINKING FUND PAYMENTS.=$"R5
2090 PRINT " TOTAL OPERATION COST.....=$"M5
2100 PRINT
2110 PRINT "T O T A L  C O S T .....=$"T6
2120 PRINT
2130 PRINT "THE MINIUM ANNUAL RENT =$"(T6+F1)/L"THIS IS THE"
2140 PRINT "TOTAL COST"T6"PLUS THE INTEREST LOST (AT 4 PERCENT)"F1
2150 PRINT "DIVIDED BY THE LIFE OF THE BUILDING"L
9999 END
```

COMPOUND:

DESCRIPTION

This is a very versatile program for it will compute the effective interest rate compounded over any desired period for either a borrower or a lender. Additionally this program will calculate the compounded interest rate over the shortest period between payments in compliance with Regulation Z of the Federal Reserve Systems "Truth in Lending Act".

USERS

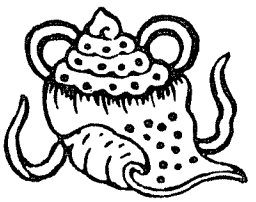
Persons who either borrow or lend money will be able to utilize this program. Several repayment plans may be compared to determine the most economical loan to take or let.

INSTRUCTIONS

Type RUN to use the program. Compound will prompt all required information necessary for operation. For additional information list the program.

LIMITATIONS

Compound will require 5K Bytes of space to store the source code and 9K Bytes of memory will be required for storage and execution.



COMPOUND

```
110REM
120REM
130REM  DESCRIPTION--COMPUTES THE INTEREST RATE REGARDLESS OF
140REM               PAYMENT STREAM IN ACCORDANCE WITH REGULAION Z.
150REM
160REM  INSTRUCTIONS--TYPE RUN TO USE. ALL NECESSARY INFORMATION
170REM                WILL BE REQUESTED.
180REM
190REM
200REM*************************************************************************49
210 DIM C(100),D(100),G(50)
220: THE EXCESS OF PAYMENTS OVER LOAN AMOUNT IS  $########.##
230: ####       ########.##           #####
240 PRINT "1.  AMOUNT OF LOAN";TAB(50);
250 INPUT P0
260 PRINT
270 IF V=5 THEN 650
280 IF V=1 THEN 1380
290 PRINT "2.  SHORTEST PERIOD BETWEEN PAYMENTS"
300  PRINT "(DAY,WEEK,HALF MONTH, MONTH,QUARTER,"
310 PRINT "HALF YEAR,YEAR)";
320 PRINT TAB(50);
330 INPUT F$
340 PRINT
350 IF F$="DAY" THEN 440
360 IF F$="WEEK" THEN 470
370 IF F$="HALF MONTH" THEN 500
380 IF F$="MONTH" THEN 530
390 IF F$="QUARTER" THEN 560
400 IF F$="HALF YEAR" THEN 590
410 IF F$="YEAR" THEN 620
420 PRINT "SPELLING ERROR!  TRY AGAIN.";
430 GOTO 320
440 LET A=1
450 LET A5=365
460 GOTO 640
470 LET A=7
480 LET A5=52
490 GOTO 640
500 LET A=15
510 LET A5=24
520 GOTO 640
530 LET A=30.4
540 LET A5=12
550 GOTO 640
560 LET A=91.25
570 LET A5=4
```

```
580 GOTO 640
590 LET A=182.5
600 LET A5=2
610 GOTO 640
620 LET A=365
630 LET A5=1
640 IF U=2 THEN 1180
650 PRINT "3.  AMOUNT OF PAYMENT AND PERIOD(S) OF PAYMENT"
660 PRINT "(E.G. 100,1,2,3,4,5,6)"
670 PRINT "INPUT 0 AFTER ALL PAYMENTS HAVE BEEN ENTERED";
680 LET I=1
690 PRINT TAB(50);
700 MAT INPUT G
710 LET Z1=NUM(X)
720 IF G(1)=0 THEN 820
730 FOR K1=2 TO Z1
740 LET J=1
750 LET A(J)=G(K1)
760 LET D(I)=G(1)
770 LET C(I)=A(J)*A
780 LET J=J+1
790 LET I=I+1
800 NEXT K1
810 GO TO 690
820 LET I1=I-1
830 IF U=5 THEN 1180
840 IF U=3 THEN 1180
850 PRINT
860 PRINT "4.  COMPOUNDING PERIOD"
870  PRINT "(DAILY,WEEKLY,SEMIMONTHLY,MONTHLY,"
880  PRINT "QUARTERLY,SEMIANNUALLY,ANNUALLY,"
890 PRINT "TIME TO PAYMENT)";
900 PRINT TAB(50);
910 INPUT R$
920 IF R$="DAILY" THEN 1040
930 IF R$="WEEKLY" THEN 1060
940 IF R$="SEMIMONTHLY" THEN 1080
950 IF R$="MONTHLY" THEN 1100
960 IF R$="QUARTERLY" THEN 1120
970 IF R$="SEMIANNUALLY" THEN 1140
980 IF R$="ANNUALLY" THEN 1160
990 IF R$="TIME TO PAYMENT" THEN 1020
1000 PRINT "SPELLING ERROR!  TRY AGAIN.";
1010 GOTO 900
1020 LET R1=A5/(C(1)/A)
1030 GOTO 1170
1040 LET R1=365
1050 GOTO 1170
1060 LET R1=52
1070 GOTO 1170
1080 LET R1=26
```

```
1090 GOTO 1170
1100 LET R1=12
1110 GOTO 1170
1120 LET R1=4
1130 GOTO 1170
1140 LET R1=2
1150 GOTO 1170
1160 LET R1=1
1170 IF U=4 THEN 1380
1180 PRINT
1190 PRINT "5.  WOULD YOU LIKE TO HAVE"
1200 PRINT "THE SCHEDULE OF PAYMENTS PRINTED";
1210 PRINT TAB(50);
1220 INPUT T$
1230 IF T$="YES" THEN 1280
1240 IF T$="NO" THEN 1380
1250 PRINT
1260 PRINT "ENTER ONLY THE WORDS 'YES' OR 'NO'.  TRY AGAIN.";
1270 GOTO 1210
1280 LET X1=1
1290 LET X2=I1
1300 PRINT
1310 PRINT
1320 PRINT "PAYMENT","PAYMENT","END OF"
1330 PRINT "NUMBER","AMOUNT",F$
1340 PRINT
1350 FOR I=X1 TO X2
1360 PRINT USING 230,I;D(I);C(I)/A
1370 NEXT I
1380 LET R=1
1390 LET L3=0
1400 LET B=0
1410 FOR C=1 TO 5
1420 LET Q=.1↑C
1430 LET B=B+Q
1440 LET E=0
1450 FOR I=1 TO I1
1460 LET E=D(I)*(1/((1+B/R)↑((C(I)*R)/365)))+E
1470 NEXT I
1480 IF E-P0>0 THEN 1430
1490 LET B=B-Q
1500 NEXT C
1510 IF B=0 THEN 1540
1520 LET B=INT(B*1000+.5)/10
1530 GOTO 1560
1540 LET B=-.8
1550 GOTO 1410
1560 IF L3=1 THEN 1640
1570 PRINT
1580 PRINT
1590 PRINT "ANNUAL INTEREST RATE COMPOUNDED ANNUALLY = ";B;"%"
```

```
1600 PRINT
1610 LET R=R1
1620 LET L3=1
1630 GOTO 1400
1640 IF R=1 THEN 1660
1650 PRINT "ANNUAL INTEREST RATE COMPOUNDED ";R$;" = ";B;"%"
1660 PRINT
1670 LET W=0
1680 FOR I=1 TO I1
1690 LET W=W+D(I)
1700 NEXT I
1710 PRINT USING 220, W-P0
1720 PRINT
1730 PRINT
1740 PRINT "WOULD YOU LIKE TO CHANGE SOME OF THE INPUT DATA";
1750 PRINT TAB(50);
1760 INPUT W$
1770 IF W$="NO" THEN 1990
1780 IF W$="YES" THEN 1820
1790 PRINT
1800 PRINT "ENTER ONLY THE WORDS 'YES' OR 'NO'.  TRY AGAIN.";
1810 GOTO 1750
1820 PRINT
1830 IF L5=1 THEN 1910
1840 PRINT "WOULD YOU LIKE TO CHANGE"
1850 PRINT "    1. AMOUNT"
1860 PRINT "    2. PERIOD BETWEEN PAYMENTS"
1870 PRINT "    3. PAYMENTS SCHEDULE"
1880 PRINT "    4. COMPOUNDING PERIOD"
1890 PRINT "    5. AMOUNT & PAYMENTS SCHEDULE"
1900 PRINT "    6. ALL OF THE INPUT DATA"
1910 PRINT
1920 LET L5=1
1930 PRINT "ENTER 1,2,3,4,5 OR 6";
1940 PRINT TAB(50);
1950 INPUT V
1960 PRINT
1970 PRINT
1980 ON V GOTO 240,290,650,860,240,240
1990 END
```

```
COMPOUND


RUN


1. AMOUNT OF LOAN                                          ?5000

2. SHORTEST PERIOD BETWEEN PAYMENTS
DAY, WEEK, MONTH, QUARTER, HALF YEAR
YEAR, HALF MONTH.                                          ?HALF MONTH

3. AMOUNT OF PAYMENT AND PERIODS OF PAYMENT
(E.G.  100,1,2,3,4,5,6)
INPUT  0  AFTER ALL PAYMENTS HAVE BEEN ENTERED             ?200,2,4,6,8,10
                                                           ?200,12,14,16,18,20,22
                                                           ?200,24,26,28,30
                                                           ?100,1,3,5,7,9,11,13,15
                                                           ? 100,13,15,17,19
                                                           ?100,21,23,25,27
                                                           ? 100,29
                                                           ? 1000,36
                                                           ? 0
4. COMPOUNDING PERIOD
DAILY, WEEKLY, SEMIMONTHLY, MONTHLY
QUARTERLY,SEMIANNUALLY,ANNUALLY
TIME TO PAYMENT.                                           ?SEMIMONTHLY

5. WOULD YOU LIKE TO HAVE
THE SCHEDULE OF PAYMENTS PRINTED                           ?NO



ANNUAL INTEREST RATE COMPOUNDED ANNUALLY  =  12.9  %

ANNUAL INTEREST RATE COMPOUNDED SEMIMONTHLY  =  12.2  %

THE EXCESS OF PAYMENTS OVER LOAN AMOUNT IS   $ 500.00


WOULD YOU LIKE TO CHANGE SOME OF THE INPUT DATA    ?NO
```

CYCLIC:

DESCRIPTION

Cyclic calculates seasonal coefficients for observed series of two cycles. Once the series of the two cycles are entered in the program it will compute the seasonal coefficients and explain the differences between the trend and the observed series. The output data is represented in a plot of coefficients versus period, months or quarters.

USERS

This program can be used by store managers to determine how a particular item is moving and what to prepare for in the way of stocking for the coming season.

INSTRUCTIONS

Before the program is run, enter your data in lines 801 to 899. Enter the data in the following format:

801 DATA P,#,S

802 DATA observation for Cycle #1

805 DATA observation for Cycle #2

where

P = the number of periods per cycle (13max.)

= the starting period number

S = sorting code (1=ascending order; 2=descending order)

(January, February, ... would be in ascending order)

(December, November, ... would be in descending order)

The observed data for the two cycles, one observation for each period for each cycle, are entered next. This data could for example be the quantity sold for the month, and so forth. Then type RUN.

LIMITATIONS

Lines 535 and 560 use the ABS( ) statement. Print Using statements are used extensively throughout this program, starting in line 680. The source code requires 3K Bytes for storage and Cyclic will execute in 4K Bytes of memory.

CYCL1C

```
150 PRINT
155 PRINT"    CA :  SEASONAL COEFFICIENTS FOR CYCLE 1"
160 PRINT"    CB :  SEASONAL COFEFFICIENTS FOR CYCLE 2"
165 PRINT"    CS :  SEASONAL COEFFICIENTS FOR BOTH CYCLES"
170 PRINT
175 PRINT
180DIMV(30)
185READN,I,M
190 FOR J=1 TO 2*N
195READV(J)
200NEXTJ
205DIMA(15),B(15),C(15),P(15),O(15),K(15)
210 LETS1=S2=D1=D2=D=0
215FORJ=1TON
220 LETS1=S1+V(J)
225 LETS2=S2+V(J+N)
230 LETK(J)=V(J)+V(J+N)
235NEXTJ
240 LETS1=S1/N
245 LETS2=S2/N
250 LETS=.5*(S1+S2)
255 LETD5=(S2-S1)/N
260IFS*D5=0THEN390
265FORJ=1TON
270 LETD6=S+(J-N-.5)*D5
275 LETD7=S+(J-.5)*D5
280 LETD8=D6+D7
285IFD6*D7*D8=0THEN 310
290 LETP(J)=V(J)/D6
295 LETO(J)=V(J+N)/D7
300 LETK(J)=K(J)/D8
305GOTO315
310 LETP(J)=O(J)=K(J)=1
315 LETD1=D1+P(J)
320 LETD2=D2+O(J)
325 LETD=D+K(J)
330NEXTJ
335IFD*D1*D2=0THEN390
340FORJ=1TON
345IFM=2THEN360
350 LETL=1+J-2-N*(INT((I+J-2)/N))+1
355GOTO365
360 LETL=N+I-J-N*(INT((N+I-J)/N))+1
365 LETA(L)=P(J)*N/D1
```

```
370 LETB(L)=D(J)*N/D2
375 LETC(L)=K(J)*N/D
380NEXTJ
385GOTO410
390FORJ=1TON
395 LETA(J)=B(J)=C(J)=1
400NEXTJ
405DIMB$(15)
410 PRINT"PERIOD ";
415FORJ=1TON
420PRINTUSING795;J;
425NEXTJ
430PRINT
435PRINT
440 LETM1=M2=1
445FORJ=1TON
450IFM2>A(J)THEN460
455 LETM2=A(J)
460IFM2>B(J)THEN470
465 LETM2=B(J)
470IFM1<A(J)THEN480
475 LETM1=A(J)
480IFM1<B(J)THEN490
485 LETM1=B(J)
490NEXTJ
495 LETA$(1)="      "
500 LETA$(2)=" SSS "
505 LETA$(3)="  A  "
510 LETA$(4)=" SAS "
515 LETA$(5)="  B  "
520 LETA$(6)=" SBS "
525 LETA$(7)=A$(8)=" SAB "
530 LETA$(9)="-----"
535 LET K=2↑INT(LOG(INT(M2-M1+1))/LOG(2)+.00005)/20
540FORJ=K*INT(M2/K+1)TOK*INT(M1/K-1)STEP-K
545PRINTUSING790,J;
550FORJ1=1TON
555 LETJ2=1
560IFABS(J-A(J1))>K/2THEN570
565 LETJ2=2+J2
570IFABS(J-B(J1))>K/2THEN580
575 LETJ2=4+J2
580IFABS(J-C(J1))>K/2THEN590
585 LETJ2=1+J2
590IF(J-1)↑2+(J2-1)↑2>K*K/2THEN600
595 LETJ2=9
600 LETB$(J1)=A$(J2)
605IFJ2=1THEN615
610 LETJ3=J1
615NEXTJ1
620FORJ1=1TOJ3
```

```
625PRINTB$(J1);
630NEXTJ1
635PRINT
640 LETJ3=0
645NEXTJ
650PRINT
655PRINT
660PRINT"*  SEASONAL COEFFICIENTS  *"
665PRINT
670PRINT"*  CA ";
675FORJ=1TON
680PRINTUSING800,A(J);
685NEXTJ
690PRINT
695PRINT"*  CB ";
700FORJ=1TON
705PRINTUSING800,B(J);
710NEXTJ
715PRINT
720PRINT"*  CS ";
725FORJ=1TON
730PRINTUSING800,C(J);
735NEXTJ
740PRINT
745 PRINT
750 PRINT"PERIOD ";
755FORJ=1TON
760PRINTUSING795,J;
765NEXTJ
770PRINT
775PRINT
780PRINT
785PRINT
790:####.##
795:###
800:##.##
900 END
```

DECISION 1:

DESCRIPTION

This program makes a lease-buy decision for you. It uses the Bower-Williamson method of analysis and assumes that if an item is purchased the item will be depreciated by the sum-of-the-years-digits method. The total lease costs are then compared with the total costs to purchase. The program will then select the method that offers the greatest savings for you and explain its reasons.

USERS

This program is of use to anyone who wants to weigh the costs of purchasing an item outright when they have the option of leasing the same item. A prime example of this would be the costs involved in purchasing and assembling a micro computer system versus the cost of leasing a system already up and running. While this program has considerably more value for businesses then individuals it is definitely not limited to this market as the above example clearly demonstrated a rising issue in todays world of the micro computer.

INSTRUCTIONS

All of the data for the problem must be entered before the program is run, in the following format:

```
120 DATA  P,T,R1,R2

121 DATA  M,L,S1,S2

122 DATA  E1,E2,Y,J

123 DATA  X,X1,X2
```

These 15 quantities are defined in lines 26 through 67 in the program. List the program for additional information. After your data is entered, type RUN.

LIMITATIONS

This program uses the Print Using statement extensively starting in line 405. The source code for this program is 6K Bytes long and should execute without incident in 8K Bytes in most systems.

DECISION 1

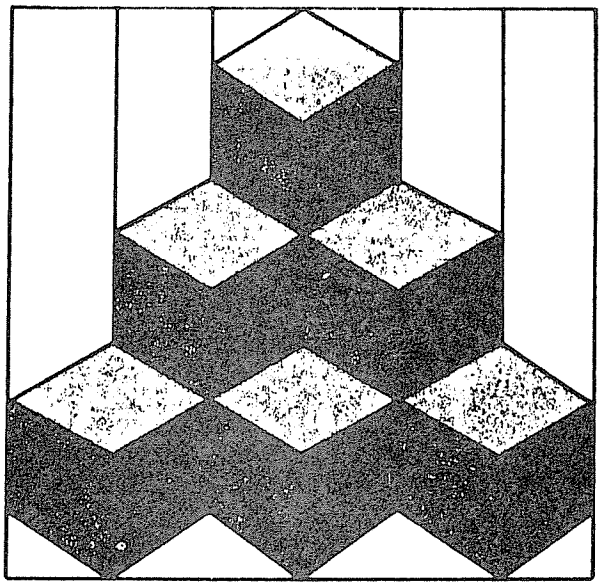
```
15REM  THIS BASIC PROGRAM COMPARES A LEASE WITH PURCHASE OF EQUIPMENT,
17REM      USING THE BOWER-WILLIAMSON METHOD OF ANALYSIS.  THE
19REM      EQUIPMENT IS DEPRECIATED ON SUM-OF-THE-YEARS DIGITS,
21REM      AND THE APPROPRIATE INVESTMENT TAX CREDIT IS TAKEN, FOR
23REM      THE PURCHASE ALTERNATIVE.
24REM
25REM  ------------------------------------------------------------
26REM  VALUES FOR THE FOLLOWING VARIABLES MUST BE SUPPLIED AS DATA
27REM      IN LINES 120-133:
29REM
31REM  1. P = THE PURCHASE PRICE OF THE EQUIPMENT
33REM  2. T = THE LESSEE'S INCOME TAX RATE
35REM  3. R1= THE INTEREST RATE ON A LOAN, COMPOUNDED SEMI-ANNUALLY
37REM  4. R2= THE OPPORTUNITY RATE THAT CAN BE EARNED, AFTER TAXES,
39REM         ON NEW INVESTMENTS, COMPOUNDED SEMI-ANNUALLY
41REM  5. M = THE MONTHLY RENT, PAYABLE IN ADVANCE
43REM  6. L = THE DEPRECIABLE LIFE OF THE EQUIPMENT, IN YEARS
45REM  7. S1= THE SALVAGE VALUE FOR TAX PURPOSES
47REM  8. S2= EXPECTED ACTUAL SALVAGE VALUE; MUST BE LESS THAN P
49REM  9. E1= EXPENSES OF MAKING THE LEASE AGREEMENT
51REM 10. E2= ANNUAL SAVING IN EXPENSES DUE TO THE LEASE
53REM 11. Y = EXPECTED DURATION OF THE LEASE IN YEARS
55REM 12. J = MINIMUM DURATION OF LEASE IN YEARS
57REM 13. X = THE NUMBER OF THE VARIABLE FOR WHICH A SENSITIVITY ANALYSIS
59REM         IS TO BE DONE, 0 IF NO ANALYSIS, 1 IF ON PURCHASE PRICE,
61REM         2 IF INCOME TAX RATE, 3 IF INTEREST RATE, ETC.
63REM 14. X1 = THE LOWEST VALUE FOR THE VARIABLE SPECIFIED IN 13.
65REM 15. X2 = THE HIGHEST VALUE FOR THE VARIABLE SPECIFIED IN 13.
67REM
69REM------------------------------------------------------------
71REM   LINES 120-123 CONTAIN DATA FOR A SAMPLE RUN.
72REM------------------------------------------------------------
75REM
77REM  * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
79REM
100 READ P,T,R1,R2,M,L,S1,S2,E1,E2,Y,J,X,X1,X2
111 DIM A$(12)
112 FOR H=1 TO 12
114 READ A$(H)
116 NEXT H
117 DATA PURCHASE PRICE,TAXRATE,INTEREST RATE,OPPURTUNITY RATE,MON.RENT
118 DATA DEPRECIABLE LIFE,TAX SALVAGE,ACTUAL SALVAGE,LEASE EXPENSE
119 DATA ANNUAL SAVING,LIFE OF LEASE,BASIC RENTAL PERIOD
```

```
120 DATA 60000,.48,.0475,.1
121 DATA 900,10,5000,10000
122 DATA 1000,3500,8,6
123 DATA 6,8,18
130 IF X=0 THEN 170
140 PRINT "DO YOU WANT THE SENSITIVITY ANALYSIS ONLY";
150 INPUT N$
160 IF N$="YES" THEN 280
170 GOSUB 430
180 PRINT "DO YOU WANT TO SEE THE FLOWS";
190 INPUT N$
200 IF N$="YES" THEN 230
210 LET F9=-1
220 GOTO 240
230 GOSUB 680
240 GOSUB 760
250 PRINT "


          "
260 GOSUB 1920
270 IF X=0 THEN 1900
280 PRINT "

          SENSITIVITY ANALYSIS ON ";
290 PRINT A$(X);
300 PRINT "



          "
310 PRINT A$(X);
320 PRINT TAB(30);"NET ADVANTAGE OF LEASE
                                          "
330 FOR F8= 0 TO 10
340    LET F9=-1
350 RESTORE
360 READ P,T,R1,R2,M,L,S1,S2,E1,E2,Y,J,X,X1,X2
370    GOSUB 1440
390    GOSUB 760
400 PRINT USING 405,TAB(30);A1+U2
405:  ######.##
410 NEXT F8
420 STOP
430 PRINT "

          COMPARISON OF LEASE WITH PURCHASE
                                          "
440 PRINT "PURCHASE PRICE $";P,"TAX RATE";T
450 PRINT "INTEREST RATE";R1,"OPPORTUNITY RATE";R2
460 PRINT "MONTHLY RENT";M,"DEPRECIABLE LIFE";L;"YEARS"
```

```
470 PRINT "SALVAGE FOR TAX $";S1,"EXPECTED SALVAGE $";S2
480 PRINT "EXPENSE OF ARRANGING LEASE $";E1
490 PRINT "ANNUAL EXPENSE SAVING DUE TO LEASE $";E2
500 PRINT "EXPECTED DURATION OF LEASE";Y;"YEARS"
510 PRINT "MINIMUM DURATION OF LEASE";J;"YEARS"
520 IF X=0 THEN 660
530 PRINT "SENSITIVITY ANALYSIS ON ";
540 PRINT A$(X);
550 PRINT " WITH A RANGE OF";X1;"TO";X2
660 PRINT
670 RETURN
680 PRINT
690 PRINT TAB(50);"BASIC"
700 PRINT TAB(40);"OP'G FLO";TAB(50);"CASH FLO";TAB(60);"BASIC"
710 PRINT TAB(40);"DIFF'CE";TAB(50);"SAVING";TAB(60);"CASH FLOW"
720 PRINT TAB(30);"LOAN";TAB(40);"WITH";TAB(50);"WITH";TAB(60);"DISC. AT"
730 PRINT "YEAR";TAB(10);"RENT";TAB(20);"DEPREC'N";TAB(30);"INTEREST";
735 PRINT TAB(40);"LEASE";TAB(50);"LEASE";TAB(60);R2
740 PRINT
750 RETURN
760 LET R4 = (1+R1/2)↑(1/6)-1
770 LET P1=(M/R4)*(1+R4-(1/(1+R4)↑(12*J-1)))
780 LET A1 = P-P1
790 IF J = 0 THEN 810
800 LET B2 = M*P/P1
810 LET P2 = P
820 LET D1 = 0
830 LET VP = 0
840 LET M1 = 12*N
850 LET I1=I2=I3=I4=I5=I6=0
860 FOR K = 1 TO Y
870    LET D = (P2-S1)*2*(L-K+1)/(L*(L+1))
880    IF D <= P2-S1-D1 THEN 900
890    LET D = P2-S1-D1
900    IF  D>=0THEN 920
910    LET D=0
920    LET D1=D1+D
930    LET B3 = 0
940    IF K > J THEN 1010
950    FOR I = 1 TO 12
960       LET B1 = R4*(P-B2)
970       LET B3 = B3+B1
980       LET B4 = B2-B1
990       LET P = P-B4
1000    NEXT I
1010    LET F = E2
1020    LET S3 = -E2
1030    IF K>1 THEN 1070
1040    LET F = E2-E1
1050    LET S3 = -F
1060    GO TO 1110
```

```
1070 IF K<Y THEN 1110
1090    LET F = E2-S2
1090    LET S3 = S2 - (P2-D1) - E2
1110 LET C= (M1+S3-D-B3)*T+F
1120    IF K <=J THEN 1140
1130    LET C = C-M1
1140    LET U1 = C/(1+R2/2)↑(2*K-1)
1150    LET U2 = U2 + U1
1160    LET U1 = INT (M1+.5)
1170    LET U2 = INT(D+.5)
1180    LET U3 = INT(B3+.5)
1190    LET U4 = INT(F+.5)
1200    LET U5 = INT(C+.5)
1210    LET U6 = INT(U1+.5)
1220    IF F9=-1 THEN 1300
1225 PRINT TAB(0);K;
1230 PRINT USING 1232,TAB(10);U1;TAB(20);U2;TAB(30);U3;
1232:########
1235 PRINT USING 1232,TAB(40);U4;TAB(50);U5;TAB(60);U6
1240    LET I1=I1+U1
1250    LET I2=I2+U2
1260    LET I3=I3+U3
1270    LET I4=I4+U4
1280    LET I5=I5+U5
1290    LET I6=I6+U6
1300 NEXT K
1310 IF F9=-1 THEN 1340
1315 PRINT
1317 PRINT "TOTAL";
1320 PRINT USING 1323,TAB(10);I1;TAB(20);I2;TAB(30);I3;
1322 PRINT USING 1323,TAB(40);I4;TAB(50);I5;TAB(60);I6
1323:########
1340 RETURN
1440 LET W=X1+(F8/10)*(X2-X1)
1445 PRINT W;
14500N X GOTO 1460,1490,1520,1550,1580,1610,1640,1670,1700,1730,1760,1790
1460 LET P=W
1480 RETURN
1490 LET T=W
1510 RETURN
1520 LET R1=W
1540 RETURN
1550 LET R2=W
1570 RETURN
1580 LET M=W
1600 RETURN
1610 LET L=W
1630 RETURN
1640 LET S1=W
1660 RETURN
1670 LET S2=W
```

```
1690 RETURN
1700 LET E1=W
1720 RETURN
1730 LET E2=W
1750 RETURN
1760 LET Y=W
1780 RETURN
1790 LET J=W
1810 RETURN
1820 PRINT
1830 PRINT USING 1835,A1
1835: FINANCIAL ADVANTAGE OF LEASE      $########.##
1840 PRINT
1850 PRINT USING 1855,V2
1855: OPERATING ADVANTAGE OF LEASE      $########.##
1860 PRINT
1870 PRINT USING 1875,A1+V2
1875: NET ADVANTAGE OF LEASE            $########.##
1890 RETURN
1900 END
```



```
DECISION 1



120 DATA 60000, .48, .0475, .1
121 DATA 900, 10,5000,10000
122 DATA 1000,3500,8,6
123 DATA 6,8,18


RUN


DO YOU WANT THE SENSITIVITY ANALYSIS ONLY  ?NO


COMPARISON OF LEASE WITH PURCHASE

PURCHASE PRICE  $  60000    TAX RATE     .48
INTEREST RATE          .0475     OPPORTUNITY RATE       .1
MONTHLY RENT           900     DEPRECIABLE LIFE    10  YEARS
SALVAGE FOR TAX  $      5000       EXPECTED SALVAGE  $    10000
EXPENSE OF ARRANGING LEASE  $  1000
ANNUAL EXPENSE SAVING DUE TO LEASE  $  3500
EXPECTED DURATION OF LEASE     8  YEARS
MINIMUM DURATION OF LEASE     6  YEARS
SENSITIVITY ANALYSIS ON DEPRECIABLE LIFE WITH A RANGE OF    8  TO    18

DO YOU WANT TO SEE THE FLOWS  ?NO

FINANCIAL ADVANTAGE OF LEASE       $ 3415.92

OPERATING ADVANTAGE OF LEASE        $ 990.83

NET ADVANTAGE OF LEASE             $ 4406.74
```

DECISION 2:

DESCRIPTION

Decision 2 is similar to Decision 1 in that it also determines whether to buy an item or in this case to make the item. This program is oriented toward volume production or purchases of such items as: subassemblies, components, finished assemblies, etc. The overall cost of producing the item; including overhead, taxes, etc. are compared to the purchase price for the item through another vendor.

USERS

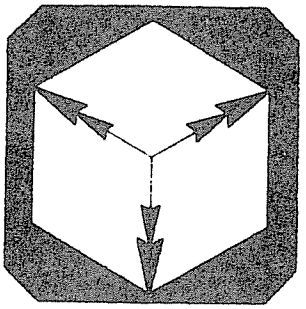
This program is of most use to manufacturing concerns. The concern does not have to be large to use this program. As long as more then one item is being used, Decision 2 will show you the most economical way to go.

INSTRUCTIONS

To use this program type RUN. The program will list all necessary instructions for entering the 11 data inputs if you respond YES to the first question. List the program for additional instructions.

LIMITATIONS

Lines 290 thru 370 contain the FNP and FNEND statements. Lines 1450, 1960 and 2280 contain ON___GOTO statements. Starting in line 1500 the Print Using statement appears and is used extensively throughout the rest of the program. Decision 2 should store and execute in 9K Bytes of memory.



DECISION 2

```
110REM
115REM-----------------------------------------------------------------
120REM   DESCRIPTION-- MAKE OR BUY DECISIONS
125REM
130REM-----------------------------------------------------------------
180REM INSTRUCTIONS--TYPE "RUN" TO USE
190REM INSTRUCTIONS ARE PROVIDED IN PRINT STATEMENTS
200REM
240REM
250REM*****************************************************************************
260REM  INITIALIZATION
280 LET Y1=0
290 DEF FNP(C,X)
300 LET 04=0
310 LET X=(INT((X*100)+.5))/(100)
320 LET FNP=C-2
330 IF ABS(X)<1 THEN 350
340 LET FNP=FNP-INT((LOG(ABS(X))+5E-7)/LOG(10))
350 PRINT TAB(FNP);
360 LET FNP=X
370 FNEND
380 DIM A(25),B(25),C(25),D(25)
390 LET C2=C8=0
400 PRINT "WOULD YOU LIKE INSTRUCTIONS FOR ENTERING DATA";
410 PRINT "(YES OR NO)";
420 INPUT Q3$
430 IF Q3$="YES" THEN 520
440 IF Q3$="NO" THEN 470
450 PRINT "INVALID ANSWER - - RESPOND YES OR NO";
460 GO TO 420
470 PRINT "ENTER ITEMS 1 THROUGH 11"
480 INPUT I1,I2,I3,I4,I5,I6,I7,I8,I9,J1,J2
490 LET 04=1
500 LET C(I4)=-I5
510 GO TO 740
520 PRINT "ITEM"
530 PRINT " NO."
540 PRINT"----"
550 PRINT "1. WHAT IS THE COST TO BUY A COMPONENT F.O.B. YOUR PLANT";
560 INPUT I1
570 PRINT "2. WHAT IS THE COST TO MANUFACTURE A COMPONENT IN YOUR PLANT"
580 PRINT "    INCLUDING DIRECT MATERIALS AND LABOR BUT NOT INCLUDING"
590 PRINT "    OVERHEAD";
600 INPUT I2
```

```
610 PRINT "3. WHAT IS THE INITIAL INVESTMENT (COST OF THE EXTRA"
620 PRINT "   MACHINERY THAT WOULD BE NEEDED IF YOU WERE GOING TO"
630 PRINT "   MANUFACTURE THE COMPONENTS)";
640 INPUT I3
650 PRINT "4. WHAT IS THE LIFE OF THE INVESTMENT IN YEARS";
660 INPUT I4
670 PRINT "5. WHAT IS THE SALVAGE VALUE OF THIS INVESTMENT";
680 INPUT I5
690 LET C(I4)=-I5
700 PRINT "6. WHICH METHOD OF DEPRECIATION DO YOU WISH TO USE (SUM-"
710 PRINT "   OF-THE-YEARS-DIGITS (1),STRAIGHT LINE (2), OR DOUBLE"
720 PRINT "   DECLINING BALANCE (3), ENTER 1, 2 OR 3)";
730 INPUT I6
740 ON I6 GOTO 750,790,790
750 LET S4=0
760 FOR S5=1TOI4
770 LET S4=S4+S5
780 NEXT S5
785REM         DEPRECIABLE INVESTMENT
790 LET S6=I3-I5
800 IF Q4=1 THEN 1040
810 PRINT "7. WHAT ARE THE ANNUAL FIXED COSTS (SUCH AS SUPERVISION AND"
820 PRINT "   MAINTENANCE) INVOLVED IN YOUR MAKING THE COMPONENTS";
830 INPUT I7
840 PRINT "8. WHAT IS YOUR CORPORATE TAX RATE IN PERCENT";
850 INPUT I8
860 LET S1=I8
870 GOSUB 1080
880 IF S2=1 THEN 840
890 LET I8=I8/100
900 PRINT "9. WHAT IS THE LOCAL TAX ON THE EXTRA INVESTMENT IN"
910 PRINT "   DOLLARS PER THOUSAND";
920 INPUT I9
930 LET I9=I9/1000
940 PRINT "10.WHAT IS YOUR COST OF CAPITAL IN PERCENT";
950 INPUT J1
960 LET S1=J1
970 GOSUB 1080
980 IF S2=1 THEN 940
990 LET J1=J1/100
1000 PRINT "11.WHAT IS YOUR ESTIMATE OF THE YEARLY DEMAND FOR THE"
1010 PRINT "   COMPONENTS";
1020 INPUT J2
1030 GO TO 1160
1040 LET I8=I8/100
1050 LET I9=I9/1000
1060 LET J1=J1/100
1070 GOTO 1160
1080REM   ****************PERCENTAGE CHECK SUBROUTINE**************
1090 IF S1>1 THEN 1140
1100 IF S1=0 THEN 1140
```

```
1110 PRINT "PLEASE GIVE YOUR ANSWER IN PERCENT."
1120 LET S2=1
1130 GO TO 1150
1140 LET S2=2
1150 RETURN
1160REM   CONTINUE
1170 LET D(0)=C7=I3
1180 LET D(I4)=-I5*(1-I8)
1190 FOR A=1 TO (I4-1)
1200 LET C(A)=D(A)=0
1210 NEXT A
1220REM   **************EXECUTIVE ROUNTINE**********************
1225REM   TIME LOOP
1230 FOR A=I TO I4
1235REM   INTEREST FACTOR
1240 LET C6=(1+J1)↑(A)
1245REM   COST TO BUY
1250  LET A(A)=I1*J2
1255REM   INTEREST FACTOR-POST TAX
1260 LET B(A)=A(A)*(1-I8)
1270 LET C5=B(A)/C6
1275REM   SUM OF PRESENT VALUE
1280 LET C8=C8+C5
1285REM   DEPRECIATION
1290 GOSUB 2280
1295REM   STATE TAX
1300 LET C3=(I3-C2)*I9
1305REM   YEARLY MFG. COST
1310 LET C4=(I2*J2)+I7+C3
1320 LET C(A)=C4+C1+C(A)
1330 LET D(A)=(C4*(1-I8))-(C1*I8)+D(A)
1335REM   PRESENT VALUE MFG.
1340 LET C5=D(A)/C6
1345REM   SUM OF P.V. MFG.
1350 LET C7=C7+C5
1360 NEXT A
1370REM*********    PRINT OUT ROUTINE    ******************
1380 PRINT
1390 PRINT "*****************************************************************************"
1400 PRINT
1410 PRINT "THE PRESENT VALUE OF THE COST TO MAKE IS ";C7
1420 PRINT "THE PRESENT VALUE OF THE COST TO BUY IS  ";C8
1430 PRINT
1440 LET C9=ABS(C8-C7)
1450 ON SGN(C8-C7)+2 GO TO 1460,1520,1480
1460 LET C$="BUY"
1470 GO TO 1490
1480 LET C$="MAKE"
1490 PRINT "YOU SHOULD ";C$;" THE COMPONENTS AT A SAVINGS OF ";
1500 PRINT USING 1505,C9
1505: $########
```

```
1510 GOTO 1540
1520 PRINT "IT MAKES NO DIFFERENCE WHETHER YOU MAKE OR BUY THE"
1530 PRINT "   COMPONENTS SINCE THE COSTS ARE EQUAL"
1540 PRINT
1550 PRINT "DO YOU WANT TO SEE THE CASH FLOWS";
1560 INPUT Y$
1570 IF Y$="NO" THEN 1820
1580 PRINT
1590 PRINT " **** THE FLOWS *****"
1600 PRINT
1610 PRINT TAB(10);"IF BUY**********";
1620 PRINT TAB(38);"IF MAKE**********";
1630 PRINT TAB(62);"***NET***"
1640 PRINT " YEAR";
1650 PRINT TAB(8);"EXPENSE";
1660 PRINT TAB(20);"CASH FLOW";
1670 PRINT TAB(36);"EXPENSE";
1680 PRINT TAB (48);"CASH FLOW";
1690 PRINT TAB(62);"CASH FLOW"
1700 FOR A=1 TO I4
1710 PRINT A;
1715 PRINT USING 1775,TAB(8);A(A);
1720 PRINT USING 1775,TAB(20);B(A);
1730 PRINT USING 1775,TAB(36);C(A);
1740 PRINT USING 1775,TAB(48);D(A);
1750 LET S7=B(A)-D(A)
1760 PRINT USING 1775,TAB(60);S7
1770 NEXT A
1775:########
1780REM   SENSITIVITY CHECK
1790 PRINT
1800 PRINT "---------------SENSITIVITY CHECK=========================="
1810 PRINT
1820 PRINT "WOULD YOU LIKE TO SEE THE EFFECT OF CHANGING "
1830 PRINT " A VARIABLE ( YES OR NO)";
1840 INPUT A$
1850 IF A$="NO" THEN 2460
1860 PRINT "WHAT IS THE NUMBER OF THE ITEM YOU WOULD LIKE"
1870 PRINT "TO CHANGE";
1880 INPUT A2
1890 PRINT "WHAT IS THE NEW VALUE";
1900 INPUT A3
1910 GOTO 1960
1920 PRINT "WOULD YOU LIKE TO MAKE FURTHER CHANGES";
1930 INPUT B$
1940 IF B$="NO" THEN 1160
1950 GOTO 1860
1960 ONA2GOTO1970,1990,2010,2030,2050,2070,2090,2110,2130,2150,2170
1970 LET I1=A3
1980 GO TO 2180
1990 LET I2=A3
```

```
2000 GO TO 2180
2010 LET I3=A3
2020 GO TO 2180
2030 LET I4=A3
2040 GO TO 2180
2050 LET I5=A3
2060 GO TO 2180
2070 LET I6=A3
2080 GO TO 2180
2090 LET I7=A3
2100 GO TO 2180
2110 LET I8=A3/100
2120 GO TO 2180
2130 LET I9=A3/1000
2140 GO TO 2180
2150 LET J1=A3/100
2160 GO TO 2180
2170 LET J2=A3
2180 LET C2=C8=0
2190 LET C(I4)=-I5
2200 ON I6 GOTO 2210,2250,2250
2210 LET S4=0
2220 FOR S5=1TOI4
2230 LET S4=S4+S5
2240 NEXT S5
2250 LET S6=I3-I5
2260 GOTO 1920
2270 STOP
2280 ON I6 GOTO 2290,2330,2370
2290 REM SUM-OF-THE-YEARS-DIGITS
2295REM   AMOUNT OF DEPRECIATION
2300 LET C1=S6*((I4+1-A)/S4)
2305REM   ACCUMULATED DEPRECIATION
2310 LET C2=C2+C1
2320 RETURN
2330 REM STRAIGHT LINE
2340 LET C1=S6/I4
2350 LET C2=C2+C1
2360 RETURN
2370 REM DOUBLE DECLINING BALANCE
2380 IF A>=I4-3 THEN 2430
2390 LET C1=2*S6/I4
2400 LET C2=C2+C1
2410 LET S6=S6-C1
2420 RETURN
2430 LET C1=S6/3
2440 LET C2=C2+C1
2450 RETURN
2460 END
```

DEPRECIATION:

DESCRIPTION

This program calculates Depreciation using four methods. The depreciation may be computed monthly and/or annually. The four methods are:

1. Straight Line
2. Double Declining Balance
3. Sum-of-the-Years-Digits
4. 150% Declining Balance

The program will also compute the switchover from one method to another.

USERS

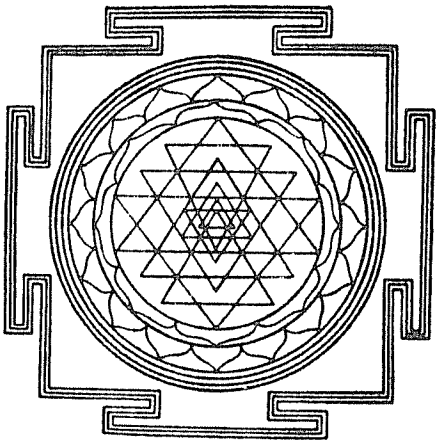
This program is primarily intended for individuals who have items to depreciate for tax purposes, such as: inventory, a building, a business, a house, a car, etc. This program can be used by the average home owner but the man who has an office at home or a small business could best utilize this program.

INSTRUCTIONS

Type RUN and enter your data as requested by the program. List the program for detailed program information.

LIMITATIONS

This program should execute without difficulty in most systems that have 6K Bytes of available program space.



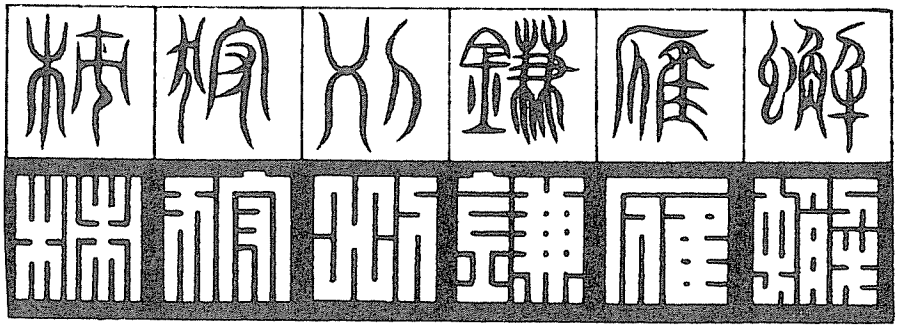
DEPRECIATION

```
20 PRINT"THIS PROGRAM COMPUTES AND PRINTS DEPRECIATION BY MONTHS BY"
30 PRINT "STRAIGHT LINE, DOUBLE DECLINING BALANCE, SUM-"
40 PRINT"THE-YEARS-DIGITS, AND 150 PERCENT DECLINING BALANCE."
50 PRINT
60 PRINT"IF YOU WISH TO SUPPRESS MONTH BY MONTH DETAIL,TYPE"
70 PRINT"'1' AFTER QUESTION MARK. OTHERWISE, TYPE '0'.";
80 INPUT A8
90 PRINT
100 PRINT"WHAT IS THE AMOUNT OF THE INVESTMENT";
110 INPUT I1
120 PRINT
130 PRINT"WHAT IS THE SALVAGE VALUE";
140 INPUT S1
150 PRINT
160 PRINT"WHAT IS THE DEPRECIABLE LIFE (IN YEARS)";
170 INPUTL1
180 PRINT
190 PRINT "AT THE END OF WHICH MONTH (1 THRU 12), AND IN WHAT YEAR"
200 PRINT "(EG.1968) IS THE INVESTMENT MADE";
210 INPUT A1,A9
220 PRINT
230 PRINT"WHAT IS THE DISCOUNT RATE (IN DECIMAL NOTATION) FOR COMPUTING"
240 PRINT"THE PRESENT VALUE OF THE ANNUAL DEPRECIATION";
250 INPUT R
260 PRINT
270 PRINT"YOU HAVE OPTIONS ON SWITCHOVER FROM DOUBLE DECLINING BALANCE TO"
280 PRINT"STRAIGHT LINE.  TO PREVENT SWITCHOVER TYPE 0; TO SPECIFY THE"
290 PRINT"YEAR OF SWITCHOVER, TYPE THE YEAR; TO OBTAIN AUTOMATIC SWITCH-"
300 PRINT"OVER WHEN THE ANNUAL STRAIGHT LINE DEPRECIATION BECOMES"
310 PRINT"GREATER THAN DOUBLE DECLINING BALANCE, TYPE 1.  WHICH DO YOU"
320 PRINT"WANT";
330 INPUT Y
340 PRINT
350 PRINT
360 PRINT "        DATE","     STRLINE","        DDB","     SYD","     150%DB"
370 PRINT
380 LET K=A9
390 LET D1 = ((I1-S1)/L1)*(1-A1/12)
400 LET Q1 = D1
410 LET F2=0
420 LETD2=(2/L1)*I1*(1-A1/12)
430 LET Q2 = D2
440 LET D3 = ((I1-S1)*(1-A1/12)*(2*L1))/((L1+1)*L1)
```

```
450 LET Q3 = D3
460 LET D4 = (1.5/L1)*I1*(1-A1/12)
470 LET Q4 = D4
480 LET V1 = D1/(1+R)
490 LET V2 = D2/(1+R)
500 LET V3 = D3/(1+R)
510 LET V4 = D4/(1+R)
520 FOR M = 1 TO 12
530 IF MK(A1+1) THEN 560
540 LET M1 = D1/(12-A1)
550 GO TO 570
560 LET M1 = 0
570 IF MK(A1+1) THEN 600
580 LET M2 = D2/(12-A1)
590 GO TO 610
600 LET M2=0
610 IF MK(A1+1) THEN 640
620 LET M3 = D3/(12-A1)
630 GO TO 650
640 LET M3=0
650 IF MK(A1+1) THEN 680
660 LET M4 = D4/(12-A1)
670 GOTO 690
680 LET M4 = 0
690 IF A8=1 THEN 710
700 PRINT K;"/";TAB(5);M;TAB(15);M1,M2,M3,M4
710 NEXT M
720 GOSUB 1470
730 LET K = K+1
740 LET D1 = (I1-S1)/L1
750 IF K<(A9+L1) THEN 810
760 LET D1 = I1-S1-Q1
770 IF D1>1 THEN 820
780 LET D1 = 0
790 LET M1 = D1/A1
800 GO TO 820
810 LET M1 = D1/12
820 LET D2 = (2/L1)*(I1-Q2)
830 IF K > A9+L1 THEN 990
840 IF Y < 1 THEN 930
850 IF F2 > 0 THEN 920
860 LET E2=(I1-S1-Q2)/(A9+L1-K+(A1/12))
870 IF Y = 1 THEN 900
880 IF K<Y THEN 930
890 GO TO 910
900 IF D2>E2 THEN 930
910 LET F2 = E2
920 LET D2 = F2
930 IF D2 <= I1-S1-Q2 THEN 970
940 LET D2 = I1-S1-Q2
950 IF D2>1 THEN 970
```

```
960 LET D2 = 0
970 LET M2 = D2/12
980 GO TO 1020
990 IF D2>1 THEN 1010
1000 LET D2 = 0
1010 LET M2 = D2/A1
1020 LET P3=(I1-S1-Q3)*2*(A9+L1-K+(A1/12))
1030 LET P4=(A9+L1-K+1)*(A9+L1-K+(A1/6))
1040 LET D3 = P3/P4
1050 IF K<(A9+L1) THEN 1100
1060 IF D3>1 THEN 1080
1070 LET D3 = 0
1080 LET M3 = D3/A1
1090 GO TO 1110
1100 LET M3= D3/12
1110 LET D4 = (1.5/L1)*(I1-Q4)
1120 IF K<A9+L1 THEN 1200
1130 IF K=A9+L1 THEN 1160
1140 LET D4 = 0
1150 GO TO 1240
1160 IF D4 >1 THEN 1180
1170 LET D4 = 0
1180 LET M4 = D4/A1
1190 GO TO 1250
1200 IF D4<= I1-S1-Q4 THEN 1220
1210 LET D4 = I1-S1-Q4
1220 IF D4>1 THEN 1240
1230 LET D4 = 0
1240 LET M4 = D4/12
1250 LET U1=U1+D1/((1+R)↑(K-(A9-1)))
1260 LET U2=U2+D2/((1+R)↑(K-(A9-1)))
1270 LET U3=U3+D3/((1+R)↑(K-(A9-1)))
1280 LET U4=U4+D4/((1+R)↑(K-(A9-1)))
1290 FOR M = 1 TO 12
1300 IF I1-S1-Q1>1 THEN 1320
1310 LET M1=0
1320 LET Q1=Q1+M1
1330 IF I1-S1-Q2 >1 THEN 1350
1340 LET M2 = 0
1350 LET Q2 = Q2+M2
1360 IF I1-S1-Q3 >1 THEN 1380
1370 LET M3=0
1380 LET Q3 = Q3+M3
1390 IF I1-S1-Q4>1 THEN 1410
1400 LET M4 = 0
1410 LET Q4 = Q4+M4
1420 IF A8=1 THEN 1440
1430 PRINT K;"/";TAB(5);M;TAB(15);M1,M2,M3,M4
1440 NEXT M
1450 GOSUB 1470
1460 GO TO 1690
```

```
1470 PRINT
1480 PRINT K,D1,D2,D3,D4
1490 IF A8=1 THEN 1510
1500 PRINT
1510 PRINT "CUM DEP",01,02,03,04
1520 IF A8=1 THEN 1540
1530 PRINT
1540 LET B1 = I1-S1-01
1550 IF B1 > 1 THEN 1570
1560 LET B1 = 0
1570 LET B2 = I1-S1-02
1580 IF B2 > 1 THEN 1600
1590 LET B2 = 0
1600 LET B3 = I1-S1-03
1610 IF B3 > 1 THEN 1630
1620 LET B3 = 0
1630 LET B4 = I1-S1-04
1640 IF B4 > 1 THEN 1660
1650 LET B4 = 0
1660 PRINT "UNDEPR BAL",B1,B2,B3,B4
1670 PRINT
1680 RETURN
1690 IF K>=(A9+L1) THEN 1710
1700 GO TO 730
1710 PRINT
1720 PRINT "PRESENT VALUE OF DEPRECIATION"
1730 PRINT "AT THE BEGINNING OF";TAB(20);A9
1740 LET R=R*100
1750 PRINT "AT";TAB(3);R;TAB(10);"%";TAB(15);V1,V2,V3,V4
1760 END
```



EFFICIENT:

DESCRIPTION

Efficient computes the most cost effective assignment of resources to locations thereby solving the classical assignment problem. This program uses an algorithm by R. Silver in Communications of the ACM, Nov. 1960; pgs. 605-606. This program may be used to assign men to jobs that require a variety of tasks, each man being partly proficient in each task, so that the entire job will be completed in the least time at the least cost. The number of resources and locations must be equal.

USERS

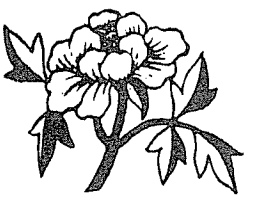
This program is ideally suited to plant or office managers who would like to increase the efficiency of their daily routines. It can be used to locate furnishings or personnel within an office or room to assure the most efficient utilization of these furnishings or persons with a minimum of effort and cost.

INSTRUCTIONS

Before the program is run the use data must be entered in lines 2000 to 2050. List lines 70 to 88 for the data input and format requirements. A sample problem is included in the data statements, lines 2000 to 2050. These statements should be changed to reflect your problem before the program is run.

LIMITATIONS

Line 100 DIM E(50,50) is a call for a two dimensional array or matrix. The first statement in line 100 will reserve about 15K Bytes of memory for program constants. In order to reduce this requirement so this program may be run on a system with limited memory, reduce the numbers in line 100 to reflect the actual matrix size desired. In the example shown the matrix size is 5; ie: DIM _(5,5). The source code requires 4K Bytes of available memory for storage.



EFFICIENT

```
20REM
30REM  DESCRIPTION: THIS BASIC PROGRAM USES THE ALGORITHM
32REM               DESCRIBED BY R. SILVER IN THE COMMUNICATION
34REM               OF THE ACM (NOV.,1960,PP.,605-606) TO
36REM               SOLVE THE CLASSIC ASSIGNMENT PROBLEM AND
38REM               COMPUTE A COST FOR THE ASSIGNMENT.
40REM-----------------------------------------------------------------------
45REM
70REM  INSTRUCTIONS: DATA IS ENTERED STARTING IN LINE 2000
72REM                IN THE FOLLOWING FORMAT:
74REM    1. FIRST ENTER  N ,THE NUMBER OF MODULES TO BE
76REM      ASSIGNED-- IT IS ASSUMED THAT THERE ARE ALSO N
77REM      LOCATIONS.
78REM    2. NEXT ENTER  E(I,J), THE "RATING MATRIX".
80REM       E(I,J) IS CONSIDERED TO BE (MODULES,LOCATIONS).
85REM
88REM       TYPE "RUN " TO EXECUTE
90REM
95REM*************************************************************************
97REM
100 DIM E(50,50),R(50),X(50),Y(50),M(50),L(50),F(50),G(50)
140 REM  INITIALIZE
150 READ N
160 FOR I=1TO N
170 FOR J=1TO N
180 READ E(I,J)
190 NEXT J
200 NEXT I
210 LET T=0
220 FOR I=1 TO N
230 LET X1=E(I,1)
240 FOR J=2 TO N
250 IF E(I,J)=>X1 THEN 270
260 LET X1=E(I,J)
270 NEXT J
280 FOR J=1TO N
290 LET E(I,J)=E(I,J)-X1
300 NEXT J
310 LET T=T+X1
320 NEXT I
330 FOR J=1TON
340 LET X1=E(1,J)
```

```
350 FOR I=2 TO N
360 IF E(I,J)=>X1 THEN 380
370 LET X1=E(I,J)
380 NEXT I
390 FOR I=1TO N
400 LET E(I,J)=E(I,J)-X1
410 NEXT I
420 LET T=T+X1
430 NEXT J
440 FOR I=1TO N
450 LET X(I)=Y(I)=0
460 NEXT I
470 FOR I=1 TO N
480 FOR J=1 TO N
490 IF E(I,J)<>0 THEN 540
500 IF X(I)<>0 THEN 540
510 IF Y(J)<>0 THEN 540
520 LET X(I)=J
530 LET Y(J)=I
540 NEXT J
550 NEXT I
560 REm  SILVER START    START LABELING
570 LET F1=N
580 LET R1=C1=0
600 LET R2=1
610 FOR I=1 TO N
620 LET M(I)=L(I)=0
640 IF X(I)<>0 THEN 690
650 LET R1=R1+1
660 LET R(R1)=I
670 LET M(I)=-1
680 LET F1=F1-1
690 NEXT I
700 IF F1=N THEN 1420
710 REm LABEL     LABEL AND SCAN
720 LET I=R(R2)
730 LET R2=R2+1
740 FOR J=1 TO N
750 IF E(I,J)<>0 THEN 840
760 IF L(J)<>0 THEN 840
770 LET L(J)=I
780 LET C1=C1+1
790 LET F(C1)=J
800 IF Y(J) =0 THEN 1320
810 LET R1=R1+1
820 LET R(R1)=Y(J)
830 LET M(Y(J))=I
840 NEXT J
850 IF R2<=R1 THEN 710
860 REm   RENORMALIZE
870 LET S1=1
```

```
880 LET C0=C1
890 LET C2=0
900 FOR J=1 TO N
910 IF L(J)<>0 THEN 940
920 LET C2=C2+1
930 LET G(C2)=J
940 NEXT J
950 LET X1=E(R(1),G(1))
960 FOR K=1 TO R1
970 FOR L1=1 TO C2
980 IF E(R(K),G(L1))>X1 THEN 1000
990 LET X1=E(R(K),G(L1))
1000 NEXT L1
1010 NEXT K
1020 LET T=T+(R1+C2-N)*X1
1030 FOR I=1 TO N
1040 IF M(I)<>0 THEN 1090
1050 FOR L1=1 TO C0
1060 LET E(I,F(L1))=E(I,F(L1))+X1
1070 NEXT L1
1080 GOTO 1240
1090 FOR L1=1 TO C2
1100 LET E(I,G(L1))=E(I,G(L1))-X1
1110 ON S1 GOTO 1120,1230,1270,1320
1120 IF E(I,G(L1)) <> 0 THEN 1230
1130 IF L(G(L1))<>0 THEN 1230
1140 LET L(G(L1))=I
1150 IF Y(G(L1)) <> 0 THEN 1190
1160 LET J=G(L1)
1170 LET S1=2
1180  GOTO 1230
1190  LET C1=C1+1
1200 LET F(C1)=G(L1)
1210 LET R1=R1+1
1220 LET R(R1)=Y(G(L1))
1230 NEXT L1
1240 NEXT I
1260 ON S1+2 GOTO 1120,1230,1270,1320
1270 IF C0=C1 THEN 710
1280 FOR I=C0+1 TO C1
1290 LET M(Y(F(I)))=F(I)
1300 NEXT I
1310 GOTO 710
1320 REm    MARK   MARK NEW COLUMN AND PERMUTE
1330 LET Y(J)=I=L(J)
1350 IF X(I) <>0 THEN 1380
1360 LET X(I)=J
1370 GOTO 570
1380 LET K=J
1390 LET J=X(I)
1400 LET X(I)=K
```

```
1410 GOTO 1330
1420 REm   CONTINUE
1430 FOR I=1 TO N
1440 FOR J=1 TO N
1450 LET E(I,J)=0
1460 NEXT J
1470 NEXT I
1480 FOR K=1 TO N
1490 LET E(Y(K),X(Y(K)))=1
1500 NEXT K
1510 PRINT
1520 PRINT
1530 PRINT" ","THE ASSIGNMENT IS"
1540 PRINT
1550 PRINT"MODULE\LOCATION"
1560 PRINT TAB(6);
1570 FOR I=1 TO N
1580 PRINTI;
1590 NEXT I
1600 PRINT
1610 PRINT
1620 FOR I=1 TO N
1630 PRINT I;TAB(6);
1640 FOR J=1 TO N
1650 PRINT E(I,J);
1660 NEXT J
1670 PRINT
1680 NEXT I
1690 PRINT
1700 PRINT "THE COST OF THIS ASSIGNMENT IS";T
1710 PRINT
1720 PRINT
2000 DATA 5
2010 DATA 144,74,46,81,68
2020 DATA 77,27,13,38,28
2030 DATA 107,55,34,60,47
2040 DATA 91,49,31,52,43
2050 DATA 106,38,19,53,44
2060 END
```

```
EFFICIENT



2000 DATA 5
2010 DATA 144,74,46,81,68
2020 DATA 77,27,13,38,28
2030 DATA 107,55,34,60,47
2040 DATA 91,49,31,52,43
2050 DATA 106,38,19,53,44
2060 END



RUN


          THE ASSIGNMENT IS

MODULE/LOCATION
            1      2      3      4      5

      1     0      0      1      0      0
      2     0      0      0      1      0
      3     0      0      0      0      1
      4     1      0      0      0      0
      5     0      1      0      0      0

THE COST OF THIS ASSIGNMENT IS    259
```

FLOW:

DESCRIPTION

Flow analyzes the data from the past histories of expense and income accounts and predicts the cash flow for the coming year. While this program leans towars state or municipal governments it can easily be used by individuals and small businesses by modifying the expense and income accounts to fit their specific situations.

USERS

Any person, agency, business, etc. whose operating capital fluctuates, creating a need to either borrow funds or delay projects until funds are available will find this program extremely useful in making these determinations.

INSTRUCTIONS

Lines 4 to 38 explain how to enter your information. The sample data in lines 100 to 400 must be removed and replaced by your data before the program is run. Additional program information may be obtained by listing Flow. After you have entered your data type RUN.

LIMITATIONS

This program uses two dimensional arrays; matrix operations. The Print Using statement is used throughout this program starting in line 1600. The program source code requires 6K Bytes of memory for storage. Execution length is a function of the DIM statements in lines 1100 and 1110. With the DIM statements as they are now, the program will require 60K Bytes for execution. This length may be prohibitive except for larger systems. To reduce this requirement, reduce the number 100 in line 1100 to 10. This will limit the number of income accounts to 2, the number of expense accounts to 6, and the number of years to 2. This modification will reduce the execution space to 13K Bytes.

FLOW

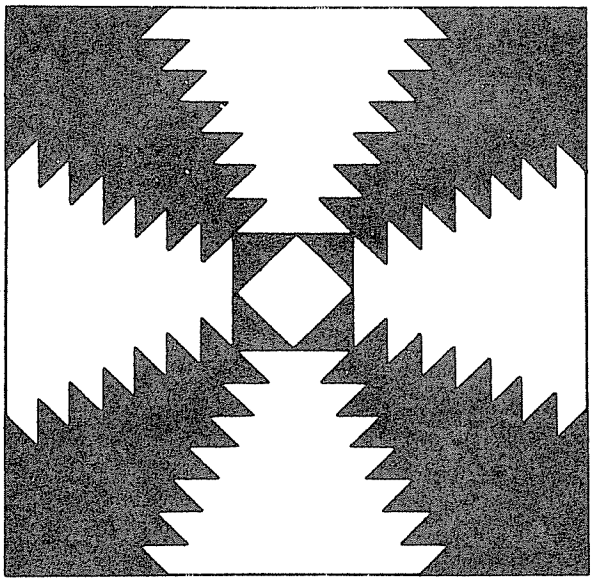
```
2REM
3REM
4REM     DESCRIPTION--TAKES HISTORICAL DATA OF MONTHLY REVENUES AND
5REM                  EXPENSES AND PREDICTS THE NEXT YEARS CASH
6REM                  FLOW REQUIREMENTS.
10REM
12REM  LINES 100-400 CONTAIN DATA FOR A SAMPLE PROBLEM
13REM    TO TEST THE PROGRAM TYPE "RUN"
14REM
15REM     TO USE PROGRAM FOR YOUR OWN PROBLEM:
16REM
17REM     1. REMOVE SAMPLE DATA IN LINES 100-400.
18REM
19REM     2. TYPE IN YOUR DATA IN LINES 100-1000 IN THIS MANNER.
20REM
21REM        FIRST TYPE IN THE (1) NO. OF REVENUE ACCOUNTS, (2) THE
22REM        NO. OF EXPENSE ACCOUNTS (3) AND THE NO. OF YEARS OF DATA.
23REM
24REM        NEXT TYPE THE NAME OF THE FIRST REVENUE ACCOUNT FOLLOWED
25REM        BY ITS MONTHLY DATA FROM THE FIRST YEAR.
26REM
27REM        AFTER THIS COMES THE MONTHLY DATA FOR THE SECOND YEAR
28REM        ON THROUGH THE LAST YEAR.
29REM
30REM        AFTER THIS ACCOUNT DATA HAS BEEN ENTERED THE OTHER REVENUE
31REM        ACCOUNTS ARE TYPED IN FOLLOWED BY THE EXPENSE ACCOUNTS.
32REM
33REM        THE LAST DATA TO BE ENTERED ARE THE BUDGET TOTALS FOR EACH
34REM        ACCOUNT FOR THE COMING YEAR.
35REM
36REM     3. NOW TYPE "RUN" AND THE PROGRAM WILL EXECUTE.
38REM
42REM
96REM  ************************** MAIN PROGRAM ********************************
98REM
99REM SAMPLE DATA
100 DATA 2,3,4
110 DATA TAXES
120 DATA 22.4,29.13,35.10,42.3,48.29,57.48,66.30,72.25,77.1,84.40
130 DATA 91.17,96.23
140 DATA 24.09,30.23,38.12,45.82,55.12,62.96,68.87,74.57,80.9
150 DATA 92.13,101.93,109.67
160 DATA 24.50,33.42,41.86,52.15,59.23,69.98,78.32,89.75,95.69
170 DATA 106.42,114.35,124.7
```

```
180 DATA 25.22,35.19,46.17,57.47,68.67,76.34,85.72,96.24,108.95
190 DATA 117.38,126.56,138.40
200 DATA LICENCES
210 DATA 5.3,6.2,7.2,6.9,5.6,4.2,3.1,2.9,3.4,5.3,2.1,1.8
220 DATA 2.9,7.4,8.1,7.2,6.1,5.6,4.2,2.9,3.3,5.5,2.3,1.9
230 DATA 4.8,8.2,9.0,7.8,6.7,5.9,5.1,3.3,3.7,5.4,2.7,1.8
240 DATA 5.0,7.9,9.2,8.3,7.2,6.4,5.3,3.7,4.1,5.2,2.8,1.7
250 DATA PAYROLL
260 DATA 55,55,55,55,55,55,55,55,55,56,57,57
270 DATA 61,62,62,62,62,62,62,62,56,56,56,63
280 DATA 69,69,69,69,69,69,69,70,70,70,70,70
290 DATA 77,77,77,77,77,79,79,79,79,79,79,79
300 DATA WELFARE
310 DATA 7.28,6.29,5.37,5.42,3.56,3.56,3.68,3.98,4.45,6.37,6.98,7.10
320 DATA 7.33,6.32,5.27,5.40,3.60,3.60,3.60,3.87,4.87,6.42,6.95,7.03
330 DATA 6.27,6.33,5.22,5.37,3.41,3.43,3.41,3.59,4.43,6.07,6.16,6.83
340 DATA 5.98,6.07,5.25,5.23,4.21,3.45,3.37,3.37,3.99,5.86,5.75,6.08
350 DATA HIGHWAY
360 DATA 4.2,4.1,3.8,3.8,4.0,4.8,4.41,4.7,4.08,2.9,2.8,3.5
370 DATA 4.1,4.3,3.9,3.7,4.2,4.9,4.95,4.95,4.35,3.3,3.2,3.7
380 DATA 4.3,4.2,3.85,3.9,4.5,5.0,5.1,4.9,4.8,3.4,3.4,4.1
390 DATA 4.4,4.2,3.9,4.1,4.6,5.2,5.3,5.1,4.1,3.7,3.7,4.2
400 DATA 1080,68,1030,60,58
1100 DIM A$(100),X(100,12),C(100,12),S(100,12),B(100),M(100,12)
1110 DIM N(12),O(12),R(12),E(12)
1120 PRINT"

          "
1130REM INDEX COMPUTATION
1140REM READ DATA
1145REM # REVENUE ACCOUNTS, # EXPENSE ACCOUNTS, # YEARS DATA
1150  READ M,N,Y
1160  FOR J= 1 TO (M+N)
1170 FOR I= 1 TO Y
1180  IF I>1 THEN 1200
1190  READ A$(J)
1200   LET S=0
1210   FOR K=1 TO 12
1220   READ X(J,K)
1225REM  COMPUTE AVERAGE MONTHLY DATA
1230   LET S=S+X(J,K)/12
1240   NEXT K
1250  FOR K=1 TO 12
1260 LET C(J,K)=X(J,K)/S
1270 IF I=1 THEN 1310
1280 LET A=.25
1285REM  SINGLE SMOOTHED INDEX
1290 LET S(J,K)=S(J,K)*A+(1-A)*C(J,K)
1300 GO TO 1320
1310 LET S(J,K)=C(J,K)
1320 NEXT K
```

```
1330 NEXT I
1340 NEXT J
1350REM  READ IN BUDGET (ANNUAL BY ACCOUNT)
1360 FOR J= 1 TO M+N
1370 READ B(J)
1380 FOR K= 1 TO 12
1385REM  INDEX TIMES AVERAGE MONTHLY
1390 LET M(J,K)=S(J,K)*(B(J)/12)
1400 LET M(J,K)=INT (M(J,K)*100+.5)/100
1410 NEXT K
1420 NEXT J
1430 PRINT TAB(15);"FORECASTED INCOME STATEMENT"
1440 PRINT TAB(15);"============================"
1450 PRINT
1460 PRINT
1470 LET G= 1
1480 LET E= 1
1490 LET H= M
1500 LET F=6
1505REM  MONTHLY HEADING ROUTINE
1510 GOSUB 2190
1520 IF H= M+N THEN 1550
1530 PRINT TAB(0);"REV ACCTS"
1540 GO TO 1560
1550 PRINT TAB(0);"EXP ACCCTS"
1560 FOR J= G TO H
1570 PRINT TAB(2); A$(J);
1580 LET T=12
1590 FOR K= E TO F
1600 PRINT USING 1605,TAB(T);M(J,K);
1605:######.##
1610 LET T = T + 10
1620 NEXT K
1630 PRINT
1640 NEXT J
1645REM  MONTHLY SUMMATION ROUTINE
1650 GOSUB 2370
1660 GOSUB 2470
1670 PRINT TAB(5);"TOTAL"
1680 IF H=(M+N) THEN 1710
1690 PRINT TAB(2);"REVENUES";
1700 GO TO 1720
1710 PRINT TAB(2);"EXPENSES";
1720 LET T=12
1730 FOR J= E TO F
1740 IF H=M+N THEN 1770
1750 PRINT USING 1605,TAB(T);R(J);
1760 GO TO 1780
1770 PRINT USING 1605,TAB(T);E(J);
1780 LET T = T + 10
1790 NEXT J
```

```
1800 PRINT
1810 PRINT
1820 PRINT
1830 IF H= M+N THEN 1870
1840 LET G=G+M
1850 LET H=H+N
1860 GO TO 1550
1865REM  COMPUTE MONTHLY NET BALANCES
1870 GOSUB 2280
1880 GOSUB 2470
1890 PRINT
1900 PRINT TAB(5);"NET"
1910 PRINT TAB(2);"SURP(DEF)";
1920 LET T=12
1930 FOR J= E TO F
1940 PRINT USING 1605,TAB(T);N(J);
1950 LET T=T+10
1960 NEXT J
1970 PRINT
1980 GOSUB 2470
1990 PRINT TAB(5);"CUM"
2000 PRINT TAB(2);"SURP(DEF)";
2010 LET T=12
2020 FOR J= E TO F
2030 PRINT USING 1605,TAB(T);O(J);
2040 LET T=T+10
2050 NEXT J
2060 PRINT
2070 FOR L= 15 TO 68
2080 PRINT TAB(L);"=";
2090 NEXT L
2100 PRINT
2110 PRINT
2120 PRINT
2130 IF F= 12 THEN 9999
2140 LET E= E+6
2150 LET F=F+6
2160 LET G=1
2170 LET H=M
2180 GO TO 1510
2190 IF F=12 THEN 2230
2200 PRINT TAB(15);"JAN";TAB(25);"FEB";TAB(35);"MAR";TAB(45);"APR";
2210 PRINT TAB(55);"MAY";TAB(65);"JUN"
2220 GO TO 2260
2230  PRINT
2240 PRINT TAB(15);"JUL";TAB(25);"AUG";TAB(35);"SEP";TAB(45);"OCT";
2250 PRINT TAB(55);"NOV";TAB(65);"DEC"
2260 GOSUB 2470
2270 RETURN
2280REM  SUBROUTINE FOR COMPUTING MONTHLY NEXT BALANCES
```

```
2290 FOR J=E TO F
2300 LET N(J)= R(J)-E(J)
2310 LET X9=X9+N(J)
2320 LET O(J)=X9
2330 IF ABS(O(J))>=.02 THEN 2350
2340 LET O(J)=0
2350 NEXT J
2360 RETURN
2370REM  SUBROUTINE FOR TOTALING REV. AND EXP.
2380 FOR K= E TO F
2390 FOR J= G TO H
2400 IF J>M THEN 2430
2410 LET R(K)=R(K)+M(J,K)
2420 GO TO 2440
2430 LET E(K)=E(K)+M(J,K)
2440 NEXT J
2450 NEXT K
2460 RETURN
2470 FOR L = 15 TO 69
2480 PRINT TAB(L);"-";
2490 NEXT L
2500 PRINT
2510 RETURN
9999 END
```



INSTALLMENT:

DESCRIPTION

This program computes the monthly payment schedules for a borrower for an installment loan. Interest and insurance are amortized using the sum-of-the-months method. The loan payments are pro-rated over the life of the loan. Shown in the print out are the remaining balance (principal), pay-off balance (principal), unearned insurance, remaining interest and the earned interest.

USERS

This program can be used by anyone who does installment buying. From the print out one can determine the amount of yearly interest paid for income tax purposes and the amount required to pay off the loan at any time. This program may also be used by a lender to keep a record of all installment accounts, outstanding.

INSTRUCTIONS

To use the program, remove the sample data in lines 1090 and 1100, then enter the new data in the following format:

1090 DATA Name, Street, City

1100 DATA Beginning month, beginning day, beginning year, loan amt., insurance amt., interest rate, effective rate, mths. to maturity

The effective interest is determined as: $i = \frac{2pc}{n + 1}$

p = # of payments per year

c = % of interest charged

n = total # of payments

i = effective interest

LIMITATIONS

The source code requires 5K of memory to store and the program should execute in about 6K Bytes of memory in most systems.

INSTALLMENT

```
120REM-----------------------------------------------------------------
130REM
140REM  DESCRIPTION-- CALCULATES THE MONTHLY PAYMENT SCHEDULE
150REM                FOR AN INSTALLMENT LOAN.
160REM
170REM-----------------------------------------------------------------
180REM
190REM  INSTRUCTIONS-- DATA FOR A SAMPLE PROBLEM IS STARTING IN
195REM                 LINE 1090.
200REM                 TO USE TYPE "RUN".
210REM                 ENTER DATA FOR YOUR INSTALLMENT LOANS
220REM               BEGINNING IN LINE 1090 AND "RUN".
230REM
235REM
240REM-----------------------------------------------------------------
250REM
255REM   PRINTS IN DOLLARS & CENTS FORMAT
260 DEF FNP(N7,N9)
270 LET C2=1
280 IF N9=0 THEN 415
290 LET P9=0
300 LET C9=INT(N9*100+.5)
305 LET F9=INT(C9/100)
310 LET R9=C9-100*F9
315 LET T9=INT(F9/10)
320 LET P9=P9+1
325 LET T9=INT(F9/10)
330 LET O(P9)=F9-10*T9+48
335 LET F9=T9
340 IF F9>0 THEN 320
345 LET O(0)=P9+3
350 LET O(P9+1)=46
355 LET O(P9+2)=INT(R9/10)
360 LET O(P9+3)=R9-O(P9+2)*10+48
365 FOR I9=1 TO P9/2
370 LET T9=O(I9)
375 LET O(I9)=O(P9+1-I9)
380 LET O(P9+1-I9)=T9
385 NEXT I9
390 LET O(P9+2)=O(P9+2)+48
395 CHANGE O TO O$
400 PRINT TAB(N7-LEN(O$));O$;
405 LET FNP=C9/100
410 GO TO 420
```

```
415 PRINT TAB(N7-4);"0.00";
420 FNEND
425 REm CALCULATES PAYMENTS FOR AN INSTALLMENT LOAN
429REM  MONTHS OF THE YEAR
430 DIM C$(12)
432 FOR I=1 TO 12
435 READ C$(I)
437 NEXT I
440 READ G$
445 IF G$="FINISH" THEN 9999
450 READ G1$,G2$
455 READ B,B1,C,A,I,R,R1,M
460 LET C3=C
465 LET C8=1
469REM  CHECKS FOR FEE RATHER THAN RATE
470 IF R<1 THEN 485
475 LET A5=R
480 GO TO 495
485 LET A5=(A+I)*R*M/12
489REM  MONTHLY PAYMENT
490 LET T=(I+A+A5)/M
495 IF T*100=INT(T*100) THEN 525
500 LET T=INT(T*100+1)/100
505 IF R<1 THEN 520
510 LET A1=R
515 GO TO 525
519REM  TOTAL PAYMENTS
520 LET A1=T*M-A-I
525 IF A1*100=INT(A1*100) THEN 535
530 LET A2=INT((A1*(I/(A+I)))*100+.5)/100
535 LET D=A1
540 LET E=I
545 PRINT
550 PRINT
555 PRINT TAB(15);"INSTALLMENT LOAN LEDGER"
560 PRINT TAB(15);"-----------------------"
565 PRINT
570 PRINT G$
575 PRINT G1$
580 PRINT G2$
585 PRINT
590 PRINT "AMOUNT OF LOAN";
595 LET A=FNP(33,A)
600 PRINT
605 PRINT "INTEREST";
610 LET A1=FNP(33,A1)
615 PRINT
620 PRINT "INSURANCE";
625 LET I=FNP(33,I)
630 PRINT
635 PRINT TAB(26);"--------"
```

```
630 LET T7=A+A1+I
640 PRINT "FACE AMOUNT OF THE NOTE";
642 LET T7=FNP(33,T7)
645 PRINT
646 PRINT
647 PRINT
650 IF R<1 THEN 665
655 PRINT "FINANCING FEE";R
660 GO TO 670
665 PRINT "ADD ON INTEREST RATE";R
670 PRINT "EFFECTIVE RATE";R1
675 PRINT "DATE OF LOAN IS  ";C$(B);" ";B1;",";C+1900
680 PRINT "MONTHS TO MATURITY";M
685 PRINT"MONTHLY PAYMENT   $";
690 LET T=FNP(30,T)
695 PRINT
700 PRINT
705 PRINT
710 PRINT TAB(0);"DATE";TAB(7);"DATE";TAB(14);"BALANCE";TAB(23);"PAYOFF";
715 PRINT TAB(32);"IRREG";TAB(40);"NEW OR";TAB(48);"UNEARN REMAINING";
720 PRINT TAB(66);"EARNED"
725 PRINT TAB(0);"DUE";TAB(7);"PAID";TAB(14);"REMAIN";TAB(23);"BALANCE";
730 PRINT TAB(32);"PAYMENT";TAB(40);"SHORT";TAB(48);"INSURE";
735 PRINT TAB(56);"INTEREST";TAB(65);"INTEREST"
740 PRINT TAB(0);"----";TAB(7);"----";TAB(14);"-------";TAB(23);
745 PRINT "-------";TAB(32);"-------";TAB(40);"-----";TAB(48);"------";
750 PRINT TAB(57);"-------";TAB(66);"-------"
755 LET Z=B+1
760 LET B5=A1+A+I
765 LET C1=12-B
770 LET C=C+1900
775 PRINT TAB(0);C
780 PRINT
785 PRINT TAB(0);C$(B);TAB(7);"NONE";
790 LET B5=FNP(21,B5)
800 LET A=FNP(30,A)
810 LET E=FNP(53,E)
820 LET D=FNP(62,D)
825 PRINT
829REM  CALCULATION AND PRINTING MONTHLY TABLE
830 FOR J=1 TO M
835 LET P=((M-J+1)/(((M+1)/2)*M))*A1
840 LET P=INT(P*100+.5)/100
845 LET S(C8)=S(C8)+P
850 LET F=((M-J+1)/(((M+1)/2)*M))*I
855 LET F=INT(F*100+.5)/100
860 IF J<M THEN 875
865 LET P=D
870 LET F=E
875 LET A=A-(T-P-F)
880 LET A=INT(A*100+.5)/100
```

```
884REM  FINAL PAYMENT
885 LET B1=B5
890 LET B5=INT((B5-T)*100+.5)/100
895 IF J<M THEN 905
900 LET B5=A=0
905 LET D=INT((D-P)*100+.5)/100
910 LET E=INT((E-F)*100+.5)/100
915 PRINT TAB(0);C$(Z);
920 LET B5=FNP(21,B5)
930 LET A=FNP(30,A)
940 LET E=FNP(53,E)
950 LET D=FNP(62,D)
960 LET P=FNP(71,P)
965 PRINT
969REM  CHECK FOR END OF CALENDAR YEAR
970 IF J=M THEN 1030
975 LET Z=Z+1
980 IFJ<C1 THEN 1030
985 IF J>C1 THEN 995
990 GO TO 1000
995 IF Z<13 THEN 1030
1000 LET Z=1
1005 LET C=C+1
1010 LET C8=C8+1
1015 PRINT
1020 PRINT TAB(0);C
1025 PRINT
1030 NEXT J
1035 PRINT
1040 IF R<1 THEN 1055
1045 PRINT"FINAL MONTHLY PAYMENT IS  ";
1050 LET B1=FNP(35,B1)
1055 PRINT
1060 FOR J=1 TO C8
1065 PRINT
1070 PRINT"TOTAL INTEREST PAID IN ";(C3+1900+J-1);" IS ";
1075 LET S(J)=FNP(42,S(J))
1080 PRINT
1082 NEXT J
1084 DATA JAN,FEB,MAR,APR,MAY,JUNE,JULY
1085 DATA AUG,SEPT,OCT,NOV,DEC
1090 DATA "JAMES JONES","100 CACTUS AVE.","PHOENIX,ARIZ."
1100 DATA 7,01,72,2500,31.91,.06,.11,12
9990 DATA "FINISH"
9991 PRINT""
9995 GO TO 440
9999 END
```

```
RUN


                  INSTALLMENT LOAN LEDGER
                  -----------------------

JAMES JONES
100 CACTUS AVE.
PHOENIX, ARIZ.

AMOUNT OF LOAN                2500.00
INTEREST                       152.01
INSURANCE                       31.91
                              --------
FACE AMOUNT OF THE NOTE       2683.92


ADD ON INTEREST RATE          .06
EFFECTIVE RATE          .11
DATE OF LOAN IS  JULY     1,  1972
MONTHS TO MATURITY        12
MONTHLY PAYMENT       $      223.66

DATE       DATE     BALANCE     PAYOFF   IRREG      NEW OR UNEARN  REMAIN     EARNED
DUE        PAID     REMAIN      BALAN    PAYMENT    SHORT  INSUR   INTER      INTERE
-----      ----     --------    -----    -------    ------ ------  -------    -------

1972

JULY       NONE       2683.92   2500.00                     31.91   152.01
AUG                   2460.26   2304.64                     27.00   128.62      23.39
SEPT                  2236.60   2106.92                     22.50   107.18      21.44
OCT                   2012.94   1906.84                     18.41    87.69      19.49
NOV                   1789.28   1704.40                     14.73    70.15      17.54
DEC                   1565.62   1499.60                     11.46    54.56      15.59


1973

JAN                   1341.96   1292.44                      8.60    40.92      13.64
FEB                   1118.30   1082.92                      6.15    40.92      13.64
MAR                    894.64    871.05                      4.10    19.49       9.74
APR                    670.98    656.83                      2.46    11.69       7.80
MAY                    447.32    440.25                      1.23     5.84       5.85
JUNE                   223.66    221.31                      0.41     1.94       3.90
JULY                     0.00      0.00                      0.00     0.00       1.94


TOTAL INTEREST PAID IN 1972  IS   97.45

TOTAL INTEREST PAID IN 1973  IS   54.57
```

INTEREST:

DESCRIPTION

When run, Interest calculates the accrued interest on installment loans. In addition it calculates that portion of the unearned interest that was earned during the current period. The print outs may be included in your operating statements for the current month.

USERS

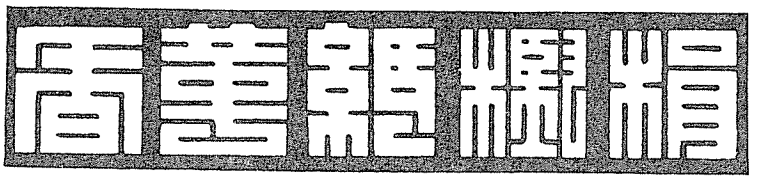
This program is slanted toward the lender rather then the borrower, however it may be used by anyone who does installment buying. This program will keep a record of all of ones accounts for tax purposes, budget purposes, etc.

INSTRUCTIONS

Before the program is run, enter your data starting in line 1000 to 1090. Sample data is presently contained in lines 1000 to 1090; this should be deleted before running your data. Enter the total amount of unearned interest, due from all accounts, per month for the rest of the current year and for 48 consecutive months after the current year; in chronological order. The unearned interest is figured using the sum-of-the-months-digits method. Interest earned during the period = 2/(p + 1) times the unearned interest at the beginning of the period; and "p" is the sequential number of the period in which loans mature. From this, interest earned on loans maturing next month would be 2/3's of the interest unearned on those loans at the beginning of the current month.

LIMITATIONS

Lines 60 to 430 contain DEF FNP and FNEND statements. The program should execute in 4K Bytes of memory.

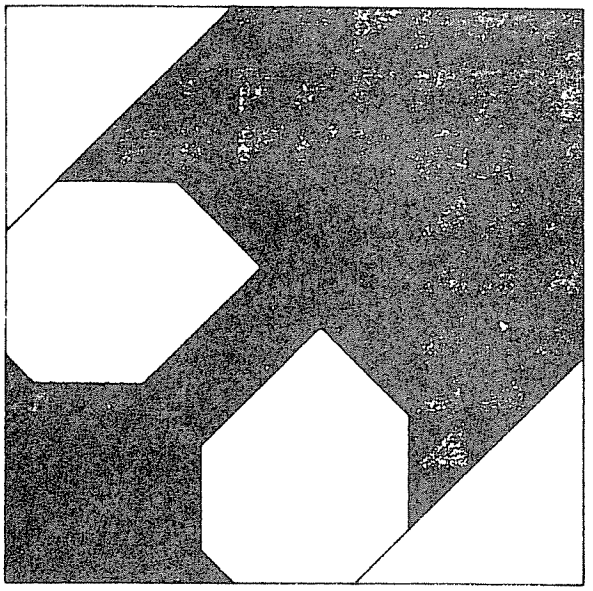


INTEREST

```
11REM
12REM
14REM  DESCRIPTION--COMPUTES AND PRINTS THE ACCRUED INTEREST
15REM                ON INSTALLMENT LOANS.
16REM
18REM  INSTRUCTIONS --DATA BEGINS IN LINE 1000 AND CONSISTS OF
20REM                 UNEARNED INTEREST BY MONTH OF MATURITY.
22REM
24REM*****************************************************************************
26REM
30 DIM C$(12)
40 REM FUNCTION TO PRINT RESULTS IN DOLLARS AND CENTS FORMAT
50 REM AND TO ALIGN DECIMAL POINTS
60 DEF FNP(N9)
70 IF N9=0 THEN 420
80 LET P9=0
90 LET C9=INT(N9*100+.5)
100 LET F9=INT(C9/100)
110 LET R9=C9-100*F9
120 LET P9=P9+1
130 LET T9=INT(F9/10)
140 LET O(P9)=F9-10*T9+48
150 LET F9=T9
160 IF F9>0 THEN 120
170 LET O(0)=P9+3
180 LET O(P9+1)=46
190 LET O(P9+2)=INT(R9/10)
200 LET O(P9+3)=R9-O(P9+2)*10+48
210 FOR I9= 1 TO P9/2
220 LET T9=O(I9)
230 LET O(I9)=O(P9+1-I9)
240 LET O(P9+1-I9)=T9
250 NEXT I9
260 LET O(P9+2)=O(P9+2)+48
270 CHANGE O TO O$
280 LET U9=0
290 LET U9=U9+1
300 IF U9=O(0) THEN 370
310 IF O(U9)<>46 THEN 290
320 FOR U9= 1 TO 7-U9
330 LET P(U9)=32
340 NEXT U9
350 LET P(0)=U9
360 CHANGE P TO M$
```

```
370 CHANGE O TO O$
390 PRINT M$;"$";O$;
400 LET FNP=C9/100
410 GOTO 430
420 PRINT"      $0.00";
430 FNEND
440 FOR I=1 TO 12
450 READ C$(I)
455 NEXT I
460 PRINT"WHAT IS THE CURRENT MONTH AND YEAR(E.G. 12,1972";
470 INPUT A,A1
480 IF A1>99 THEN 500
490 LET A1=A1+1900
500 PRINT
510 LET N=12-A+1
520 LET Z=A
530 PRINT TAB(12);"EARNED INTEREST - INSTALLMENT LOANS"
540 PRINT TAB(12);"-----------------------------------"
550 PRINT "MONTH OF";TAB(20);"EARNED";TAB(40);"REMAINING UNEARNED"
560 PRINT "MATURITY";TAB(20);"INTEREST";TAB(40);"INTEREST"
570 PRINT "--------";TAB(20);"--------";TAB(40);"------------------"
575 PRINT
580 PRINT A1
585REM  **** MAXIMUM MATURITY 4 YEARS  ***************
590 FOR J=1 TO N+48
600 READ P
605REM   FORMULA FOR SUM OF MONTHS DIGITS    *********
610 LETS=INT(P*(2/(J+1))*100+.5)/100
620 LET T=T +S
630 LET R=P-S
640 LET R1=R1+R
650 PRINT " ";C$(Z);TAB(18);
660 LET S=FNP(S)
670 PRINT TAB(40);
680 LET R=FNP(R)
690 PRINT
700 LET Z=Z+1
710 IF J=72+N THEN 800
720 IF J<N THEN 800
730 IF J>N THEN 750
740 GO TO 760
750 IF Z<13 THEN 800
760 LET Z=1
770 LET A1=A1+1
780 PRINT
785 IF J=N+48 THEN 800
790 PRINT A1
800 NEXT J
810 PRINT TAB(20);"--------";TAB(42);"--------"
820 PRINT "TOTALS";TAB(18);
830 LET T=FNP(T)
```

```
840 PRINT TAB(40);
850 LET R1=FNP(P1)
860 PRINT
870 DATA JANUARY,FEBRUARY,MARCH,APRIL,MAY,JUNE,JULY,AUGUST
880 DATA SEPTEMBER,OCTOBER,NOVEMBER,DECEMBER
890REM
900 REM ENTER TOTAL UNEARNED INTEREST IN DATA STARTING AT LINE 1000
910 REM FOR EACH MONTH OF MATURITY IN CHRONOLOGICAL ORDER.
1000 DATA 900.50,98.35,150.55,270.66,27.77,56.29
1010 DATA 2.65,193.42,362.4,609.55,832.39,936.14
1020 DATA 654.66,1146.61,1521.3,1226.52,2083.25,2455.6
1030 DATA 1350.4,1597.11,2537.63,2362.95,5755.1,5203.83
1040 DATA 4856.7,5819.73,2490.84,3283.03,4817.39,1927.29
1050 DATA 1867.08,2090.91,3912.03,7773.25,5414.98,11928.33
1060 DATA 4660.57,7371.53,2572.17,3190.66,3712.78,927.05
1070 DATA 0,0,790.34,360.38,0,944.86
1080 DATA 0,0,898.64,0,0,426.69
1090 DATA 0,271.43,0,0,0,0
99999 END
```



INVESTMENTS:

DESCRIPTION

This program determines the annual rate of return for an investment and compounds it for each year data is provided. Additionally this program provides analytical data expressed in percentages for the various holding periods of your investments.

USERS

Businessmen, housewives, etc. anyone who invests either casually or on a regular basis will find this program helpful and useful.

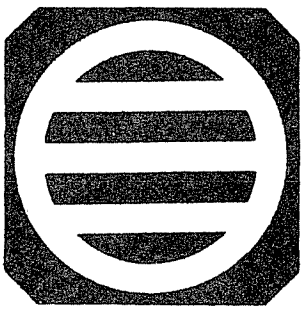
INSTRUCTIONS

List the program for information concerning data entry and operation. The data may be entered into lines 1000 to 1100 before the program is run or it may be prompted for by the computer during program execution. When the program is run it will ask if you want instructions. There are three valid responses to that question.

1. DATA - data is already entered and ready to run
2. YES - the program will prompt you for the desired data
3. NO - You must enter the data without any prompting or instructions

LIMITATIONS

Line 110 contains W(25,25). This program requires matrix operations. The program will store in 5K Bytes and execute in 12K Bytes of memory.



INVESTMENTS

```
15REM
20REM  DESCRIPTION-- THIS BASIC PROGRAM COMPUTES A MATRIX OF
30REM  RETURNS FOR AN INVESTMENT IN A SECURITY, IT THEN COMPUTES
35REM  AN AVERAGE RETURN FOR A PURCHASE AT THE BEGINNING OF A
40REM  YEAR, SELLING AT EACH OF THE FOLLOWING YEAR ENDS, AND
45REM  COMPUTES AN AVERAGE RETURN FOR ALL DESIGNATED HOLDING
50REM  PERIODS. IT ALSO COMPUTES AN AVERAGE RETURN, STANDARD
55REM  DEVIATION AND COEFFICIENT OF VARIATION FOR DIFFERENT
60REM  LENGTH HOLDING PERIODS.
70REM
75REM-----------------------------------------------------------------
80REM INSTRUCTIONS--SAMPLE DATA-NO. OF YRS.,BASE YR.-DIVIDENDS
85REM                PER YR.,ANNUAL CLOSING PRICE ARE PRESENTLY
90REM                ENTERED STARTING IN LINE 1000
95REM                TYPE "RUN" AND PROGRAM WILL ASK IF YOU HAVE
100REM               ALREADY ENTERED OR WISH TO ENTER DATA.
102REM
105REM----------------------------------------------------------------
110 DIM D(25),P(25),W(25,25)
115 PRINT "DO YOU WANT INSTRUCTIONS FOR SUPPLYING DATA";
120 INPUT A$
125 IF A$="DATA" THEN 240
130 IF A$="NO" THEN 265
135 PRINT
140 PRINT"FOR HOW MANY YEARS DO YOU WISH TO ENTER PRICE AND DIVIDEND"
145 PRINT"DATA, REMEMBERING THE NEED FOR A BASE YEAR. E.G., 10 YEARS"
150 PRINT"OF DATA ARE NEEDED TO GIVE 9 ANNUAL RETURNS. THE MAXIMUM"
155 PRINT"NUMBER OF YEARS IS 25.  ";
160 INPUT N
165 PRINT
170 PRINT"WHAT IS THE FIRST YEAR FOR WHICH YOU WISH TO ENTER DATA";
175 INPUT Y1
180 PRINT
185 PRINT"ENTER THE DIVIDEND PER SHARE (DPS) AND THE CLOSING SECURITY"
190 PRINT"PRICE (CSP), SEPARATED BY A COMMA, FOR EACH OF THE FOLLOWING"
195 PRINT"YEARS:"
200 PRINT
205 PRINT TAB(12);"DPS, CSP"
210 PRINT
215 FOR I=1 TO N
220 PRINT"YEAR";Y1+(I-1);
225 INPUT D(I),P(I)
230 NEXT I
```

```
235 GOTO 285
240 READ N,Y1
245 FOR I=1 TO N
250 READ D(I),P(I)
255 NEXT I
260 GOTO 285
265 PRINT
270 PRINT "NO. OF YEARS, FIRST YEAR";
275 INPUT N,Y1
280 GOTO 200
285 PRINT
290 PRINT"------------------------------------------------------------------------"
300 FOR I = 1 TO (N-1)
305 FOR J = (I+1) TO N
310 LET B = 0
315 FOR C = 1 TO 5
320 LET Q = .1↑C
325 LET B = B + Q
330 LET E = 0
335 FOR F = (I+1) TO J
340 LET E = (D(F)*(1/((1+B)↑(F-I)))) + E
345 NEXT F
350 LET E = E + P(J)*(1/((1+B)↑(J-I)))
355 IF E-P(I)>0 THEN 325
360 LET B = B-Q
365 NEXT C
370 IF B = 0 THEN 380
375 GO TO 390
380  LET B = -.8
385 GO TO 315
390 LET W(I,J) =B
395 NEXT J
400 NEXT I
405 PRINT
410 PRINT
415 PRINT
420 PRINT
425 PRINT"                    RETURNS ON INVESTMENTS"
430 PRINT"                    ----------------------"
435 PRINT TAB(11);"(ANNUAL RATES COMPOUNDED ANNUALLY)"
440 PRINT
445 PRINT
450 FOR K=1 TO (N-1) STEP4
455 IF N-1-K<4 THEN540
460 PRINT"    TO";Y1+K,Y1+(K+1),Y1+(K+2),Y1+(K+3)
465 PRINT"FROM"
470 FOR I=1 TO K
475 PRINT Y1+(I-1),
480 FOR J=(K+1) TO (K+4)
485 PRINT W(I,J),
490 NEXT J
```

```
495 NEXT I
500 PRINT Y1+K," ";W(K+1,K+2);W(K+1,K+3);W(K+1,K+4)
505 PRINT Y1+K+1," ";" ";W(K+2,K+3);W(K+2,K+4)
510 PRINT Y1+K+2," ";" ";" ";W(K+3,K+4)
515 PRINT
520 PRINT
525 PRINT
530 NEXT K
535 GO TO 665
540 PRINT"   TO";
545 FOR I=K TO (N-1)
550 PRINT Y1+I;
555 NEXT I
560 LET Q=4-(N-K)
565 GOSUB 645
570 PRINT"FROM"
575 FOR I=1 TO N-1
580 PRINT Y1+(I-1);
585 IF I<=(N-(N-K)) THEN 610
590 LET Q=I-K
595 GOSUB 645
600 LET J=K+1+Q
605 GO TO 615
610 FOR J=K+1 TO N
615 PRINT W(I,J);
620 NEXT J
625 LET Q=4-(N-K)
630 GOSUB 645
635 NEXT I
640 GO TO 665
645 FOR H=1 TO Q
650 PRINT " ";
655 NEXT H
660 RETURN
665 PRINT
670 PRINT
675 PRINT
680 LET X=0
685 LET Y=0
690 LET U=0
695 FOR I=1 TO (N-1)
700 FOR J=(I+1) TO N
705 LET X=W(I,J)+X
710 LET Y=W(I,J)+Y
715 NEXT J
720 PRINT"AVERAGE RETURN FROM";Y1+(I-1);"=";X/(N-I)
725 LET U=(N-I)+U
730 PRINT
735 LET X=0
740 NEXT I
745 PRINT
```

```
750 PRINT" AVERAGE RETURN FOR ALL"
755 PRINT"POSSIBLE HOLDING PERIODS =";Y/U
760 PRINT
765 PRINT
770 PRINT"                    ----------------------------"
775 PRINT
780 PRINT
785 PRINT TAB(35);"AVERAGE";TAB(47);"STANDARD";TAB(61);"COEFF."
790 PRINT TAB(36);"RETURN";TAB(47);"DEVIATION";TAB(60);"VARIATION"
795 PRINT
800 LET U3=0
805 LET N2 = 0
810 LET X2 = 0
815 LET Y2 = 0
820 LET U2 = 0
825 FOR I = 1 TO (N-1)
830 FOR J = 1 TO N
835 IF J + I > N THEN 855
840 LET X2 = W(J,J+I) + X2
845 LET U2 = W(J,J+I) + U2
850 NEXT J
855 LET X2 = X2/(J-1)
860 FOR J = 1 TO N
865 IF J + I > N THEN 885
870 LET Y2 = (W(J,J+I)-X2)↑2+Y2
875 LET U3 = (W(J,J+I))↑2+U3
880 NEXT J
885 LET Y2 = SQR(Y2/(J-1))
890 PRINT "FOR ALL";I;"YEAR HOLDING PERIODS:";TAB(35);X2;TAB(47);Y2;
895 PRINT TAB(60);Y2/X2
900 PRINT
905 LET X2 = 0
910 LET Y2=C3=0
915 NEXT I
920 IF U-1 =0 THEN 930
925 LET C3=SQR((U*U3-U2*U2)/U/(U-1))
930 PRINT "FOR ALL POSSIBLE HOLDING PERIODS:";TAB(35);U2/U;TAB(47);C3;
935 PRINT TAB(60);C3/(U2/U)
940 PRINT
945 PRINT
950 PRINT
955 PRINT"------------------------------------------------------------"
1000 DATA 10,1962
1010 DATA 0,39.25
1020 DATA 1.02,43.65
1030 DATA 1.10,46.75
1040 DATA 1.20,60.125
1050 DATA 1.30,60.00
1060 DATA 1.30,58.00
1070 DATA 1.30,50.25
1080 DATA 1.30,49.125
1090 DATA 1.30,47.25
1100 DATA 1.40,66.50
9999 END
```

```
INVESTMENTS


RUN


DO YOU WANT INSTRUCTIONS FOR SUPPLYING DATA ?YES

FOR HOW MANY YEARS DO YOU WISH TO ENTER PRICE AND DIVIDEND
DATA, REMEMBERING THE NEED FOR A BASE YEAR. E.G., 10 YEARS
OF DATA ARE NEEDED TO GIVE 9 ANNUAL RETURNS. THE MAXIMUM
NUMBER OF YEARS IS 25.   ?10

WHAT IS THE FIRST YEAR FOR WHICH YOU WISH TO ENTER DATA ?1962

ENTER THE DIVIDEND PER SHARE (DPS) AND THE CLOSING SECURITY
PRICE (CSP), SEPERATED BY A COMMA, FOR EACH OF THE FOLLOWING
YEARS:

                DPS,  CSP

YEAR 1962 ?9,39.25
YEAR 1963 ?1.02,43.65
YEAR 1964 ?1.10,46.75
YEAR 1965 ?1.20,60.125
YEAR 1966 ?1.30,60.00
YEAR 1967 ?1.30,58.00
YEAR 1968 ?1.30,50.25
YEAR 1969 ?1.30,49.125
YEAR 1970 ?1.3,47.25
YEAR 1971 ?1.4,66.5


              RETURNS ON INVESTMENTS
            ---------------------------
          (ANNUAL RATES COMPOUNDED ANNUALLY)


   TO                1963       1964       1965       1966
FROM
          1962      .13808      .1172      .17721     .13695
          1963                  .09621     .19796     .13555
          1964                             ..31176    .15799
          1965                                        .00954
```

MORTGAGE:

DESCRIPTION

This program provides a rapid comparison of mortgage terms. All of the particulars of the mortgage are printed out for all combinations of the input mortgages.

USERS

This program can be used by anyone who is planning to purchase something that is very costly and for which payments would be spread out over a period of years rather then months. Purchasers of such items as: a house, a car, a boat, a piece of land, or even an airplane could benefit from the information provided by this program.

INSTRUCTIONS

When the program is run it will ask for all necessary problem data. For additional information list the program.

LIMITATIONS

Lines 230 to 510 contain DEF FNP and FNEND statements. Line 490 contains a Change P to P$ statement. Lines 540, 570 and 600 contain MAT Input statements. Line 610 contains a NUM( ) statement. The source code will require 3K Bytes of memory for storage and 4K Bytes will be required for execution.

MORTGAGE

```
110REM
120REM
130REM  DESCRIPTION--THIS BASIC PROGRAM COMPUTES AND PRINTS
140REM                MORTGAGE SCHEDULES FOR VARIOUS MORTGAGE
150REM                TERMS.
160REM
170REM  INSTRUCTIONS--ALL DATA IS ENTERED AS INPUT DURING RUN.
180REM
190REM*****************************************************************************
200REM
210 DIM Z(10),R(10),Y(10)
220 DIM P(15)
230 DEF FNP(P1,P9,P8)
240 LET P0 = 0
250 LET FNP = P1
260 IF P1 >= 0 THEN 290
270 LET P1 = ABS(P1)
280 LET P0 = 1
290 LET P(0) = P9 + P8 + 1
300 LET P2 = INT (P1*(10↑P8) + .5)
310 FOR P4 = 1 TO P8
320 LET P3 = P2 - INT (P2/10)*10
330 LET P(P9 + P8 + 2 - P4) = P3 + 48
340 LET P2 = INT(P2/10)
350 NEXT P4
360 LET P(P9+1) = 46
370 FOR P4 = 1 TO P9
380 LET  P3 = P2 - INT(P2/10)*10
390 LET P(P9 + 1 - P4) = P3 + 48
400 IF P2 = 0 THEN 430
410 LET P2 = INT(P2/10)
420 GO TO 480
430 IF P0 = 0 THEN 470
440 LET P(P9 + 1 - P4) = 45
450 LET P0 = 0
460 GO TO 480
470 LET P(P9 + 1 - P4) = 32
480 NEXT P4
490 CHANGE P TO P$
500 PRINT P$;
510 FNEND
520 REM
530 PRINT "AMOUNTS TO BE CONSIDERED";
```

```
540 MAT INPUT Z
550 LET Z0 = NUM(%)
560 PRINT "RATES TO BE CONSIDERED";
570 MAT INPUT R
580 LET R0 = NUM(%)
590 PRINT "YEARS TO BE CONSIDERED";
600 MAT INPUT Y
610 LET Y0 = NUM(%)
620 PRINT
630 PRINT
640 PRINT
650 PRINT
660 PRINT
670 FOR Z1 = 1 TO Z0
680 LET A = Z(Z1)
690 PRINT
700 PRINT "FOR A LOAN OF ";
710 LET O9 = FNP(A,7,2)
720 PRINT
730 PRINT
740 PRINT
750 PRINT "             NUMBER                                  DECREASE  INCREASE"
760 PRINT "INTEREST      OF     MONTHLY     TOTAL              MONTHLY   TOTAL"
770 PRINT "  RATE       YEARS   PAYMENT    INTEREST            PAYMENT   INTEREST"
780 FOR R9 = 1 TO R0
790 PRINT
800 LET R3 = R(R9)/1200
810 LET M2 = 0
820 FOR Y3 = 1 TO Y0
830 LET M = (A*R3) / (1-(1/(1+R3)↑(12*Y(Y3))))
840 LET I1 = M*12*Y(Y3) -A
850 LET O9 = FNP(R(R9),2,3)
860 PRINT "%";
870 LET O9 = FNP(Y(Y3),6,2)
880 LET O9 = FNP (M,7,2)
890 LET O9 = FNP(I1,8,2)
900 IF M2 = 0 THEN 930
910 LET O9 = FNP(M1-M,9,2)
920 LET O9 = FNP(I1 - I2,7,2)
930 LET M1 = M
940 LET I2 = I1
950 LET M2 = 1
960 PRINT
970 NEXT Y3
980 PRINT
990 NEXT R9
1000 PRINT
1010 NEXT Z1
1020 PRINT "DO YOU WISH TO CONSIDER ANOTHER SET OF TERMS";
1030 INPUT Z$
1040 IF Z$ >= "Y" THEN 530
1050 END
```

```
MORTGAGE


RUN



AMOUNTS TO BE CONSIDERED ?19500,30000
RATES TO BE CONSIDERED ?6,7.5
YEARS TO BE CONSIDERED ?20,30


FOR A LOAN OF    19500


                 NUMBER                                DECREASE    INCREASE
     INTEREST      OF       MONTHLY      TOTAL        MONTHLY     TOTAL
      RATE       YEARS      PAYMENT      INTEREST     PAYMENT     INTEREST

       6.000%    20.00       139.70      14028.99
       6.000%    30.00       116.91      22588.46       22.79       8559.47

       7.500%    20.00       157.09      18201.77
       7.500%    30.00       136.35      29584.87       20.74      11383.09

FOR A LOAN OF     30000.00


                 NUMBER                                DECREASE   INTEREST
     INTEREST      OF       MONTHLY      TOTAL        MONTHLY    TOTAL
      RATE       YEARS      PAYMENT      INTEREST     PAYMENT    INTEREST

       6.000%   20.00       214.93      21583.05
       6.000%   30.00       179.87      34751.47    35.06        13168.42

       7.500%   20.00       241.68      28002.73
       7.500%   30.00       209.76      45515.18    31.91        17512.45

DO YOU WISH TO CONSIDER ANOTHER SET OF TERMS ?NO
```

OPTIMIZE:

DESCRIPTION

Optimize calculates cost improvement savings on plant, office, store, etc. layouts. The savings is arrived at through more efficient placement of resources within the plant, office, store, etc.

USERS

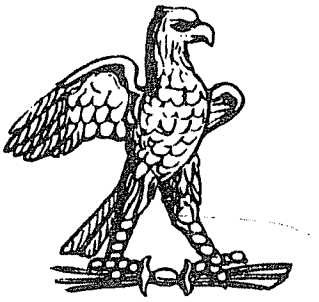
This program will be of value to managers of departments where materials are handled or transferred or where some type of exchange flows between departments within a business. This program could also be used by home and apartment owners to obtain the maximum usage of the space available.

INSTRUCTIONS

Enter your data in lines 5000 to 5500 before the program is run. List lines 70 to 109 for the required data format as well as input instructions. For additional information list the entire program. Lines 5000 to 5301 contain sample data and should be removed prior to entering your data. After your data has been entered type RUN. The current size of the DIM statements in line 250 sets the largest number of departments this program will handle at 40. For larger problems increase the dimensions accordingly.

LIMITATIONS

Line 250 contains two dimensional arrays. The program requires matrix operations. Line 310 MAT Read and line 460 MAT = ZER statements are present. In line 1000 an ON___GOTO statement is used. The program requires 8K Bytes of memory for storage. Execution length is a function of the DIM statements. With the present capability of 40 departments the program will require about 40K Bytes of on line memory for execution.



OPTIMIZE

```
5REM DESCRIPTION--VOLLMANN-RUML PLANT LAYOUT MODEL.  GIVES CHOICE OF
6REM THREE LAYOUT HEURISTICS: CRAFT; ANY IMPROVEMENT; AND RANKED
7REM PRODUCT.  YOU INPUT THE PLANT CONFIGURATION BY DEPARTMENTS; FLOW
8REM MATRIX FOR EXCHANGES AMONG DEPARTMENTS; COST WEIGHTINGS
9REM FOR EACH DEPARTMENT; AND THE STARTING SOLUTIONS.  ALLOWS FOR
10REM FIXED DEPARTMENTS.
11REM
70REM INSTRUCTIONS--
74REM DATA STATEMENTS BEGIN AT LINE 5000. SAMPLE DATA ARE CURRENTLY
75REM ENTERED IN LINES 5000-5301 INCLUSIVE AND SHOULD BE
76REM EXCHANGED FOR DATA PERTINENT TO THE PROBLEM AT HAND.  THE
77REM PROGRAM WILL HANDLE LAYOUTS WITH 40 DEPARTMENTS WITHOUT
78REM CHANGING THE DIM STATEMENTS.
79REM
80REM     1. LINE 5000: THE RECTANGULAR DIMENSIONS OF THE LAYOUT
81REM        AREA (NUMBER OF DEPARTMENTS ALONG THE SIDE BORDER OF
82REM        THE PLANT AND THE NUMBER OF DEPARTMENTS ALONG THE TOP
83REM        BORDER OF THE PLANT) AND THE NUMBER OF STARTING
84REM        SOLUTIONS.  THE EXAMPLE IS FOR A 2 BY 3 PLANT WITH
85REM        2 STARTING SOLUTIONS.
86REM
87REM     2. LINE 5100: THE FLOW MATRIX (MEASURED IN PRODUCTS
88REM        HANDLED; FACE TO FACE CONTACTS; OR SOME OTHER APPROPRIATE
89REM        MEASURE) FROM EACH DEPARTMENT TO THE OTHER DEPARTMENTS.
91REM     3. LINE 5200: THE COST VECTOR GIVING THE COST WEIGHTINGS FOR
92REM        EACH DEPARTMENT
93REM
94REM     4. LINE 5300: THE STARTING SOLUTIONS. THE NUMBER OF THE
95REM        DEPARTMENT IN EACH LOCATION (DEPT.1 IN LOCATION 1,
96REM        DEPT. 2 IN LOCATION 2, ETC.,WOULD GIVE 1,2,3,4,ETC.
97REM        DEPT. 1 IN LOCATION 3 AND DEPT.3 IN LOCATION 1 WOULD
98REM        GIVE 3,2,1,4,ETC.).  THE DEPARTMENTS WHICH ARE FIXED AND
99REM        WHOSE LOCATION CAN NOT BE EXCHANGED MUST ALSO BE INDICATED
100REM       AFTER THE LOCATIONS BY INDICATING THE TOTAL NUMBER OF
101REM       FIXED DEPARTMENTS, AND THEIR RESPECTIVE NUMBERS.  IF NO
102REM       DEPARTMENTS ARE FIXED, A 0 MUST BE ENTERED. EXAMPLE:
103REM
104REM         1,2,3,4,5,6,0   MEANS NO FIXED DEPARTMENTS.
105REM
106REM         3,2,1,4,5,6,2,2,4   MEANS TWO FIXED DEPTS.,2 AND 4
107REM         IN LOCATIONS 2 AND 4 RESPECTIVELY
108REM
109REM * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
200 PRINT "THIS  WILL HANDLE THREE LAYOUT HEURISTICS:"
```

```
210 PRINT "CRAFT (=1), ANY IMPROVEMENT (=2), AND RANKED PRODUCT (=3)."
220 PRINT
230 PRINT "WHICH HEURISTIC 1, 2, OR 3.";
240 INPUT Z0
250 DIM A(40,40),C(40,40),B(40),S(40,40),P(40),Q(40),F(200,3),X(40)
260 REM #ROWS, #COLUMNS, #STARTING SOLUTIONS
270 READ M1,M2,Z9
280 LET M9=M1*M2
290 LET M7=M9
300  REM FLOW MATRIX
310 MAT READ A(M9,M9)
320 REM COST VECTOR
329 FOR I=1 TO M9
330 READ B(I)
331 NEXT I
340 FOR I =1 TO M9
350 FOR J= 1 TO M9
360REM COST WEIGHT FLOW MATRIX, FROM-TO
370 LET C(I,J)=B(I)*A(I,J)
380 NEXT J
390 NEXT I
400 FOR J=1 TO M9-1
410 FOR I=J+1 TO M9
420REM COST WEIGHT FLOW MATRIX, BETWEEN
430 LET C(I,J)=C(I,J)+C(J,I)
440 NEXT I
450 NEXT J
460 MAT A=ZER
470 LET K=0
480  REM INITIAL STARTING SOLUTION
489 FOR I=1 TO M9
490 READ P(I)
491 NEXT I
500 FOR I=1 TO M1
510 FOR J=1 TO M2
520 LET K=K+1
530REM INITIAL LAYOUT MATRIX
540 LET A(I,J)=P(K)
550 NEXT J
560 NEXT I
570 LET K=0
580 FOR K=1 TO M9
590 FOR I=1 TO M1
600 FOR J=1 TO M2
610 IF A(I,J)=K THEN 640
620 NEXT J
630 NEXT I
640 LET V=I
650 LET W=J
660 FOR H=1 TO M9
670 FOR I=1 TO M1
```

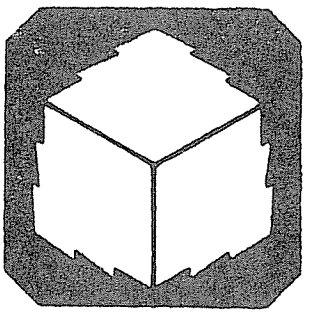
```
680 FOR J=1 TO M2
690 IF A(I,J)=H THEN 730
700 NEXT J
710 NEXT I
720 REM DISTANCE MATRIX
730 LET S(K,H)=ABS(U-I)+ABS(W-J)
740 NEXT H
750 NEXT K
760 FOR I=1 TO M9-1
770 FOR J=I+1 TO M9
780 REM COST WEIGHTED FLOW DISTANCE MATRIX
790 LET C(I,J)=S(I,J)
800 NEXT J
810 NEXT I
820 FOR Z1=1 TO Z9
830 IF Z1=1 THEN 860
840 REM LAYOUT FOR OTHER STARTING SOLUTIONS
849 FOR I=1 TO M9
850 READ P(I)
851 NEXT I
860 FOR I=1 TO M9
870 LET X(I)=0
880 LET Q(P(I))=I
890 NEXT I
900 REM DEPARTMENT TO BE FIXED
910 READ F9
915 IF F9 = 0 THEN 960
920 FOR I=1 TO F9
930 READ A
940 LET X(A)=-2
950 NEXT I
960 PRINT
970 PRINT "STARTING SOLUTION";Z1
980 PRINT"----------------------"
990 GOSUB 1370
1000 ON Z0 GOTO 2680,2630,1020
1010 REM *MASTER RANKED PRODUCT*
1020 GOSUB 2230
1030 LET K3=0
1040 FOR I1=1 TO 2
1050 LET N1=J8=0
1060 LET J9=0
1070 LET I9=F(I1,0)
1080 IF X(I9)<-1 THEN 1210
1090 LET X(I9)=-1
1100 FOR I5=1 TO M9
1110 IF I5=I9 THEN 1160
1120 IF X(I5)<=-1 THEN 1160
1130 GO SUB 1990
1140 IF J6<=J8 THEN 1160
1150 GOSUB 1500
```

```
1160 NEXT I5
1170 IF N1=0 THEN 1210
1180 FOR J2=1 TO N1
1190 GOSUB 1600
1200 NEXT J2
1210 NEXTI1
1220 IF K3=0 THEN 1240
1230 GOTO 1020
1240 FOR I=1 TO 2
1250 LET K3=0
1260 GOSUB2510
1270 IF K3<=0 THEN 1290
1280 NEXT I
1290 REM *TERMINATE*
1300 PRINT
1310 PRINT"FINAL LAYOUT"
1320 GO SUB 1890
1330 LET M7=M9
1340 NEXT Z1
1350 STOP
1360 REM SUBROUTINE *COST*  CALCULATE INITIAL COST
1370 LET S9=J2=0
1380 FOR X1=1 O M9-1
1390 FOR X2=X1+1 TO M9
1400 IF Q(X1)>=Q(X2) THEN 1430
1410 LET S9=S9+C(Q(X1),Q(X2))*C(X2,X1)
1420 GOTO 1440
1430 LET S9=S9+C(Q(X2),Q(X1))*C(X2,X1)
1440 NEXT X2
1450 NEXT X1
1460 PRINT
1470 PRINT"INITIAL LAYOUT:"
1480 GOSUB 1890
1490 RETURN
1500 REM SUBROUTINE *SWITCH*  SET UP SWITCH TABLE
1510 LET N1=N1+1
1520 LET F(N1,1)=I9
1530 LET F(N1,2)=I5
1540 LET F(N1,3)=J6
1550 IF J6<=J9 THEN 1580
1560 LET J9=J6
1570 LET J8=.2*J9
1580 RETURN
1590 REM SUBROUTINE *EXCHANGE*  MAKE THE SWITCH
1600 LET J7=0
1610 FOR I=1 TO N1
1620 IF F(I,3)<J7 THEN 1650
1630 LET J7=F(I,3)
1640 LET I4=I
1650 NEXT I
1660 IF J7<=0 THEN 1770
```

```
1670 LET I9=F(I4,1)
1680 LET I5=F(I4,2)
1690 IF J2<=1 THEN 1730
1700 GOSUB 1990
1710 IF J6<=0 THEN 1760
1720 GOTO 1750
1730 LET J6=J7
1740 LET J2=1
1750 GOSUB 1790
1760 LET F(I4,3)=-1
1770 RETURN
1780 REM SUBROUTINE *EXCHANGER*
1790 LET E1=O(I9)
1800 LET P(E1)=I5
1810 LET E2=O(I5)
1820 LET P(E2)=I9
1830 LET O(I9)=O(I5)
1840 LET O(I5)=E1
1850 LET S9=S9-J6
1860 LET K3=K3+1
1870 RETURN
1880 REM SUBROUTINE *PRINT*  PRINT THE LAYOUT
1890 FOR I=1 TO M9 STEP M2
1900 FOR J=I TO I+(M2-1)
1910 PRINT TAB((J-I)*4);P(J);
1920 NEXT J
1930 PRINT
1940 NEXT I
1950 PRINT"THE AVERAGE COST OF THE CURRENT LAYOUT IS";S9
1960 PRINT
1970 RETURN
1980  REM SUBROUTINE *PAIR-WISE EXCHANGE* CALCULATE ALL P-W EX.
1990 LET J6=0
2000 FOR J=1 TO M9
2010 IF I5=J THEN 2200
2020 IF I9=J THEN 2200
2030 IF O(J)>O(I5) THEN 2060
2040 LET D1=C(O(J),O(I5))
2050 GOTO 2070
2060 LET D1=C(O(I5),O(J))
2070 IF O(J)>O(I9) THEN 2100
2080 LET D2=C(O(J),O(I9))
2090 GOTO 2110
2100 LET D2=C(O(I9),O(J))
2110 IF J>I5 THEN 2140
2120 LET C1=C(I5,J)
2130 GOTO 2150
2140 LET C1=C(J,I5)
2150 IF J>I9 THEN 2180
2160 LET C2=C(I9,J)
2170 GOTO 2190
```

```
2180 LET C2=C(J,I9)
2190 LET J6=J6+(C1-C2)*(D1-D2)
2200 NEXT J
2210 RETURN
2220 REM SUBROUTINE *PRODUCT*  SET UP THE PRODUCT TABLE
2230 FOR I=1 TO M9
2240 LET F(I,1)=0
2250 IF X(I)<=-1 THEN 2380
2260 FOR J=1 TO M9
2270 IF I=J THEN 2370
2280 IF Q(I)>Q(J) THEN 2310
2290 LET D1=C(Q(I),Q(J))
2300 GOTO 2320
2310 LET D1=C(Q(J),Q(I))
2320 IF D1=1 THEN 2370
2330 IF I>J THEN 2360
2340 LET F(I,1)=F(I,1)+C(J,I)*D1
2350 GOTO 2370
2360 LET F(I,1)=F(I,1)+C(I,J)*D1
2370 NEXT J
2380 NEXT I
2390 FOR I=1 TO 2
2400 FOR J=1 TO M7
2410 IF J2>F(J,1) THEN 2440
2420 LET J2=F(J,1)
2430 LET I4=J
2440 NEXT J
2450 LET F(I,0)=I4
2460 LET F(I4,1)=0
2470 LET J2=0
2480 NEXT I
2490 LET M7=M7-2
2500 RETURN
2510 REM SUBROUTINE *ANY EXCHANGE*
2520 FOR I9=1 TO M9-1
2530 IF X(I9)=-2 THEN 2600
2540 FOR I5=I9+1 TO M9
2550 IF X(I5)=-2 THEN 2590
2560 GOSUB 1990
2570 IF J6<=0 THEN 2590
2580 GOSUB 1790
2590 NEXT I5
2600 NEXT I9
2610 RETURN
2620 REM *MASTER--NATURAL SELECTION*
2630 LET K3=0
2640 GOSUB 2510
2650 IF K3>0 THEN 2620
2660 GOTO 1290
2670 REM *MASTER--CRAFT*
2680 LET J9=0
```

```
2690 FOR I9=1 TO M9-1
2695 IF X(I9)=-2 THEN 2770
2700 FOR I5=I9+1 TO M9
2705 IF X(I5)=-2 THEN 2760
2710 GOSUB 1990
2720 IF J6<=J9 THEN 2760
2730 LET J9=J6
2740 LET I4=I5
2750 LET I8=I9
2760 NEXT I5
2770 NEXT I9
2780 IF J9<=0 THEN 1290
2790 LET J6=J9
2800 LET I5=I4
2810 LET I9=I8
2820 GOSUB 1790
2830 GO TO 2680
4990 REM ********************DATA**********************
5000 DATA 2,3,2
5100 DATA 0,10,5,15,30,60
5101 DATA 50,0,50,5,10,75
5102 DATA 0,75,0,10,15,80
5103 DATA 100,120,90,0,10,20
5104 DATA 40,10,15,60,0,10
5105 DATA 65,30,10,5,45,0
5200 DATA 2.50,1.50,1.75,4.50,3.50,4.00
5300 DATA 1,2,3,4,5,6,0
5301 DATA 3,2,1,4,5,6,2,2,4
9999 END
```



```
OPTIMIZE



RUN


OPTIMIZE WILL HANDLE THREE LAYOUT HEURISTICS:
CRAFT (=1), ANY IMPROVEMENT (=2), AND  RANKED PRODUCT (=3).

WHICH HEURISTIC  1,   2, OR 3  ?2

STARTING SOLUTION   1
--------------------------

INITIAL LAYOUT:
      1      2      3
      4      5      6
THE AVERAGE COST OF THE CURRENT LAYOUT IS  6383.75



FINAL LAYOUT
      3      4      2
      5      1      6
THE AVERAGE COST OF THE CURRENT IS 4881.25


STARTING SOLUTION    2
-------------------------


INITIAL LAYOUT:
      3      2      1
      4      5      6
THE AVERAGE COST OF THE CURRENT LAYOUT IS  6053.75


FINAL LAYOUT
      3      2      6
      4      1      5
THE AVERAGE COST OF THE CURRENT LAYOUT IS  5355
```

ORDER:

DESCRIPTION

This unique program calculates the optimum order quantity for a group of goods, each with different supplier discounts. The order quantity for various goods is a function of how fast the individual items move, their discount order prices, available total inventory, etc. All of the variables that enter into determining the optimum order quantity are taken into consideration; including the cost of holding goods in inventory.

USERS

Individuals who order goods periodically can use this program to keep their cost as economically low as possible. This would include businessmen, housewives, manufacturing concerns, Radio & Television sales and repair shops, wholesalers, etc.

INSTRUCTIONS

Enter your data into DATA statements, starting in line 100 before the program is run. The format for the data entry is as follows:

```
100  DATA    N,D,C,O
105  DATA    U(N),V(N),A(N)
106  DATA    U(N-1),V(N-1),A(N-1)
200  DATA    M(D),P(D)
```

where

N = number of items
D = number of supplier discounts (Ø-8)
C = carrying cost (% of price)
O = ordering cost

U(N) = unit index (order quantity multiplier)
V(N) = item selling price
A(N) = annual demand
M(D) = minimum number will ship
P(D) = discount in percent from price

After the data has been entered into the program type RUN.

LIMITATIONS

Starting in line 1090 there is a Print Using statement. This statement is used extensively throughout this program. This program should store and execute in 8K Bytes of memory.

ORDER

```
1020 DIM P(60),R(60),O(60)
1030 READ N1,N2,C1,C2
1040 REM N1 = NUMBER OF ITEMS
1050 REM N2 = NUMBER OF DISCOUNTS
1060 REM C1 = CARRYING COST
1070 REM C2 = ORDERING COST
1080 B$="MAY"
1090PRINTUSING1100,C1;
1100:THE CARRYING COST IS####
1110 PRINT" PER CENT OF ITEM VALUE."
1120 PRINT"THE ORDERING COST IS";
1130PRINTUSING1140,C2
1140:###.## DOLLARS
1150PRINT
1160LETC1=C1/100
1170LETN2=N2+1
1180IFN1=1THEN1250
1190PRINTUSING1220
1200PRINTUSING1230
1210PRINTUSING1240
1220:: ITEM : UNIT   :   ITEM    : ANNUAL :
1230::   NO  : INDEX :   VALUE   : DEMAND :
1240::=======:=======:==========:=========:
1250FORI=1TON1
1260READU,C9,E9
1270 REM U  = UNIT INDEX
1280 REM C9 = ITEM PRICE
1290 REM E9 = ANNUAL DEMAND
1300IFN1=1THEN1340
1310PRINTUSING1320,I,U,C9,E9
1320::####  :###.##  :######.##  :#######  :
1330GOTO1380
1340 PRINTUSING 1360,C9
1350 PRINTUSING 1370,E9
1360:ITEM PRICE    :###.## FRANCS.
1370:ANNUAL DEMAND:#### ITEMS.
1380LETC=C+C9*E9
1390LETE=E+U*E9
1400NEXTI
1410PRINT
1420LETC=C/E
1430LETA=C*C1/2
1440LETB=E*C2
1450LETE9=SQR(B/A)
1460LETC=52/E
```

```
1470FORI=2TON2
1480READM(I),T
1490PRINTUSING1500,M(I),T
1500:FROM##### UNITS THE SUPPLIER OFFERS A DISCOUNT OF ## PER CENT.
1510LETT(I)=1-T/100
1520IFM(I)>ETHEN1550
1530NEXTI
1540LETI=I+1
1550LETN2=I-1
1560 PRINT
1570LETM(N2+1)=E
1580LETT(1)=1
1590LETN(1)=A/G+B*G
1600FORI=1TON2
1610IFN2=1THEN1640
1620PRINTUSING1630,M(I),M(I+1)
1630:IN THE INTERVAL FROM##### TO#####
1640LETE(I)=E9/SQR(T(I))
1650LETN(I+1)=A*T(I)*M(I+1)+B/M(I+1)
1660IF(E(I)-M(I))*(E(I)-M(I+1))<0THEN1720
1670IFE(I)<M(I)THEN1710
1680 PRINT" THERE IS NO EOQ."
1690LETE(I)=0
1700GOTO1810
1710LETE(I)=M(I)
1720LETF(I)=A*T(I)*E(I)+B/E(I)
1730LETK=G*E(I)
1740PRINTUSING1750,E(I)
1750: THE ECONOMIC ORDER QUANTITY IS ###.## INDEX UNITS
1760LETE(I)=INT(K+.5)
1770PRINTUSING1780,F(I)
1780:    CORRESPONDING TO A TOTAL COST OF#####.## DOLLARS
1790 PRINT USING 1800,K
1800:    AND AN ORDER EVERY ##.# WEEK.
1810PRINT
1820LETM(I)=INT(M(I)*G+.5)
1830NEXTI
1840LETM(N2+1)=INT(M(N2+1)*G+.5)
1850LETA=A/G
1860LETB=B*G
1870LETM2=2*A+B/2
1880LETM1=52*A*T(N2)+B/52
1890FORI=1TON2
1900IFF(I)=0THEN1930
1910IFM1<F(I)THEN1930
1920LETM1=F(I)
1930IFM2>N(I+1)THEN1950
1940LETM2=N(I+1)
1950NEXTI
1960LETR8=3.75
1970LETM9=M1
```

```
1980LETM1=M9
1990LETR=M2-M1
2000LETR1=R/R8
2010LETR2=10↑INT(LOG(R1)/2.3025851)
2020LETR3=R1/R2
2030LETR4=2↑INT(LOG(R3)/.69314718)
2040LETR=R2*R4/4
2050LETM2=R*INT(M2/R+1)
2060LETM1=R*INT(M1/R-1)
2070LETM(1)=1
2080FORK=1TON2
2090LETC=A*T(K)
2100LETX=M(K+1)-1
2110FORI=M(K)TOX
2120LETP(I)=C*I+B/I
2130NEXTI
2140NEXTK
2150LETX=N2-1
2160FORK=1TOX
2170FORI=P(M(K+1))TON(K+1)STEPR
2180LETI9=I9+1
2190LET R(I9)=M(K+1)
2200LETR(I9)=M(K+1)
2210LETO(I9)=I
2220NEXTI
2230NEXTK
2240 PRINT"HORIZONTAL: ORDER FREQUENCY   (IN WEEKS)."
2250 PRINT"VERTICAL  : TOTAL ANNUAL COST (IN DOLLARS)"
2260PRINT
2270LETI1=1
2280LETI2=53
2290LETP(I2)=P(I1)
2300FORK=M2TOM1+RSTEP-R
2310LETK1=K+R/2
2320LETK2=K1-R
2330PRINTUSING2340,K,
2340:########## :
2350FORI=I1TOI2
2360IFP(I)>K1THEN2390
2370LETI1=I
2380GOTO2400
2390NEXTI
2400FORI=I2TOI1
2410IFP(I)<K2THEN2430
2420LETI2=I
2430GOTO2450
2440NEXTI
2450FOR I=I1TOI2
2460LETX=N2+1
2470FORN=1TOX
2480IFI<>E(N)THEN2520
```

```
2490IF(F(N)-K1)*(F(N)-K2)>0THEN2520
2500LETA$="E"
2510GOTO2670
2520IFI<>M(N)THEN2560
2530IF(N(N)-K1)*(N(N)-K2)>0THEN2560
2540LETA$="-"
2550GOTO2670
2560NEXTN
2570IF(P(I)-K1)*(P(I)-K2)>0THEN2600
2580LETA$="*"
2590GO TO 2670
2600FORN=1TOI9
2610IFI<>R(N)THEN2650
2620IF(Q(N)-K1)*(Q(N)-K2)>0THEN2650
2630LETA$="I"
2640GOTO2670
2650NEXTN
2660GOTO2680
2670PRINTTAB(10+I);A$;
2680NEXTI
2690PRINT
2700NEXTK
2710PRINT"==========:----------------------------------------------------"
2720PRINT"          1          13          26          39          52"
2730PRINT
2740 IF B$="YES" THEN 2830
2750 PRINT"DO YOU WANT TO ENLARGE THE CURVE - ANSWER YES OR NO";
2760INPUTB$
2770PRINT
2780 IF B$="NO" THEN 2830
2790LETM2=(9*M9+M2)/10
2800LETR8=2.5
2810GOTO1980
2820 PRINT
2830 PRINT"HOW MANY WEEKS SHALL YOUR ORDER COMPRISE";
2840INPUTN
2850PRINT
2860RESTORE
2870 READ N1,N2,C1,C2
2880PRINTUSING2890,N
2890:##.# WEEKS CORRESPONDS TO THE FOLLOWING ORDER:
2900FORI=1TON1
2910READU,U,U
2920 PRINT USING 2930,N*U/52,I
2930:   ########.##   OF ITEM NUMBER####
2940NEXTI
2950 END
```

PERT TREE:

DESCRIPTION

This program analyzes a pert network. Each event in the network will have four variables computed for it. They are as follows:

TE = the earliest time of completion

V = the variance associated with TE

TL = the latest allowable time for completion

Slack = TL - TE

USERS

Persons who set up schedules will find this program very helpful, especially if there are several different alternatives possible. This would include construction firms, drafting and consulting companies, manufacturers, etc. to name just a few. This program could also be used to keep tabs on a home construction project, such as building an extension onto a house or adding a garage. Here, materials would have to be ordered and the electricians and carpenters would have to be scheduled. Some of the events could proceed ahead of others and some couldn't. If the project was analyzed on a Pert Tree the maximum amount of slippage for each event would be known as well as critically timed events.

INSTRUCTIONS

Enter your data starting in line 3000 before running the program. List lines 170 to 1590 before you enter your data. For additional program information list Pert Tree. Before you enter your data you should draw a picture of the chain of events to make sure you have included all information about the intended project.

LIMITATIONS

Line 70 contains a Restore statement. Line 1610 contains a DIM E(18,13) statement. The source code for this program will require 9K Bytes for storage. The program should execute in about 13K Bytes of memory space in most systems.

PERT TREE

```
30 PRINT TAB(25);"PERT ANALYSIS PROGRAM"
40 PRINT
50 PRINT
60 READ T
70 RESTORE
80 IF T <> 4E36 *HEN 1600
90 PRINT
100 PRINT "ENTER DATA STARTING IN LINE 3000."
110 PRINT
120 PRINT "FOR PROGRAM DESCRIPTION AND INSTRUCTIONS TYPE:"
130 PRINT
140 PRINT "LIST 170-1590"
150 STOP
160 GO TO 1600
170 REM
180 REM                    PROGRAM DOCUMENTATION
190 REM
200 REM          THIS PROGRAM ANALYZES A PERT NETWORK.  THE ANALYSIS
210 REM      IS ADOPTED FROM THE PROGRAM AS SET FORTH IN MC MILLAN
220 REM      AND GONZALES (PAGES 189 TO 211).
230 REM
240 REM          FOLLOWING THE CONVENTION AS DELINEATED IN M &G,
250 REM      A CIRCLE CORRESPONDS TO A 'COMPLETION EVENT' AND
260 REM      AN ARROW CORRESPONDS TO AN 'ACTIVITY'.  IN THE
270 REM      NETWORK ANALYSIS TWO PARAMETERS ARE ASSOCIATED
280 REM      WITH EACH TIME CONSUMING ACTIVITY: A MEAN AND A
290 REM      VARIANCE.
300 REM
310 REM          FOR EACH EVENT IN  YOUR NETWORK, THE PROGRAM
320 REM      WILL DETERMINE THE FOLLOWING VARIABLES FOR YOU:
330 REM
340 REM        1)  TE = THE EARLIEST EXPECTED TIME OF OCCURRENCE
350 REM                 OF COMPLETION EVENT X.
360 REM
370 REM        2)  V = THE VARIANCE ASSOCIATED WITH THE TE OF THE
380 REM                 EVENT.
390 REM
400 REM        3)  TL = THE LATEST EXPECTED TIME WHICH A COM-
410 REM                 PLETION EVENT CAN BE ALLOWED TO OCCUR
420 REM                 WITHOUT DISTURBING THE TE OF THE FINAL
430 REM                 EVENT OF THE NETWORK.
440 REM
450 REM        4)  SLACK = TE-TL
```

```
460 REM
470 REM       THE ABOVE MENTIONED VARIABLE TE MUST NOT BE CONFUSED
480 REM     WITH T(E).  THE VALUE T(E) IS THE EXPECTED AMOUNT OF
490 REM     TIME REQUIRED FOR THE COMPLETION OF A SINGLE ACTIVITY,
500 REM     INDEPENDENT OF WHAT HAS OCCURRED BEFORE IT.  THE DATA
510 REM     FOR T(E) OF EACH EVENT WILL BE ENTERED BY YOU AS
520 REM     DESCRIBED BELOW.  THE SAME NOMENCLATURE IS USED WITH
530 REM     V AND V(E).
540 REM
550 REM       IN THIS PROGRAM NO EVENT CAN HAVE MORE THAN TWO
560 REM     IMMEDIATE PREDECESSOR EVENTS OR MORE THAN TWO
570 REM     IMMEDIATE SUCCESSOR EVENTS.  TO USE THIS PROGRAM WITH
580 REM     MORE COMPLEX NETWORKS CONTAINING MORE THAN TWO
590 REM     IMMEDIATE PREDECESSOR OR SUCCESSOR EVENTS, ENTER
600 REM     A NUMBERED 'DUMMY' EVENT THAT HAS A T(E) =0 AND
610 REM     A V(E) =0.
620 REM
630 REM       FOR EXAMPLE, IF EVENTS 1, 2 AND 3 PRECEED EVENT 5
640 REM     THEN ENTER A 'DUMMY' EVENT 4, OF ZERO (0) TIME FOR
650 REM     COMPLETION AND ZERO (0) VARIANCE, SUCH THAT EVENTS
660 REM     1 AND 2, OR 1 AND 3, OR 2 AND 3 PRECEED EVENT 4.
670 REM     THEN EVENT 5 WILL HAVE ONLY TWO PRECEEDING EVENTS AS
680 REM     ALLOWED BY THE PROGRAM.  (IE, EVENT 5 WILL BE PRECEEDED
690 REM     BY 1 AND 4, OR 2 AND 4, OR 3 AND 4)  --SEE PAGE 197
700 REM     OF M & G.
710 REM
720 REM       BEGINNING IN LINE 3000 ENTER THE DATA.  FIRST ENTER
730 REM     T, THE TOTAL NUMBER OF EVENTS IN THE NETWORK INCLUDING
740 REM     DUMMY EVENTS IN LINE 3000.
750 REM
760 REM       THEN BEGINNING WITH THE FINAL EVENT AS NUMBER ONE,
770 REM     ( 1 ), ENTER IN LINE 3001 THE FOLLOWING 8 PIECES OF
780 REM     INFORMATION ABOUT THE EVENT IN THE ORDER INDICATED,
790 REM     ALL ON LINE 3001.  REPEAT THIS SEQUENCE, ENTERING THE
800 REM     8 PIECES OF DATA FOR EACH OF THE REMAINING EVENTS ON A
810 REM     SINGLE LINE.  INCREMENT LINE NUMBERS BY 1 AFTER LINE
820 REM     3001.
830 REM
840 REM     1)  THE NUMBER OF THE EVENT'S FIRST IMMEDIATE
850 REM         PREDECESSOR EVENT.
860 REM
870 REM     2)  THE T(E) ASSOCIATED WITH THE ACTIVITY BOUNDED
880 REM         BY THIS COMPLETION EVENT AND ITS FIRST
890 REM         IMMEDIATE PREDECESSOR EVENT.
900 REM
910 REM     3)  THE VARIANCE V(E) ASSOCIATED WITH THE ACTIVITY
920 REM         BOUNDED BY THIS COMPLETION EVENT AND ITS FIRST
930 REM         IMMEDIATE PREDECESSOR EVENT.
940 REM
950 REM     4)  THE NUMBER OF THE EVENT'S SECOND IMMDEIATE
960 REM         PREDECESSOR EVENT.  IF NONE, ENTER ZERO.
```

```
970 REM
980 REM      5) THE T(E) ASSOCIATED WITH THE ACTIVITY BOUNDED BY
990 REM         THIS COMPLETION EVENT AND ITS SECOND IMMEDIATE
1000 REM         PREDECESSOR EVENT.  IF NONE, ENTER ZERO.
1010 REM
1020 REM      6) THE VARIANCE V(E) ASSOCIATED WITH THE ACTIVITY
1030 REM         BOUNDED BY THIS COMPLETION EVENT AND ITS SECOND
1040 REM         IMMEDIATE PREDECESSOR EVENT. IF UNKNOWN, ENTER ZERO.
1050 REM
1060 REM      7) THE TE OF THE EVENT, WHERE KNOWN.
1070 REM         IF UNKNOWN, ENTER ZERO.
1080 REM
1090 REM      8) THE VARIANCE V ASSOCIATED WITH THE EVENT, WHERE
1100 REM         KNOWN.  IF UNKNOWN, ENTER ZERO.
1110 REM
1120 REM         THE LAST EVENT (ACTUALLY ENTERED FIRST, AS ABOVE)
1130 REM      MUST BE LABELED ONE.  THE OTHER EVENTS NEED NOT HAVE
1140 REM      ANY ORDER.  REMEMBER, WHEN ENTERING THE DATA THAT YOU
1150 REM      ENTER T (LINE 3000), THE 8 PIECES OF DATA FOR EVENT
1160 REM      1 (LINE 3001), THEN 8 FOR EVENT 2 (LINE 3002), THEN
1170 REM      8 FOR EVENT 3 (LINE 3003), ETC., IN STRICT
1180 REM      SEQUENTIAL EVENT NUMBER ORDER, REGARDLESS OF THE
1190 REM      PHYSICAL LAYOUT ORDER OF THE NETWORK EVENTS.
1200 REM
1210 REM      T(E) IS DEFINED AS;  T(E) = ( A + 4*M + B )/6, WHERE
1220 REM
1230 REM      A = MOST OPTIMISTIC TIME FOR COMPLETION OF THE ACTIVITY
1240 REM      B = MOST PESSEMISTIC TIME FOR COMPLETION OF THE
1250 REM          ACTIVITY
1260 REM      C = MOST LIKELY TIME FOR COMPLETION OF THE ACTIVITY
1270 REM
1280 REM      VARIANCE = V(E) = ((B-A)/6)↑2, WHERE A AND B ARE
1290 REM      DEFINED AS ABOVE.
1300 REM
1310 REM
1320 REM           AT LEAST ONE EVENT IN THE NETWORK MUST HAVE ITS
1330 REM      EARLIEST COMPLETION TIME SPECIFIED ( I.E. AT LEAST
1340 REM      ONE EVENT'S TE MUST BE KNOWN.
1350 REM
1360 REM           IF HOWEVER, NO EVENT HAS A SPECIFIED TE, LET THE
1370 REM      THE TE OF THE INITIAL EVENT IN THE NETWORK BE
1380 REM      SPECIFIED AS ONE, ( 1 ).  THUS, THE INITIAL EVENT IN
1390 REM      THE NETWORK WOULD HAVE IN ITS SEVENTH DATA LOCATION
1400 REM      A ONE, INSTEAD OF A ZERO.  (IE, ASSUME EVENT NUMBER
1410 REM      9 IS THIS FIRST EVENT IN THE NETWORK AND STARTS AT
1420 REM      TIME ZERO, ITS DATA FORM WOULD LOOK LIKE
1430 REM      XXXX DATA ------0-, HOWEVER, FOR THE PROGRAM TO
1440 REM      OPERATE THE EVENT WOULD HAVE TO BE ASSIGNED AN
1450 REM      ARBITRARY TE, SAY 1, ITS CORRECT DATA STATEMENT
1460 REM      WOULD TAKE THE FORM;  XXXX DATA ------1-.
1470 REM
```

```
1480 REM
1490 REM          DON'T FORGET TO ENTER 'T', THE NUMBER OF EVENTS
1500 REM     IN THE NETWORK.  EACH EVENT IN THE NETWORK MUST HAVE
1510 REM     8 PIECES OF DATA ENTERED FOR IT.
1520 REM
1530 REM          IF THERE ARE MORE THAN TEN EVENTS IN THE NETWORK
1540 REM     ENTER A DIM STATEMENT IN LINE  1600 SUCH THAT E(T,13),
1550 REM     P(T) AND S(T) ARE DIMENSIONED, WHERE T=NUMBER OF EVENTS.
1560 REM     FOR EXAMPLE, IF YOUR NETWORK HAS 18 EVENTS, THE
1570 REM     DIM STATEMENT WOULD BE DIM E(18,13),P(18),S(18).
1580 REM     AFTER THE DATA HAS BEEN ENTERED, TYPE: RUN
1590 REM
1600 READ T
1610 DIM E(18,13),P(18),S(18)
1620 FOR N= 1 TO T
1630 FOR I= 1 TO 8
1640 READ E(N,I)
1650 NEXT I
1660 FOR I= 9 TO 13
1670 LET E(N,I) = 0
1680 NEXT I
1690 NEXT N
1700 REM FIND TE
1710 FOR I= 1 TO T
1720 LET P(I) = 0
1730 NEXT I
1740 LET I = 1
1750 LET P(1)  = 1
1760 LET N = 1
1770 LET N = E(N,1)
1780 LET I = I + 1
1790 LET P(I) = N
1800 IF E(N,7) = 0 THEN 1770
1810 LET I = I - 1
1820 IF I = 0 THEN 2190
1830 LET N = P(I)
1840 IF S(N) = 2 THEN 2030
1850 IF E(N,4) <> 0 THEN 1890
1860 LET E(N,7) = E(N,2) + E(P(I+1),7)
1870 LET E(N,8) =  E(N,3) + E(P(I+1),8)
1880 GO TO 1810
1890 LET A = E(P(I+1),7) + E(N,2)
1900 LET F = E(P(I+1),8) + E(N,3)
1910 LET N = E(N,4)
1920 LET I = I + 1
1930 LET P(I) = N
1940 IF E(N,7) <> 0 THEN 1970
1950 LET S(P(I-1)) = 2
1960 GO TO 1770
1970 LET I = I - 1
1980 IF I = 0 THEN 2090
```

```
1990 LET N=P(I)
2000 LET B = E(P(I+1),7) + E(N,5)
2010 LET G = E(P(I+1),8) + E(N,6)
2020 GO TO 2110
2030 LET B = E(P(I+1),7) + E(N,5)
2040 LET G = E(P(I+1),8) + E(N,6)
2050 LET N = E(N,1)
2060 LET C = E(N,7)
2070 LET H = E(N,8)
2080 LET N = P(I)
2090 LET A = C + E(N,2)
2100 LET F = H + E(N,3)
2110 IF A > B THEN 2150
2120 LET E(N,7) = B
2130 LET E(N,8) = G
2140 GO TO 1810
2150 LET E(N,7) = A
2160 LET E(N,8) = F
2170 GO TO 1810
2180 REM  FIND SUCCESSOR EVENTS AND RECORD TE'S
2190 FOR I = 1 TO T
2200 LET N = E(I,1)
2210 IF N = 0 THEN 2280
2220 IF E(N,9) <> 0 THEN 2260
2230 LET E(N,9) = I
2240 LET E(N,10) = E(I,2)
2250 GO TO 2280
2260 LET E(N,11) = I
2270 LET E(N,12) = E(I,2)
2280 LET N = E(I,4)
2290 IF N = 0 THEN 2360
2300 IF E(N,9) <> 0 THEN 2340
2310 LET E(N,9) = I
2320 LET E(N,10) = E(I,5)
2330 GO TO 2360
2340 LET E(N,11) = I
2350 LET E(N,12) = E(I,5)
2360 NEXT I
2370 REM  FIND TL
2380 LET E(1,13) = E(1,7)
2390 FOR K= 1 TO T
2400 IF E(K,13) = 0 THEN 2430
2410 NEXT K
2420 GOTO 2730
2430 LET N = K
2440 LET I = 1
2450 LET P(1) = N
2460 IF E(N,13) <> 0 THEN 2600
2470 LET A = E(N,9)
2480 IF E(A,13) = 0 THEN 2640
2490 LET B = E(N,11)
```

```
2500 IF B = 0 THEN 2590
2510 IF E(B,13) = 0 THEN 2680
2520 LET T1 = E(A,13) - E(N,10)
2530 LET T2 = E(B,13) - E(N,12)
2540 IF T1 < T2 THEN 2570
2550 LET E(N,13) = T2
2560 GO TO 2600
2570 LET E(N,13) = E(A,13) - E(N,10)
2580 IF I = 1 THEN 2390
2590 LET E(N,13) = E(A,13) - E(N,10)
2600 IF I = 1 THEN 2390
2610 LET I = I - 1
2620 LET N = P(I)
2630 GO TO 2460
2640 LET N = A
2650 LET I = I + 1
2660 LET P(I) = N
2670 GO TO 2460
2680 LET N = B
2690 LET I = I + 1
2700 LET P(I) = N
2710 GO TO 2460
2720 REM PRINT RESULTS
2730 PRINT"EVENT NUMBER";TAB(25);"TE";TAB(41);"V";TAB(55);"TL";
2740 PRINT TAB(60);"TOTAL SLACK"
2750 PRINT"----- ------";TAB(25);"--";TAB(41);"-";TAB(55);"--";
2760 PRINT TAB(60);"----- -----"
2770 PRINT
2780 FOR N = T TO 1 STEP -1
2790 PRINT N,E(N,7),E(N,8),E(N,13),E(N,13)-E(N,7)
2800 NEXT N
3000 DATA 4E36
9999 END
```

RATE:

DESCRIPTION

The program Rate will compute the true interest rate that is charged on an installment account. This program is slanted toward the individual borrower rather then the lender.

USERS

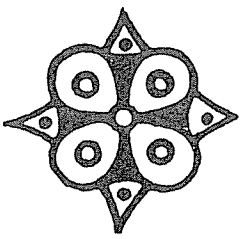
Individuals who do installment purchasing will find this program very helpful in computing the interest owed or paid on accounts.

INSTRUCTIONS

Type RUN and the program will ask for the four required variables. They are as follows: (1) The amount of the loan, (2) The amount of each payment, (3) The total number of payments, and (4) The number of payments per year. For additional information list the program.

LIMITATIONS

The program requires 2K Bytes of memory for storage. It will execute in 4K Bytes in most systems.



RATE

```
7 PRINT "DO YOU WANT INSTRUCTIONS, (1=YES, 0=NO)"
8 INPUT Y7
9 IF Y7=0 THEN 80
10 PRINT"
                "
20 PRINT "THIS PROGRAM WILL CALCULATE THE TRUE ANNUAL INTEREST"
30 PRINT "RATE CHARGED ON AN INSTALLMENT LOAN.  YOU SUPPLY THE"
40 PRINT "VALUES OF FOUR VARIABLES:  A = AMOUNT OF LOAN (IN $),"
50 PRINT "P = AMOUNT OF EACH PAYMENT ($), N = THE TOTAL NUMBER"
60 PRINT "OF PAYMENTS DUE, AND  K = THE NUMBER OF PAYMENTS DUE"
70 PRINT "IN ONE YEAR.  ";
80 PRINT "WHAT ARE A,P,N,K";
90 INPUT A, P, N, K
100 PRINT
110 IF N=1 THEN 510
120 IF P*N>=A THEN 180
130 PRINT
140 PRINT "THAT'S NOT REASONABLE.  THE PAYMENTS ADD UP"
150 PRINT "TO LESS THAN THE AMOUNT OWED.  TRY AGAIN:"
160 PRINT
170 GOTO 80
180 LET R=0
190 LET D=100
200 GOSUB 290
210 IF P=P1 THEN 390
220 IF P>P1 THEN 250
230 LET R=R-D
240 GOTO 260
250 LET R=R+D
260 LET D=D/2
270 IF D<0.0001 THEN 390
280 GOTO 200
290 LET R1=R/(100*K)
300 LET Q=1+R1
310 IF N*LOG(Q)/LOG(10)<=75 THEN 340
```

```
320 LET P1=A*R1
330 RETURN
340 IF Q>1 THEN 370
350 LET P1=A/N
360 RETURN
370 LET P1=A*Q↑N*R1/(Q↑N-1)
380 RETURN
390 LET R=0.01*INT(0.5+100*R)
400 LET R2=.01*INT(.5+10000*((1+R/(100*K))↑K-1))
410 IF R<199.5 THEN 460
420 PRINT
430 PRINT "RATE WOULD BE OVER 200 PERCENT.  TRY AGAIN:"
440 PRINT
450 GOTO 80
460 PRINT "TRUE ANNUAL INTEREST RATE (NOMINAL)=";R
470 PRINT "TRUE ANNUAL INTEREST RATE (EFFECTIVE)=";R2
480 PRINT
490 PRINT "ANOTHER CASE?  (TYPE 'S' TO STOP NOW)."
500 GOTO 80
510 LET R=(P/A-1)*K
520 LET R=100*R
530 GOTO 390
9999 END
```

```
RUN


THIS PROGRAM WILL CALCULATE THE TRUE ANNUAL INTEREST
RATE CHARGED ON AN INSTALLMENT LOAN. YOU SUPPLY THE VALUES
OF FOUR VARIABLES: A = AMOUNT OF LOAN ( IN DOLLARS)
P= AMOUNT OF EACH PAYMENT ($),  N = THE NUMBER ( TOTAL #)
OF PAYMENTS DUE, AND  K = THE NUMBER OF PAYMENTS DUE
IN ONE YEAR. WHAT ARE A,P,N,K ?600.00,31.99,21,12

TRUE ANNUAL INTEREST RATE (NOMINAL)=  12.61
TRUE ANNUAL INTEREST RATE (EFFECTIVE)= 13.36

ANOTHER CASE ? (TYPE 'S' TO STOP NOW).
WHAT ARE A,P,N,K ?S
```

RETURN 1:

DESCRIPTION

This program computes the rate of return a lessor can expect to make on his investment. Initially an investor will purchase an item and then the item will in turn be leased out so the investor will be able to gain a monitary return for his investment. This program will also simulate a lease contract experience for the investor and will generate a set of cash flows for use by the investor.

USERS

Individuals or companies who invest in equipment for leasing purposes will find Return 1 a very useful program; especially if the particular lease is new to them.

INSTRUCTIONS

Enter your data in lines 120, 121, and 122 before running the program. The format for the data entry is as follows:

```
120 DATA  P,L,C1,R1

121 DATA  M,N1,S1,S2

122 DATA  T1,D,N2
```

List lines 56 to 80 for additional data input information. After your data has been entered type RUN.

LIMITATIONS

The DIM statements in line 100 are set for 500. This represents a little over a 41 year lease, as 12 x 41 = 492. However an array this large will require 50K Bytes of on line memory for execution. The source code only requires 7K Bytes of space. If the DIM is set equal to 50, this would represent a 4 year lease, execution could then be accomplished in 15K Bytes.

```
RETURN 1


24REM
26REM*****************************************************************************
30REM  DESCRIPTION
32REM       THIS PROGRAM CALCULATES THE LESSOR'S CASH FLOWS AND RATE
34REM       OF RETURN ON A LEASE WITH PERIOD-END PAYMENTS.
40REM
50REM:****************************************************************************
56REM  INSTRUCTIONS
58REM       VALUES FOR THE FOLLOWING VARIABLES MUST BE SUPPLIED
60REM       AS DATA IN LINES 120-122:
61REM         THESE LINES NOW CONTAIN DATA FOR A SAMPLE "RUN".
62REM
63REM  1. P = INVESTMENT
64REM  2. L = RENT PAYMENT, 0 IF THE LEASE RATE RATHER THAN THE
65REM          RENT PAYMENT IS GIVEN,
66REM  3. C1= NUMBER OF TIMES PER YEAR THAT LEASE PAYMENTS ARE MADE.
67REM  4. R1= LEASE RATE, 0 IF THE LEASE PAYMENT RATHER THAN THE
68REM          LEASE RATE IS GIVEN, OTHERWISE A DECIMAL REPRESEN-
69REM          TATION OF AN ANNUAL RATE COMPOUNDED C1 TIMES A YEAR,
70REM  5. M = LIFE OF LEASE IN YEARS,
71REM  6. N1= DEPRECIABLE LIFE IN YEARS,
72REM  7. S1= SALVAGE FOR TAX PURPOSES,
73REM  8. S2= SALVAGE ACTUALLY EXPECTED,
76REM  9. T1= THE LESSOR'S INCOME TAX RATE
77REM 10. D = METHOD OF DEPRECIATION; 1 IF STRAIGHT LINE, 2 IF
78REM          DOUBLE DECLINING BALANCE, 3 IF SUM OF THE YEARS DIGITS,
79REM 11. N2= THE NUMBER OF RUNS IN THE SIMULATION
80REM
90REM * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * * *
95REM
100 DIM A(500),B(500),C(500),D(500),E(500),L(500),P(500),T(500)
110 DIM R(100),M(100)
111 READ P,L,C1,R1
112 READ M,N1,S1,S2
113 READ T1,D,N2
120 DATA 600000,900,12,0
121 DATA 8,10,0,200000
122 DATA .7,3,50
180 PRINT
190 PRINT
200 PRINT " ","SUMMARY OF INPUT DATA"
210 PRINT
220 PRINT "INVESTMENT",P,"RENT PAYMENT"," ",L
230 PRINT "PAYMENTS";TAB(12);C1;"TIMES PER YR","LEASE LIFE";M
240 IF D = 2 THEN 280
250 IF D = 3 THEN 300
260 PRINT "DEPRECIATION","STRAIGHT LINE","DEPRECIABLE LIFE",N1
```

```
270 GO TO 310
280 PRINT "DEPRECIATION";" D D B  ","DEPRECIABLE LIFE",N1
290 GO TO 310
300 PRINT "DEPRECIATION","SOYD","DEPRECIABLE LIFE",N1
310 PRINT "TAX SALVAGE",S1,"ACTUAL SALVAGE"," ",S2
360 PRINT"-------------------------------------------------------------"
370 PRINT
380 PRINT
390 PRINT " ","RESULTS OF CALCULATION"
400 PRINT
410 LET N=M*C1
420 LET M = N
430 LET N4=N5=N6=N7=N8=N9=M5=0
500 FOR I = 1 TO 672
510 LET U=RND(I)
520 NEXT I
530 FOR I = 1 TO N
540    LET A(I) = L
550    LET D(I) = 0
560 NEXT I
570 LET X = P
580 GO SUB 1710
590 LET R=((1+R)↑C1-1)*100
600 PRINT "LEASE RATE: ";R;"PER CENT PER YEAR, COMPOUNDED ";C1;
602 PRINT "TIMES A YEAR"
610 PRINT
620 PRINT
630 GO SUB 1880
690 LET R2 = 0
700 FOR H = 1 TO N2
710 LET N = N/C1
720 LET L = L*C1
730    GO SUB 2280
740 LET N = N*C1
750 LET L = L/C1
760 LET M = M*C1
770    FOR I = 1 TO N
780       LET L(I) = L
790       LET E(I) = L(I) - D(I)
800       LET T(I)=E(I)*T1
810    NEXT I
830    LET T(M)=T(M)+(S-P(M))*T1
840    LET L(M) = L(M) + S
850    FOR I = 1 TO M
860       LET A(I) = L(I) - T(I)
870    NEXT I
880    LET X = P
890    GO SUB 1710
900    LET R=((1+R)↑C1-1)*100
930    LET R(H) = R
940    LET M(H) = M
```

```
950     LET R2 = R2 + R
960 NEXT H
970 LET R2 = R2/N2
980 LET R3 = 0
990 FOR H = 1 TO N2
1000     LET R3 = R3 + (R2-R(H))↑2
1010 NEXT H
1020 LET R3 = (R3/N2)↑.5
1030 PRINT
1040 PRINT
1050 PRINT " ","SUMMARY OF SIMULATION"
1060 PRINT " ","----------------------"
1070 PRINT
1080 PRINT "NUMBER OF RUNS"," ",N2
1090 PRINT "AVERAGE RETURN PER RUN",R2;"PER CENT"
1100 PRINT "STANDARD DEVIATION OF RETURNS",R3
1110 PRINT
1120 PRINT "SUMMARY OF RUNS IN WHICH A DEFAULT OCCURS"
1130 PRINT "        RUN"," PERIOD","RETURN"
1140 FOR H=1 TO N2
1150     IF M(H)=N THEN 1190
1160     PRINT H,M(H)   ,R(H)
1170     LET M5=M5+1
1180     GOTO 1220
1190     IF H<N2 THEN 1220
1200     IF M5>0 THEN 1220
1210     PRINT M5,M5,M5
1220 NEXT H
1230 PRINT "

          SUMMARY OF THE";N2-M5;"RUNS IN WHICH NO DEFAULT OCCURS
                                                                "
1250 LET C=10
1260 LET O=N2
1270 FOR I= 1 TO O
1280     IF M(I)<>N THEN 1330
1290     LET X=R(I)
1300     LET S1= X
1310     LET S2= X*X
1320     LET S= B= X
1330 NEXT I
1340 FOR I=2 TO O-1
1350     IF M(I)<>N THEN 1440
1360     LET X=R(I)
1370     LET S1= S1+X
1380     LET S2= S2+X*X
1390     IF X< B THEN 1420
1400     LET B= X
1410     GO TO 1440
1420     IF X> S THEN 1440
1430     LET S= X
```

```
1440 NEXT I
1450 LET W= (B-S)/C
1460 FOR I=1 TO O
1470    IF N(I)<>N THEN1530
1480    LET X=R(I)
1490    IF X<> S THEN 1510
1500    LET X= X+.0001
1510    LET F= INT(((X-S)/(B-S))*C+.999999)
1520    LET B(F)= B(F)+1
1530 NEXT I
1540 PRINT "

           ";TAB(25);"NUMBER OF RUNS"
1560 FOR I= 1 TO C
1570    IF I<> 1 THEN 1590
1580    LET W1= S
1590    PRINT INT(W1*100+.5)/100;TAB(6);"< RETURN <=";
1592    PRINT INT((W1+W)*100+.5)/100;TAB(25);
1600    LET W1= W1+W
1610    FOR J= 1 TO B(I)
1620       PRINT "*";
1630    NEXT J
1640    PRINT
1650 NEXT I
1660 PRINT
1670 PRINT "MEAN  = ";S1/(O-M5)
1680 PRINT "RANGE = ";S;"-";B
1690 PRINT "STD D = ";SQR((S2-((S1↑2)/O))/(O-1))
1700 GOTO 2530
1710 LET R = 0
1720 FOR J = 1 TO 5
1730    LET Z = .1↑J
1740    LET R = R + Z
1750    LET Y = 0
1760    FOR I = 1 TO M
1770       IF Y>1E34 THEN 1790
1780       LET Y = Y + A(I)/(1+R)↑I
1790    NEXT I
1800    IF Y - X > 0 THEN 1740
1810    LET R = R - Z
1820 NEXT J
1830 IF R > 0 THEN 1870
1840 IF R < 0 THEN 1870
1850 LET R = -1
1860 GO TO 1720
1870 RETURN
1880 LET P(0) = P
1890 IF D = 2 THEN 1950
1900 IF D = 3 THEN 2060
1910 FOR I = 1 TO N1
1920    LET A(I) = (P-S1)/N1
```

```
1930 NEXT I
1940 GO TO 2110
1950 FOR I = 1 TO N1
1960    LET A(I) = P(I-1)*(2/N1)
1970    LET B(I) = (P(I-1)-S1)/(N1-I+1)
1980    IF A(I) > B(I) THEN 2000
1990    LET A(I) = B(I)
2000    LET P(I) = P(I-1) - A(I)
2010    IF P(I)>S1 THEN 2040
2020    LET P(I)=S1
2030    LET A(I)=P(I-1)-P(I)
2040 NEXT I
2050 GO TO 2110
2060 LET W = (N1)*(N1+1))/2
2070 FOR I = 1 TO N1
2080    LET A(I) = (P-S1)*((N1-I+1)/W)
2090 NEXT I
2100 LET W=0
2110 FOR I = 1 TO N1
2120    FOR K=1 TO C1
2130       LET W=W+1
2140       LET D(W)=A(I)/C1
2150       LET P(W)=P(W-1)-D(W)
2160    NEXT K
2170 NEXT I
2180 RETURN
2280 LET M = 1
2290 LET U=RND(-1)
2300 IF M = N THEN 2330
2310 LET M = M + 1
2320 IF U > .005 THEN 2290
2330 LET U=RND(-1)
2340 IF U > .3 THEN 2370
2345REM            BANKRUPTCY
2350 LET Q=2
2360 GO TO 2380
2365REM            REORGANIZATION
2370 LET Q=6
2375REM            EXTRA SALVAGE VALUE
2380 LET Q=(P-S2)*.5↑(.5*M)
2390 IF Q<N-M THEN 2430
2400 LET Q = N-M
2410 IF Q>0 THEN 2430
2420 LET Q = 0
2430 LET U=RND(-1)-.5
2440 LET S = (S2+Q+(P/10)*U)
2450 LET S = S + L*Q
2460 IF (N-M) = 0 THEN 2520
2470 LET K = L*(N-M)
2480 IF K>S THEN 2520
2490 LET S = K
2520 RETURN
2530 END
```

```
RUN
```

SUMMARY OF INPUT DATA

INVESTMENT	60000	RENT PAYMENT			900
PAYMENTS	12	TIMES A YEAR	LEASE LIFE	8	
DEPRECIATION	$0YD	DEPRECIABLE LIFE			10
TAX SALVAGE	0	ACTUAL SALVAGE			20000

RESULTS OF THE CALCULATION

LEASE RATE: 10.09938 PER CENT PER YEAR, COMPOUNDED 12 TIMES A YEAR

SUMMARY OF SIMULATION

NUMBER OF RUNS 50
AVERAGE RETURN PER RUN 5.538767 PER CENT
STANDARD DEVIATION OF RETURNS .2736524

SUMMARY OF RUNS IN WHICH A DEFAULT OCCURS

RUN	PERIOD	RETURN
28	36	5.434857
33	60	4.020228

SUMMARY OF THE 48 RUNS IN WHICH NO DEFAULT OCCURS

	NUMBER OF RUNS
5.26 < RETURN <= 5.31	*******
5.31 < RETURN <= 5.36	***
5.36 < RETURN <= 5.42	*
5.42 < RETURN <= 5.47	****
5.47 < RETURN <= 5.52	******
5.52 < RETURN <= 5.58	******
5.58 < RETURN <= 5.63	*
5.63 < RETURN <= 5.68	********
5.68 < RETURN <= 5.74	*******
5.74 < RETURN <= 5.79	**********

MEAN = 5.45435
RANGE = 5.258627 - 5.788092
STD D = 1.34669

RETURN 2:

DESCRIPTION

This program computes the rate of return for an investor who purchases an item and then leases it out. The difference between this program and Return 1 is that Return 1 recognizes that the lease payments and the salvage value of the item is uncertain and Return 2 assumes them to be fixed.

USERS

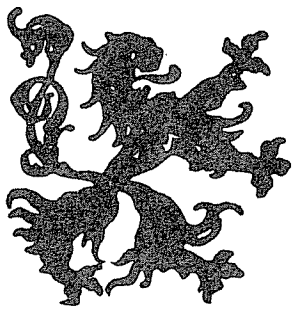
Anyone who is interested in leasing or investing in lease equipment will be able to utilize this program.

INSTRUCTIONS

Before the program is run you must enter your data in lines 120, 121 and 122. List lines 17 to 48 for instructions on data input to the program. After the data has been entered type RUN.

LIMITATIONS

Lines 1191 to 1197 contain MAT = ZER statements. The source code will require 7K Bytes of memory for storage. As in Return 1 the DIM statements in line 100 may be reduced from 500 to 50 to conserve space. With the DIM statements set to 50, a four year lease is maximum. This program will then require 15K Bytes of memory for execution.



```
RETURN 2



12REM  THIS BASIC PROGRAM DOES A LEASE ANALYSIS FROM THE
13REM  POINT OF VIEW OF LESSOR
14REM  THE PROGRAM CALCULATES THE LESSORS CASH FLOW AND RATE
15REM  OF RETURN ON A LEASE WITH PERIOD-END PAYMENTS
16REM  ************************************************************************
17REM
18REM        VALUES ARE REQUIRED FOR THE FOLLOWING VARIABLES:
19REM
20REM    1. P = INVESTMENT
21REM    2. L = LEASE PAYMENT, 0 IF THE LEASE RATE RATHER THAN THE
22REM           LEASE PAYMENT IS GIVEN,
23REM    3. C1= NUMBER OF TIMES PER YEAR THAT LEASE PAYMENTS ARE MADE.
24REM    4. R1= LEASE RATE, 0 IF THE LEASE PAYMENT RATHER THAN THE
25REM           LEASE RATE IS GIVEN, OTHERWISE A DECIMAL REPRESEN-
26REM           TATION OF AN ANNUAL RATE COMPOUNDED C1 TIMES A YEAR,
27REM    5. M = LIFE OF LEASE IN YEARS,
28REM    6. N1= DEPRECIABLE LIFE IN YEARS,
29REM    7. S1= SALVAGE FOR TAX PURPOSES,
30REM    8. S2= SALVAGE ACTUALLY EXPECTED,
33REM     9. T1= LESSOR'S INCOME TAX RATE
34REM    10. D= METHOD OF DEPRECIATION: 1 IF STRAIGHT LINE, 2 IF
35REM           DOUBLE DECLINING BALANCE, 3 IF SUM-OF-YEARS-DIGITS,
36REM    11. T9=IDENTIFICATION OF VARIABLE FOR WHICH SENSITIVITY ANALYSIS
37REM           IS TO BE DONE, 0 IF NO ANALYSIS, 1 IF INVESTMENT,
38REM           2 IF LEASE PAYMENT, 3 IF LEASE LIFE, 4 IF LEASE RATE,
39REM           5 IF DEPRECIABLE LIFE, 6 IF TAX SALVAGE, OR 7 IF ACTUAL
40REM           SALVAGE.
41REM    12. R8=LOWEST VALUE FOR VARIABLE SPECIFIED IN 11.
42REM    13. R9=HIGHEST VALUE FOR VARIABLE SPECIFIED IN 11.
43REM
44REM
46REM   LINES 120-123 CONTAIN DATA FOR A SAMPLE PROBLEM
48REM
50REM  ************************************************************************
60REM
100 DIM A(500),B(500),D(500),E(500),L(500),P(500),T(500)
101 READ P,L,C1,R1
102 READ M,N1,S1,S2
103 READ T1,D
104 READ T9,R8,R9
110 FOR H=1 TO 7
112 READ A$(H)
114 NEXT H
116 DATA INVESTMENT, LEASE PAYMENT,LEASE LIFE,LEASE RATE,DEPRECIABLE LIFE
```

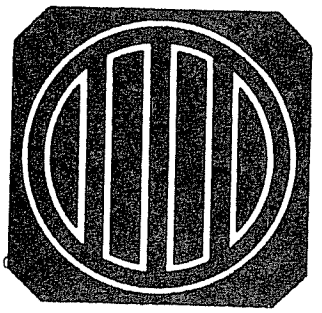
```
117 DATA TAX SALVAGE,ACTUAL SALVAGE
120 DATA 60000,900,12,0
121 DATA 3,10,5000,20000
122 DATA .7,3
123 DATA 7,0,25000
130 IF T9>8 THEN 230
140 IF T9<1 THEN 230
150 PRINT "

          "
160 PRINT "DO YOU WANT THE SENSITIVITY ANALYSIS ONLY";
170 INPUT N$
180 PRINT "

          "
190 IF N$="NO" THEN 230
200 IF N$="YES" THEN 610
210 PRINT "REM  'YES' OR 'NO'";
220 GOTO 170
230 PRINT " ","SUMMARY OF INPUT DATA"
240 PRINT
250 PRINT "INVESTMENT",P,"RENT PAYMENT"," ",L
260 PRINT "PAYMENTS";TAB(10);C1;"TIMES YEARLY";
280 PRINT TAB(30);"LIFE OF LEASE"," ",M
290 IF D = 2 THEN 330
300 IF D = 3 THEN 350
310 PRINT "DEPRECIATION","STRAIGHT LINE","DEPRECIABLE LIFE",N1
320 GO TO 360
330 PRINT "DEPRECIATION","DBLE DECLIN BALANCE","DEPRECIABLE LIFE",N1
340 GO TO 360
350 PRINT "DEPRECIATION","SOYD","DEPRECIABLE LIFE",N1
360 PRINT "TAX SALVAGE",S1,"ACTUAL SALVAGE"," ",S2
370 PRINT "LESSOR'S TAX RATE",T1
410 IF R1 = 0 THEN 450
420 PRINT "LEASE RATE GIVEN:  ";R1*100;"PER CENT PER YEAR, COMPOUNDED";
430 PRINT C1;"TIMES YEARLY";
440 PRINT
450 IF T9>8 THEN 500
460 IF T9<1 THEN 500
470 PRINT "SENSITIVITY OF LEASE RATE AND LESSOR'S AFTER TAX RETURN TO"
490 PRINT A$(T9);" WILL BE ANALYZED WITH A RANGE OF";R8;"TO";R9;"."
500 GOSUB 750
510 PRINT "  ","RESULTS OF CALCULATION
                                        "
520 LET F9=-1
530 GOSUB 1190
540 GOSUB 750
550 PRINT "DO YOU WANT A LISTING OF THE FLOWS";
560 INPUT N$
570 PRINT "
```

```
          "
580 IF N$="NO" THEN 600
590 GOSUB 2240
600 GOSUB 730
610 IF T9>8 THEN 2620
620 IF T9<1 THEN 2620
630 PRINT "SENSITIVITY ANALYSIS ON ";A$(T9);
650 PRINT "


          "
660 PRINT A$(T9);
670 PRINT TAB(25);"LEASE RATE";TAB(43);"LESSOR'S AFTER TAX RETURN

                                                                    "
680 FOR F9=0 TO 10
690     GOSUB 960
700     GOSUB 1190
710 NEXT F9
720 STOP
730 PRINT
740 PRINT
750 PRINT "-------------------------------------------------------------"
760 PRINT
770 PRINT
780 RETURN
960 LET W=R8+(F9/10)*(R9-R8)
965 PRINT TAB(5);W;
970 ON T9 GOTO 980,1010,1040,1070,1100,1130,1160
980 LET P=W
1000 RETURN
1010 LET L=W
1030 RETURN
1040 LET M=W
1060 RETURN
1070 LET R1=W
1090 RETURN
1100 LET N1=W
1120 RETURN
1130 LET S1=W
1150 RETURN
1160 LET S2=W
1180 RETURN
1190 LET N=INT(M*C1+.5)
1191 MAT A=ZER
1192 MAT B=ZER
1193 MAT D=ZER
1194 MAT E=ZER
1195 MAT L=ZER
1196 MAT P=ZER
```

```
1197 MAT T=ZER
1200 IF R1=0 THEN 1240
1210 LET X = P
1220 LET R=(1+R1)↑(1/C1)-1
1230 GOSUB 2490
1240 FOR I = 1 TO N
1250    LET A(I)=L(I)=L
1270 NEXT I
1280 LET X = P
1290 GO SUB 1670
1300 LET R=((1+R)↑C1-1)*100
1310 IF F9=-1 THEN 1340
1320 PRINT TAB(25);R;"%";
1330 GOTO1380
1340 PRINT "LEASE RATE: ";R;"PER CENT PER YEAR, COMPOUNDED";C1;
1342 PRINT "TIMES YEARLY";
1360 PRINT
1370 PRINT
1380 GOSUB 1940
1400 FOR I = 1 TO N
1410    LET E(I) = L(I) - D(I)
1420    LET T(I) = E(I)*T1
1430 NEXT I
1450 LET T(N) = T(N) + (S2-P(N))*T1
1460 LET L(N) = L(N) + S2
1470 LET D(N) = D(N) + P(N)
1480 FOR I = 1 TO N
1490    LET A(I) = L(I) - T(I)
1500 NEXT I
1510 LET X = P
1520 GOSUB 1670
1530 LET L(0)=A(0)=-P
1540 LET D(0)=T(0)=E(0)=0
1580 LET R=((1+R)↑C1-1)*100
1590 IF F9=-1 THEN 1620
1600 PRINT TAB(45);R;"%"
1610 RETURN
1620 PRINT"LESSOR'S AFTER TAX RETURN:";R;"PER CENT PER YEAR COMPOUNDED"
1630 PRINT TAB(45);C1;"TIMES YEARLY";
1650 PRINT
1660 RETURN
1670 LET R=0
1680 FOR J = 1 TO 5
1690    LET Z = .1↑J
1700    LET R = R + Z
1710    LET Y = 0
1720    FOR I = 1 TO N
1730       IF Y>1E37 THEN 1760
1740       LET Y = Y + A(I)/(1+R)↑I
1750    NEXT I
1760    IF Y - X > 0 THEN 1700
```

```
1770    LET R = R - Z
1780 NEXT J
1790 IF R<>0 THEN 1830
1810 LET R = -1
1820 GO TO 1680
1830 RETURN
1835REM                                  STRAIGHT LINE
1840 LET P(0)=P
1850 IF D = 2 THEN 1910
1860 IF D = 3 THEN 2020
1870 FOR I = 1 TO N1
1880    LET A(I) = (P-S1)/N1
1890 NEXT I
1900 GO TO 2060
1905REM                                   DOUBLE DECLINING BALANCE
1910 FOR I=1 TO N1
1920    LET A(I) = P(I-1)*(2/N1)
1930    LET B(I) = (P(I-1)-S1)/(N1-I+1)
1940    IF A(I) > B(I) THEN 1960
1950    LET A(I) = B(I)
1960    LET P(I) = P(I-1) - A(I)
1970    IF P(I)>S1 THEN 2000
1980    LET P(I)=S1
1990    LET A(I)=P(I-1)-P(I)
2000 NEXT I
2010 GO TO 2060
2015REM                                  SUM OF YEARS DIGITS
2020 LET W=(N1*(N1+1))/2
2030 FOR I = 1 TO N1
2040    LET A(I) = (P-S1)*((N1-I+1)/W)
2050 NEXT I
2060 LET W=0
2070 FOR I=1 TO N1
2080    FOR K=1 TO C1
2090       LET W=W+1
2100       LET D(W)=A(I)/C1
2110       LET P(W)=P(W-1)-D(W)
2120    NEXT K
2130 NEXT I
2135 IF W>=N THEN 2140
2137 LET P(N)=P(W)
2140 RETURN
2240 PRINT TAB(20);"LISTING OF CASH FLOWS"
2250 PRINT TAB(20);"----------------------"
2260 PRINT
2270 PRINT " YEAR "," LEASE ","DEPRECIATION","  TAX  "," CASH "
2280 PRINT TAB(15);"RECEIPT","PAYMENT","FLOW"
2290 LET K=1
2300 PRINT 0,L(0),D(0),T(0),A(0)
2310 FOR I=1 TO M
2320    LET LS=DS=TS=AS=0
```

```
2330     FOR J=1 TO C1
2340        LET L8=L8+L(K)
2350        LET D8=D8+D(K)
2360        LET T8=T8+T(K)
2370        LET A8=A8+A(K)
2380        LET K=K+1
2390     NEXT J
2400 PRINT I,L8,D8,T8,A8
2410     LET L(0)=L(0)+L8
2420     LET D(0)=D(0)+D8
2430     LET T(0)=T(0)+T8
2440     LET A(0)=A(0)+A8
2450 NEXT I
2460 PRINT "

            TOTAL",L(0),D(0),T(0),A(0)
2480 RETURN
2490 LET L=0
2500 FOR J = 1 TO 6
2510     LET Z = 10000*.1↑J
2520     LET L=L+Z
2530     LET Y = 0
2540     FOR I = 1 TO N
2550        LET Y=Y+L/(1+R)↑I
2560     NEXT I
2570     IF X-Y > 0 THEN 2520
2580     LET L=L-Z
2590 NEXT J
2600 RETURN
2620 END
```



SCHEDULE 1:

DESCRIPTION

This program is used to schedule "n" number of resources to "m" number of locations. If "n" is a number of jobs and "m" is the number of machines in a machine shop, this program will schedule the various jobs so as to minimize the total flow time for all the jobs. The program makes the following assumptions in setting up the schedules:

1. All resources are available.
2. A location can contain only one resource at a time.
3. The sequence of each operation and its timing are known.
4. #3 is independent of the schedule.
5. No alternate sequences are allowable.
6. Processing time includes all transportation and set-up time.

The program uses the following dispatching rules in setting up the schedules.

1. Select the resource with minimum processing time in a location.
2. Select the resource with minimum total remaining processing time.
3. Select the resource with maximum processing time in a location.
4. Select the resource with maximum total remaining processing time.

USERS

This program will find use any place minimum schedules are set up. The following is a partial list of the types of concerns that could benefit by using this program: Machine Shops, Printing Shops, Trucking Companies, etc.

INSTRUCTIONS

Your data must be entered before the program is run. Sample data is contained in lines 6000 to 6190. This data should be removed before entering your data. List the program for additional information. After your data has been entered into the program type RUN.

LIMITATIONS

Program lines 120, 140 and 150 contain matrix statements. Starting in line 440 there is a Print Using statement. These statements are used extensively throughout this program. The source code will require 7K Bytes of memory for storage and 25K Bytes for execution. The execution space may be reduced by reducing the size of the DIM statements in lines 120, 130, 140 and 150.

SCHEDULE 1

```
110 PRINT"JOB-SHOP SIMULATOR"
120 DIM S(15,15),P(15,15),Q(15,15),T(15,15)
130 DIM V(15)
140 DIM R(15),F(15),G(15,15)
150 DIM D(15),M(15,15)
160 READ N,M
170 IF N <> 0 THEN 420
180 PRINT
190 PRINT"INSTRUCTIONS:"
200 PRINT"THIS PROGRAM SIMULATES A JOB SHOP FUNCTIONING UNDER"
210 PRINT"FOUR DIFFERENT DISPATCHER RULES."
220 PRINT"ENTER DATA IN THE FOLLOWING ORDER BEGINNING"
230 PRINT"IN LINE 6000:"
240 PRINT"    * THE NUMBER OF JOBS TO BE PROCESSED,"
250 PRINT"    * THE NUMBER OF MACHINES,"
260 PRINT"    * THE SEQUENCE MATRIX S(I,J) BY ROWS"
270 PRINT"      WHERE S(I,J) IS THE SEQUENCE OF THE I'TH"
280 PRINT"      JOB ON THE J'TH MACHINE,"
290 PRINT"    * THE PROCESS TIME MATRIX P(I,J) BY ROWS"
300 PRINT"      WHERE P(I,J) IS THE PROCESS TIME REQUIRED"
310 PRINT"      BY THE I'TH JOB ON THE J'TH MACHINE."
320 PRINT
330 PRINT"SAMPLE DATA IS ALREADY IN LINES 6000-6190."
340 PRINT
350 PRINT"TO EXECUTE THE PROGRAM:"
360 PRINT"    TYPE 'DELETE 6000-6190' (DELETES SAMPLE DATA)"
370 PRINT"    ENTER YOUR DATA"
380 PRINT"    TYPE 'RUN'"
390 PRINT
400 PRINT"THE FOLLOWING IS A SAMPLE EXECUTION USING THE"
410 PRINT"SAMPLE DATA."
420 PRINT
430 READ N,M
440 PRINT USING 450,N,M
450:SCHEDULING ##-JOBS ON ##-MACHINES
460 PRINT
470 FOR I = 1TOM
480 FOR J = 1TON
490 READ S(I,J)
500 NEXT J
510 NEXT I
520 FOR I = 1TOM
530 FOR J= 1 TO N
540 READ P(I,J)
```

```
550 NEXT J
560 NEXT I
570 PRINT"INPUT"
580 PRINT "SEQUENCE MATRIX-S"
590 PRINT
600 GOSUB 620
610 GO TO 690
620 PRINT "MACHINE  1 ";
630 FOR I=2TOM
640 PRINT TAB(I*5);I;
650 NEXT I
660 PRINT
670 PRINT "JOB"
680 RETURN
690 FOR I=1TON
700 PRINT USING 710,I;
710:##
720 FOR J=1TOM
730 PRINT TAB(5.*J);S(I,J);
740 NEXT J
750 PRINT
760 NEXT I
770 PRINT
780 PRINT
790 PRINT"PROCESSING TIME MATRIX-P"
800 PRINT
810 GOSUB 620
820 FORI=1TON
830 PRINT USING 710,I;
840 FOR J= 1TOM
850 PRINT TAB(5.*J);P(I,J);
860 NEXT J
870 PRINT
880 NEXT I
890 PRINT
900 REM CALC TOTAL PROCESS TIME FOR JOBS & GEN M(I,J)
910 FOR I= 1TON
920 LET P(I,M+1.)=0.
930 FOR J= 1TOM
940 LET P(I,M+1.)=P(I,M+1.)+P(I,J)
950 LET M(I,S(I,J))=J
960 NEXT J
970 NEXT I
980 PRINT
990 LET C8=1.
1000 FOR I= 1TON
1010 LET S=0.
1020 FOR J=1TOM
1030 IF S(I,J)<=S THEN 1050
1040 LET S=S(I,J)
1050 NEXT J
```

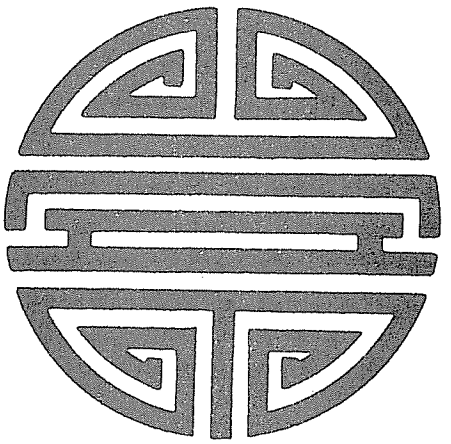
```
1060 LET S(I,0)=S
1070 NEXT I
1080 PRINT"***SCHEDULE OF JOB START TIMES***"
1090 PRINT
1100 PRINT"DISPATCHING RULE:  CHOSE JOB FOR ";
1110 IF C8>2 THEN 1140
1120 PRINT"MINIMUM"
1130 GO TO 1150
1140 PRINT"MAXIMUM"
1150 LET T=0.
1160 FOR J=0TOM
1170 FOR I=0TON
1180 LET Q(I,J)=0.
1190 LET T(I,J)=0.
1200 NEXT I
1210 NEXT J
1220 FOR I=1TON
1230 LET D(I)=P(I,M+1.)
1240 NEXT I
1250 REM GENERATE Q AND T
1260 FOR J=1TOM
1270 LET K=1.
1280 FOR I=1TON
1290 IF S(I,J)<1. THEN 1340
1300 IF S(I,J)>1. THEN 1340
1310 LET Q(K,J)=I
1320 LET T(K,J)=P(I,J)
1330 LET K=K+1.
1340 NEXT I
1350 LET V(J)=K-1.
1360 NEXT J
1370 REM END OF GEN. Q AND T
1380 IF C8=1 THEN 1430
1390 IF C8=2 THEN 1720
1400 IF C8=3 THEN 1430
1410 GO TO 1720
1420 REM DECISION RULE-PROCESS TIME
1430 PRINT"PROCESSING TIME ON CURRENT MACHINE"
1440 LET K2=1.
1450 FOR J=1TOM
1460 IF V(J)<K2 THEN 1670
1470 FOR K = K2 TO V(J)
1480 LET K1=K
1490 LET T1=T(K,J)
1500 FOR I=K2 TO V(J)
1510 IF T(I,J)<=T1 THEN 1540
1520 LET T1=T(I,J)
1530 LET K1=I
1540 NEXT I
1550 LET T(K1,J)=0.
1560 IF C8=3. THEN 1600
```

```
1570 LET R(V(J)+K2-K)=T1
1580 LET F(V(J)+K2-K)=Q(K1,J)
1590 GO TO 1620
1600 LET R(K)=T1
1610 LET F(K)=Q(K1,J)
1620 NEXT K
1630 FOR I= K2 TO V(J)
1640 LET Q(I,J)=F(I)
1650 LET T(I,J)=R(I)
1660 NEXT I
1670 NEXT J
1680 LET K2=2.
1690 REM END P(I,J)-RULES
1700 GO TO 2000
1710 REM DECISION RULE-REMAINING PROCESS TIME
1720 PRINT"TOTAL TIME FOR ALL REMAINING PROCESSING"
1730 LET K2=1.
1740 FOR J=1TOM
1750 IF V(J) < K2 THEN 1960
1760 FOR K=K2 TO V(J)
1770 LET K1=K
1780 LET D1=D(Q(K,J))
1790 FOR I=K2 TO V(J)
1800 IF D(Q(I,J))<=D1 THEN 1830
1810 LET D1=D(Q(I,J))
1820 LET K1=I
1830 NEXT I
1840 IF C8=4. THEN 1880
1850 LET R(V(J)+K2-K)=T(K1,J)
1860 LET F(V(J)+K2-K)=Q(K1,J)
1870 GO TO 1900
1880 LET R(K)=T(K1,J)
1890 LET F(K)=Q(K1,J)
1900 LET Q(K1,J)=0.
1910 NEXT K
1920 FOR I =K2 TO V(J)
1930 LET Q(I,J)=F(I)
1940 LET T(I,J)=R(I)
1950 NEXT I
1960 NEXT J
1970 LET K2=2.
1980 REM END R(I)-RULES
1990 REM COMPRESS Q AND T
2000 FOR J=1TOM
2010 IF T(1,J)>0. THEN 2080
2020 IF V(J)=0. THEN 2080
2030 FOR I=1 TO V(J)
2040 LET Q(I,J)=Q(I+1,J)
2050 LET T(I,J)=T(I+1,J)
2060 NEXT I
2070 LET V(J)=V(J)-1.
2080 NEXT J
```

```
2090 REM MINIMUM NON-ZERO VALUE OF T(1,J)
2100 FOR J=1TOM
2110 LET T2=T(1,J)
2120 IF T(1,J)>0. THEN 2150
2130 NEXT J
2140 GO TO 2810
2150 FOR H=1 TO M
2160 IF T(1,H)<=0. THEN 2200
2170 IF T(1,H)>=T2 THEN 2200
2180 LET T2=T(1,H)
2190 LET K=H
2200 NEXT H
2210 REM END MIN T(1,J)
2220 REM PRINT CURRENT VALUES
2230 LET T=T+T2
2240 GO TO 2520
2250 PRINT
2260 PRINT USING 2430,T-T2;
2270 LET Q2=V(1)
2280 FOR J=1TOM
2290 IF V(J)<=Q2 THEN 2310
2300 LET Q2=V(J)
2310 NEXT J
2320 FOR I=1TO Q2
2330 PRINT TAB(4);
2340 FOR J=1TOM
2350 IF V(J)<I THEN 2390
2360 PRINT USING 2370, Q(I,J);
2370:#######
2380 GO TO 2400
2390 PRINT "       ";
2400 NEXT J
2410 PRINT
2420 NEXT I
2430:######
2440 FOR I=1TO5
2450 FOR J=1TO10
2460 PRINT TAB(5*J);T(I,J);
2470 NEXT J
2480 PRINT
2490 NEXT I
2500 RETURN
2510 REM END PRINT CURRENT VALUES
2520 REM MOVE FINISHED JOB TO NEXT MACHINE
2530 FOR J=1TOM
2540 LET R(J)=T(1,J)
2550 NEXT J
2560 FOR J=1 TO M
2570 IF R(J)>T2 THEN 2750
2580 IF R(J)<T2 THEN 2760
2590 LET T(1,J)=0.
```

```
2600 LET I=Q(1,J)
2610 LET G(I,J)=T-P(I,J)
2620 LET D(I)=D(I)-P(I,J)
2630 FOR L= 1TOM
2640 IF S(I,L)<=S(I,J) THEN 2730
2650 IF S(I,L)>S(I,J)+1. THEN 2730
2660 LET H=V(L)
2670 IF H>=1. THEN 2690
2680 LET H=1.
2690 LET Q(H+1.,L)=Q(1,J)
2700 LET V(L)=H+1.
2710 LET T(H+1.,L)=P(I,L)
2720 GO TO 2760
2730 NEXT L
2740 GO TO 2760
2750 LET T(1,J)=T(1,J)-T2
2760 NEXT J
2770 IF C8=1. THEN 1450
2780 IF C8=2. THEN 1740
2790 IF C8=3. THEN 1450
2800 IF C8=4. THEN 1740
2810 PRINT
2820 GOSUB 620
2830 FOR I=1TON
2840 PRINT USING 710,I;
2850 FOR J=1TOM
2860 PRINT TAB(5.*J);G(I,J);
2870 NEXT J
2880 PRINT
2890 NEXT I
2900 PRINT
2910 REM CALC A(I,J)
2920 LET B1=0.
2930 LET B2=0.
2940 FOR I= 1TON
2950 LET S=G(I,M(I,S(I,0)))+P(I,M(I,S(I,0)))
2960 IF S<=B1 THEN 2980
2970 LET B1=S
2980 LET B2=B2+S
2990 NEXT I
3000 LET B2=B2/N
3010 PRINT "TOTAL TIME =";B1;" AVERAGE TIME =";B2
3020 PRINT
3030 PRINT
3040 IF C8=1. THEN 3080
3050 IF C8=2. THEN 3100
3060 IF C8=3. THEN 3120
3070 IF C8=4. THEN 3140
3080 LET C8=2.
3090 GO TO 1080
3100 LET C8=3.
```

```
3110 GO TO 1080
3120 LET C8=4.
3130 GO TO 1080
3140 STOP
6000 REM  THE FOLLOWING IS SAMPLE DATA AND SHOULD BE DELETED
6010 REM DUMMY N,M TO CAUSE INSTRUCTIONS TO BE PRINTED
6020 DATA 0,0
6030 REM 6 JOBS ON 6 MACHINES
6040 DATA 6,6
6050 REM SEQUENCE DATA
6060 DATA 2,3,1,4,6,5
6070 DATA 5,1,2,6,3,4
6080 DATA 4,5,1,2,6,3
6090 DATA 2,1,3,4,5,6
6100 DATA 5,2,1,6,3,4
6110 DATA 4,1,6,2,5,3
6120 REM PROCESSING TIME DATA
6130 DATA 3,6,1,7,6,3
6140 DATA 10,8,5,4,10,10
6150 DATA 9,1,5,4,7,8
6160 DATA 5,5,5,3,8,9
6170 DATA 3,3,9,1,5,4
6180 DATA 10,3,1,3,4,9
6190 REM END SAMPLE DATA
9999 END
```



PART 2

GAMES

AND

PICTURES

ANIMALS FOUR:

DESCRIPTION

This program demonstrates the use of cybernetics, artifical intelligence, in a small computer system. In this program the computer asks you about animals and you increase it's knowledge with your responses. When the game starts the computer knows four animals.

INSTRUCTIONS

To use, load the program into memory and type RUN. List the program for additional instructions. The program is self prompting and will ask all questions necessary for execution.

LIMITATIONS

This program uses string variables but not contantations. This program requires 7K Bytes of memory for storage. This program should execute without problems in any Basic speaking computer that has sufficient memory allocations.

ANIMALS FOUR

```
115 REM HERE YOU TEACH THE COMPUTER ABOUT ANIMALS
130 REM THIS PROGRAM DEMONSTRATES CYBERNETICS
145 REM THAT MEANS ARTIFICIAL INTELLIGENCE.
160 REM IT REQUIRES A FILE NAMED ANIMAL TO STORE
175 REM THE LESSONS IT LEARNS.
190 PRINT "WELCOME TO CLASS. I AM HAPPY YOU COULD "
205 PRINT "MAKE IT. FOR TODAYS LESSON I WOULD LIKE "
220 PRINT "YOU TO TEACH ME ABOUT ANIMALS."
235 PRINT " ALL YOU NEED DO IS THINK OF AN ANIMAL"
250 PRINT "AND I WILL TRY TO GUESS WHAT IT IS."
265 PRINT "IF I CAN'T GUESS IT RAPIDLY I WILL ASK"
280 PRINT "YOU TO GIVE ME A TYPE OF DESCRIPTION OF"
295 PRINT "IT. THEN YOU THINK OF ANOTHER ANIMAL AND"
310 PRINT "I WILL TRY AGAIN, HOPEFULLY I'LL GET BETTER."
325 PRINT " WHEN YOU ARE READY TO LEAVE TYPE STOP"
340 PRINT "TO THE QUESTION - ARE YOU THINKING OF"
355 PRINT "AN ANIMAL? IF YOU WOULD LIKE A"
370 PRINT "LIST OF ALL THE ANIMALS I KNOW TYPE"
385 PRINT "THE WORD LIST AFTER THE -ARE YOU..."
400 PRINT
415 PRINT "O.K. I AM READY NOW."
430 PRINT
445 DIM A$(200),C$(400),Q(200)
460 A$(1)="BIRD"
475 A$(2)="FISH"
490 A$(3)="FROG"
505 A$(4)="DOG"
520 N=4
535 C$(1)="       "
550 C$(2)="       "
565 C$(3)="DOES IT HOP"
580 C$(4)="DOES IT GO BOW WOW"
595 Q(1)=0
610 Q(2)=1
625 Q(3)=10
640 Q(4)=11
655 PRINT
670 PRINT "ARE YOU THINKING OF AN ANIMAL?";
685 INPUT F$
700 IF F$="STOP" GOTO 3970
715 IF F$="S" GOTO 3970
730 IF F$="NO" GOTO 655
745 IF F$="N" GOTO 655
```

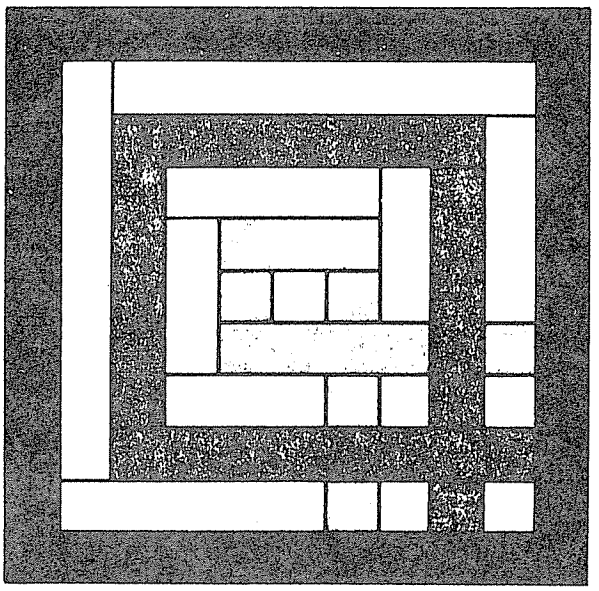
```
760 IF F$="LIST" GOTO 3805
775 IF F$="L" GOTO 3805
790 IF F$="Y" GOTO 865
805 IF F$<>"YES" GOTO 835
820 GOTO 865
835 PRINT "PLEASE ANSWER YES OR NO."
850 GOTO 655
865 REM
880 PRINT "DOES IT SWIM?";
895 INPUT F$
910 IF F$="NO" GOTO 1000
925 IF F$="N" GOTO 1000
940 IF F$="YES" GOTO 2605
955 IF F$="Y" GOTO 2605
970 PRINT "PLEASE ANSWER YES OR NO."
985 GOTO 880
1000 PRINT "IS IT A REPTILE";
1015 INPUT F$
1030 IF F$="NO" GOTO 1510
1045 IF F$="N" GOTO 1510
1060 IF F$="Y" GOTO 1120
1075 IF F$="YES" GOTO 1120
1090 PRINT "PLEASE ANSWER YES OR NO!"
1105 GOTO 1000
1120 FOR I=3 TO N
1135 IF Q(I)=10 GOTO 1255
1150 NEXT I
1165 PRINT "WHAT ANIMAL WERE YOU THINKING OF";
1180 INPUT Z9$
1195 IF Z9$="FROG" GOTO 3730
1210 P=10
1225 B$="FROG"
1240 GOTO 3220
1255 PRINT C$(I);
1270 INPUT F$
1285 IF F$="NO" GOTO 1150
1300 IF F$="N" GOTO 1150
1315 IF F$="Y" GOTO 1375
1330 IF F$="YES" GOTO 1375
1345 PRINT "PLEASE ANSWER YES OR NO!"
1360 GOTO 1255
1375 PRINT "IS IT A "A$(I);
1390 INPUT F$
1405 IF F$="YES" GOTO 3625
1420 IF F$="Y" GOTO 3625
1435 IF F$="N" GOTO 1495
1450 IF F$="NO" GOTO 1495
1465 PRINT "PLEASE ANSWER YES OR NO!"
1480 GOTO 1375
1495 GOTO 1150
1510 PRINT "DOES IT FLY";
```

```
1525 INPUT F$
1540 IF F$="YES" GOTO 2020
1555 IF F$="Y" GOTO 2020
1570 IF F$="N" GOTO 1630
1585 IF F$="NO" GOTO 1630
1600 PRINT "PLEASE ANSWER YES OR NO!"
1615 GOTO 1510
1630 FOR I=4 TO N
1645 IF Q(I)=11 GOTO 1765
1660 NEXT I
1675 PRINT "WHAT LAND ANIMAL DID YOU CHOOSE";
1690 INPUT Z9$
1705 IF Z9$="DOG" GOTO 3730
1720 P=11
1735 B$="DOG"
1750 GOTO 3220
1765 PRINT C$(I);
1780 INPUT F$
1795 IF F$="NO" GOTO 1660
1810 IF F$="N" GOTO 1660
1825 IF F$="Y" GOTO 1885
1840 IF F$="YES" GOTO 1885
1855 PRINT "ANSWER YES OR NO!."
1870 GOTO 1765
1885 PRINT "IS IT A "A$(I);
1900 INPUT F$
1915 IF F$="YES" GOTO 3625
1930 IF F$="Y" GOTO 3625
1945 IF F$="N" GOTO 2005
1960 IF F$="NO" GOTO 2005
1975 PRINT "ANSWER YES - NO!...."
1990 GOTO 1885
2005 GOTO 1660
2020 REM THIS IS FOR ANIMALS THAT FLY
2035 P=0
2050 IF N<3 GOTO 2425
2065 W=3
2080 U=N
2095 FOR I=W TO U
2110 IF Q(I)=0 GOTO 2155
2125 NEXT I
2140 GOTO 2425
2155 PRINT C$(I);
2170 INPUT F$
2185 IF F$="YES" GOTO 2290
2200 IF F$="Y" GOTO 2290
2215 IF F$="N" GOTO 2275
2230 IF F$="NO" GOTO 2275
2245 PRINT "YES OR NO - ONLY!!.."
2260 GOTO 2155
2275 GOTO 2125
```

```
2290 PRINT "IS THE ANIMAL A "A$(I);
2305 INPUT F$
2320 IF F$="YES" GOTO 3640
2335 IF F$="Y" GOTO 3640
2350 IF F$="N" GOTO 2410
2365 IF F$="NO" GOTO 2410
2380 PRINT "ONLY ANSWER YES OR NO!"
2395 GOTO 2290
2410 GOTO 2125
2425 PRINT "IS IT A BIRD";
2440 INPUT F$
2455 IF F$="YES" GOTO 3640
2470 IF F$="Y" GOTO 3640
2485 IF F$="NO" GOTO 2545
2500 IF F$="N" GOTO 2545
2515 PRINT "ONLY - YES - OR - NO!!.."
2530 GOTO 2425
2545 PRINT "WHAT IS THE ANIMAL YOU ARE THINKING OF?";
2560 INPUT Z9$
2575 B$="BIRD"
2590 GOTO 3190
2605 REM THIS IS IF IT LIVES IN THE WATER
2620 P=1
2635 W=3
2650 U=N
2665 IF N<3 GOTO 3010
2680 FOR I=W TO U
2695 IF Q(I)=1 GOTO 2740
2710 NEXT I
2725 GOTO 3010
2740 PRINT C$(I);
2755 INPUT F$
2770 IF F$="YES" GOTO 2875
2785 IF F$="Y" GOTO 2875
2800 IF F$="N" GOTO 2860
2815 IF F$="NO" GOTO 2860
2830 PRINT "YES OR NO PLEASE.."
2845 GOTO 2740
2860 GOTO 2710
2875 PRINT "IS IT A "A$(I);
2890 INPUT F$
2905 IF F$="YES" GOTO 3640
2920 IF F$="Y" GOTO 3640
2935 IF F$="N" GOTO 2995
2950 IF F$="NO" GOTO 2995
2965 PRINT "PLEASE - YES OR NO!"
2980 GOTO 2875
2995 GOTO 2710
3010 PRINT "IS IT A FISH";
3025 INPUT F$
3040 IF F$="YES" GOTO 3640
```

```
3055 IF F$="Y" GOTO 3640
3070 IF F$="NO" GOTO 3130
3085 IF F$="N" GOTO 3130
3100 PRINT "PLEASE ANSWER WITH A YES OR NO!"
3115 GOTO 3010
3130 PRINT "WHAT IS THE ANIMAL THAT YOU THOUGHT OF?";
3145 INPUT Z9$
3160 B$="FISH"
3175 GOTO 3190
3190 REM THIS IS WHERE THE COMPUTER STARTS IT LEARNING
3205 IF B$=Z9$ GOTO 3730
3220 FOR I=1 TO N
3235 IF A$(I)=Z9$ GOTO 3280
3250 NEXT I
3265 GOTO 3340
3280 PRINT "   I SHOULD HAVE KNOWN THAT! I DON'T KNOW WHAT "
3295 PRINT "I DID WRONG.. ...  "
3310 PRINT "WELL, I'LL TRY TO DO BETTER."
3325 GOTO 655
3340 N=N+1
3355 PRINT "THE ANIMAL YOU WERE THINKING OF WAS A ";Z9$
3370 PRINT "PLEASE TYPE IN A SHORT QUESTION THAT WOULD"
3385 PRINT "DISTINGUISH A "Z9$" FROM A "B$"."
3400 INPUT Z8$
3415 PRINT "FOR A "Z9$" WOULD THIS BE CORRECT?";
3430 INPUT Z7$
3445 IF Z7$="YES" GOTO 3535
3460 IF Z7$="Y" GOTO 3535
3475 IF Z7$="N" GOTO 3520
3490 IF Z7$="NO" GOTO 3520
3505 PRINT "ONLY ANSWER YES OR NO. THANK YOU"
3520 GOTO 3370
3535 REM STORE THE NEW INFO.
3550 A$(N)=Z9$
3565 C$(N)=Z8$
3580 Q(N)=P
3595 REM P IS THE FLAG =1 FOR WATER ANIMAL, =0 LAND ANIMALS
3610 GOTO 655
3625 REM THIS IS WHERE THE COMPUTER HAS THE RIGHT ANSWER
3640 PRINT
3655 PRINT
3670 PRINT "** I'AM VERY PROUD OF MYSELF **"
3685 PRINT
3700 PRINT
3715 GOTO 655
3730 PRINT
3745 PRINT "A "B$" IS A "Z9$" SO YOUR LAST ANSWER"
3760 PRINT "SHOULD HAVE BEEN - YES!"
3775 PRINT
3790 GOTO 3640
3805 REM HERE THE LIST IS PRINTED
```

```
3820 PRINT
3835 PRINT
3850 PRINT "ANIMALS THAT I ALREADY KNOW ARE:"
3865 PRINT
3880 FOR I=1 TO N
3895 PRINT A$(I),
3910 NEXT I
3925 PRINT
3940 PRINT
3955 GOTO 655
3970 PRINT
3985 PRINT
4000 PRINT
4015 PRINT "THANK YOU FOR THE LESSON, PLEASE"
4030 PRINT "COME AGAIN SOON."
4045 PRINT
4060 PRINT
4075 END
```



ASTRONAUT:

DESCRIPTION

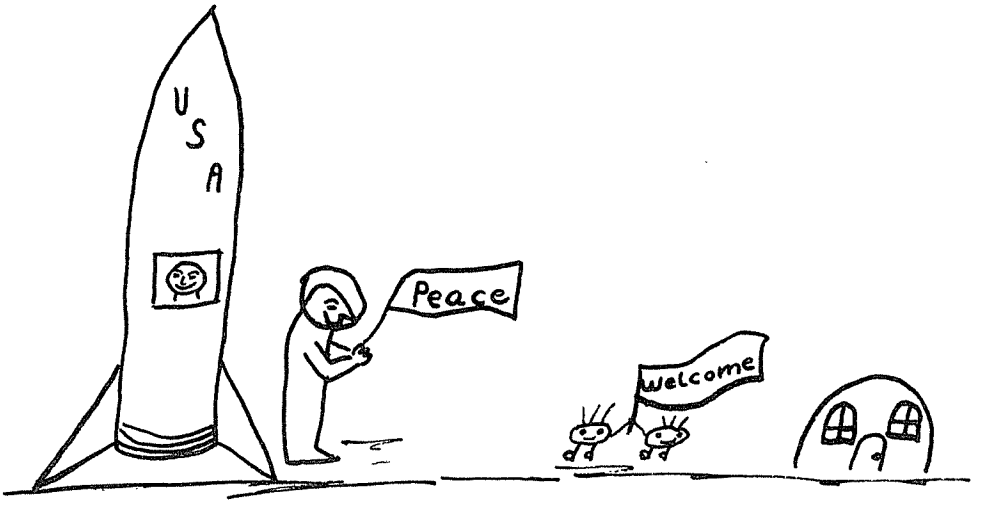
This is a computer simulation of a space ship in the process of landing, some where. There are choices of landing sites available for use. This program offers a variety of other features; such as describing the way an object falls in various environments.

INSTRUCTIONS

The program is self prompting and will ask all necessary questions. For additional information read the following instruction pages. The program may also be listed for information. An example of a lunar landing simulation is presented at the end of the source code listing.

LIMITATIONS

The following statements appear in the program: 120 DIM(20,4)/500 Chang C$ to C/550 ASC( )/1410 NUM( ). The source code is 10K Bytes long and the program should execute in about 14K Bytes of memory in most systems.



ASTRONAUT

```
10 REM THIS IS THE GAME ASTRONAUT
20REM
30REM  DESCRIPTION-- A LUNAR LANDING SIMULATION. THE USER PILOTS
40REM  A LUNAR LANDER TO A SOFT LANDING ON THE MOON.
50REM
60REM  INSTRUCTIONS-- FOR COMPLETE INSTRUCTIONS--TYPE "RUN".
70REM
80REM*****************************************************************************
90REM
100 DEF FNR(X)=INT(X*100+.5)/100
110 DIM D$(7),C$(30),D(30),C(30),F(30)
120 DIM S(20),R(20,4),R$(100)
130REM     READ MESSAGE FILE
140 GOSUB 2990
150 J7=7
160 D$(1)="NEW"
170 D$(2)="STA"
180 D$(3)="OLD"
190 D$(4)="INS"
200 D$(5)="EAR"
210 D$(6)="MOO"
220 D$(7)="TAB"
230 PRINT"FOR INSTRUCTIONS TYPE ' 0 ' AFTER 'COMMAND--?' APPEARS."
240 PRINT"
          FOR STANDARD GAME TYPE 'STA' AFTER 'COMMAND--?' APPEARS."
250 PRINT"TO STOP PLAYING TYPE  END  AFTER THE COMMAND?"
260REM     LUNAR GRAVITY IS DEFAULT INITIALIZATION
270 LET G=5
280REM  INITIALIZATION OF H5,V5,F5,F2 FOR "OLD" COMMAND
290 GOSUB 2310
300 LET G$="M00N"
310 LET C$="0"
320 PRINT"COMMAND--";
330 INPUT C$
340 PRINT C$
350REM   NOT CAR. RET.
360 IF C$="0" THEN 390
370 IF C$="END" THEN 3450
380 GO TO 480
390 PRINT"
          COMMAND";TAB(25);"EFFECT
```

```
                                        "
400 PRINT"  INS  -  LISTS INSTRUCTIONS FOR OPERATING PROGRAM"
410 PRINT"  STA  -  STANDARD INITIAL VALUES"
420 PRINT"  NEW  -  NEW INITIAL VALUES"
430 PRINT"  OLD  -  PREVIOUS INITIAL VALUES"
440 PRINT"  EAR  -  EARTH LANDING"
450 PRINT"  MOO  -  MOON LANDING"
460 PRINT"  TAB  -  PRINTS TABLE OF HEIGHTS AND SPEEDS FOR FALLING BODY"
470 GOTO 310
480 LET C0=1
490REM    DECODE ALL COMMANDS
500 CHANGE C$ TO C
510 LET J1=0
520REM    CHECK CHARACTERS
530 FOR J=1 TO C(0)
540 LET C1=C(J)
550 IF C1<=ASC(Z) THEN 600
560REM   MAKE UPPER CASE
570 LET C1=C1-32
580 GOTO 550
590REM    VALID ALPHA
600 IF C1>=ASC(A) THEN 700
610REM   SKIP APOSTROPHES
620 IF C1=ASC(') THEN 720
630REM SKIP SPACES
640 IF C1=ASC( ) THEN 720
650 PRINT"NON-ALPHABETIC CHARACTER IN YOUR COMMAND ";C$(C);"."
660 PRINT"
          RETYPE ";
670 IF C0=1 THEN 320
680 PRINT"ENTIRE INPUT LINE."
690 GOTO 310
700 LET J1=J1+1
710 LET C(J1)=C1
720 NEXT J
730 IF J1<3 THEN 810
740 LET C(0)=3
750REM              THREE CHARACTER COMMAND
760 CHANGE C TO C$
770 FOR J=1 TO J7
780REM          COMMAND DECODED
790 IF C$=D$(J) THEN 930
800 NEXT J
810 PRINT"YOUR COMMAND IS ILLEGAL! LEGAL COMMANDS ARE: "
820 FOR J=1 TO J7
830 PRINT"    ";D$(J);
840 NEXT J
850 PRINT
860 PRINT"TYPE 0 AT NEXT COMMAND--? FOR EXPLANATION OF COMMANDS"
870 PRINT" OR A LEGAL COMMAND TO CONTINUE"
880 GO TO 320
```

```
890REM
900REM
910REM    EXECUTE COMMANDS    *****
920REM
930 ON J GOTO 950,980,1010,1070,1110,1160,1200
940REM              START NEW GAME
950 GOSUB 2600
960 GOTO 1220
970REM              START STANDARD GAME
980 GOSUB 2310
990 GOTO 1220
1000REM              RELOAD OLD INITIAL VALUES
1010 LET H=H5
1020 LET V=V5
1030 LET F=F5
1040 GOSUB 2440
1050 GOTO 1230
1060REM          PRINT INSTRUCTIONS
1070 PRINT"THE INSTRUCTIONS ARE WITH THE PROGRAM DOCUMENTATION"
1080REM          NEXT COMMAND
1090 GO TO 2290
1100REM               EARTH GRAVITATION
1110 LET G=32
1120 LET G$="EARTH"
1130 LET F5=F5*3
1140 LET F2=F2*3
1150 GOTO 2290
1160 LET G=5
1170 LET G$="MOON"
1180 GOTO 2290
1190REM       PRINT FALLING BODY TABLE    ********
1200 GOSUB 2850
1210 GOTO 2290
1220 GOSUB 2520
1230 PRINT"  BURN";TAB(7);"TIME";TAB(15);"HEIGHT";TAB(24);"SPEED";
1240 PRINT TAB(43);"FUEL"
1250 LET T=0
1260REM      INITIALIZATION FOR MAT INPUT       *****
1270 LET N1=NUM(X)
1280 PRINT TAB(7);FNR(T);TAB(15);FNR(H);TAB(24);FNR(V);TAB(33);
1290REM      *****   IMPACT OCCURS    ***
1300 IF H<=0 THEN 2150
1310REM    *****   FUEL REMAINS   ***
1320 IF F>.0001 THEN 1390
1330 IF F1=0 THEN 1370
1340 PRINT"OUT OF FUEL.  FREE FALL STARTS NOW."
1350REM      SET BURN RATE TO ZERO
1360 LET F1=0
1370 PRINT TAB(2);FNR(F1)
1380 GOTO 1630
1390 PRINT FNR(F)
```

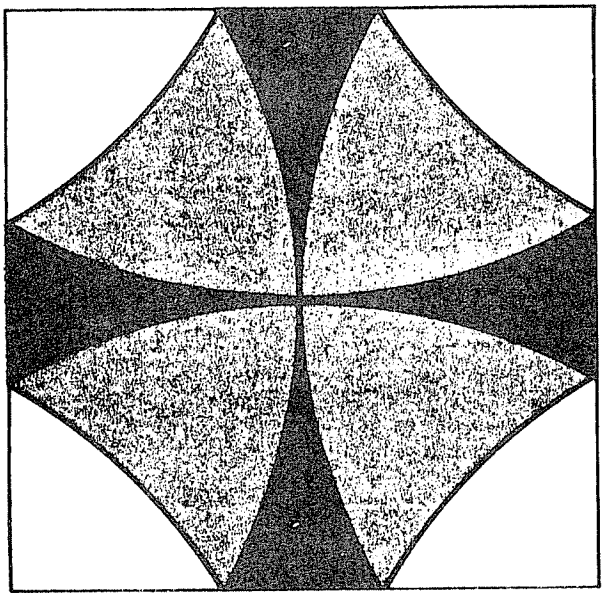
```
1400REM    ALL INPUT DATA USED
1410 IF N1=NUM(X) THEN 1460
1420 LET N1=N1+1
1430 LET F1=F(N1)
1440 PRINT" ";F1
1450 GOTO 1540
1460 MAT INPUT F
1470 IF NUM(X)>0 THEN 1510
1480 PRINT"INPUT YOUR BURN, WHICH MUST BE A NUMBER BETWEEN 0 AND";F2
1490 IF NUM(X)=0 THEN 1460
1500 GOTO 1460
1510 LET N1=1
1520 LET F1=F(1)
1530REM       NO TOO BIG
1540 IF ABS(F1)<=F2 THEN 1580
1550 PRINT"BURN RATE TOO BIG.--LIMIT  ";F2
1560 GOTO 1460
1570REM    FUEL LEFT AFTER BURN
1580 IF ABS(F1)<= F THEN 1630
1590REM    TIME OF BURN OUT
1600 LET T1=F/ABS(F1)
1610 GOTO 1650
1620REM  ONE SEC.INTERVAL, OR STEP TO NEAR SEC.
1630 LET T1=INT(T)+1-T
1640REM             ACCELERATION    *******
1650 LET A=F1-G
1660 IF ABS(A)>.00001 THEN 1750
1670REM             NOT HOVERING
1680 IF ABS(V)>.00001 THEN 1730
1690REM              HOVERING
1700 LET T6=T7=99999
1710 GOTO 1880
1720REM         ZERO ZCCELERATION
1730 LET T6=T7=H/V
1740 GOTO 1880
1750 LET T3=V/A
1760 LET T4=2*H/A
1770 LET T5=T3*T3-T4
1780REM           NEG. DISCR. MEANS NO ROOTS
1790 IF T5<0 THEN 2040
1800 LET T5=SQR(T5)
1810REM T6&T7 ARE IMPACT TIMES FOR THIS A,H&V
1820 LET T6=T3+T5
1830 LET T7=T3-T5
1840REM   NEXT FEW LINES TEST T6 NAD T7 TO SEE IN THEY OCCUR DURING
1850REM  THE TIME INTERVAL 0 TO T1. IF SO,IMPACT OCCURS. IF BOTH
1860REM  T6 AND T7 ARE IN THE INTERVAL. THE EARLIER IS THE IMPACT
1870REM  TIME. T1 IS REPALCED BY THE IMPACT TIME IF IN THE INTERVAL....
1880 IF T6<0 THEN 2010
1890 IF T6>T1 THEN 2010
1900 IF T7<0 THEN 1950
```

```
1910 IF T7>T1 THEN 1950
1920 IF T6<T7 THEN 1950
1930 LET T1=T7
1940 GOTO 1970
1950 LET T1=T6
1960REM       ***   IMPACT HEIGHTH    ***
1970  LET H=0
1980REM             SPEED CHANGE
1990 LET A=A*T1
2000 GOTO 2080
2010 IF T7<0 THEN 2040
2020 IF T7<=T1 THEN 1930
2030REM             SPEED CHANGE
2040 LET A=A*T1
2050REM             NEW HEIGHTH
2060  LET H=H-(V-A/2)*T1
2070REM          NEW SPEED
2080 LET V=V-A
2090REM       NEW FUEL SUPPLY
2100 LET F=F-ABS(F1)*T1
2110REM             NEXT TIME
2120 LET T=T+T1
2130REM        GET NEXT BURN RATE
2140   GO TO 1280
2150 PRINT FNR(F);"
                  "
2160 FOR L=1 TO L0
2170 IF V<L(L) THEN 2200
2180 NEXT L
2190REM         GET NEXT MESSAGE     :::::
2200 LET T(L)=T(L)+1
2210 IF T(L)<=S(L) THEN 2230
2220 LET T(L)=1
2230 PRINT R$(R(T(L),L));"
                          "
2240REM        ****     TRY AGAIN    ****
2250 PRINT"WANT ANOTHER TRY WITH THIS DATA??-(YES OR NO) "
2260 INPUT O$
2270 IF O$="YES" THEN 1010
2280 IF O$="Y" THEN 1010
2290REM   ********** NEXT COMMAND
2300 GOTO 310
2310REM    **** STANDARD  PARAMETERS     ******
2320 IF G=5 THEN 2400
2330 LET H5=H=500
2340 LET V5=V=50
2350REM    MORE FUEL FOR EARTH GRAVITY
2360 LET F5=F=300
2370REM     MORE THRUST
2380 LET F2=100
2390 GOTO 2440
```

```
2400 LET H5=H=500
2410 LET V5=V=50
2420 LET F=F5=120
2430 LET F2=30
2440 LET E=V*V/2+G*H
2450 LET H1=E/F2
2460 LET V1=SQR(2*(E-G*H1))
2470 LET F3=2*E/V1
2480 LET V9=SQR(2*E)
2490 LET T9=2*H/(V+V9)
2500 LET F8=F-INT(F3+.5)
2510 RETURN
2520 PRINT"


          STARTING HEIGHT:";H;"FT"
2530 PRINT"STARTING SPEED:";V;"FT/SEC"
2540 PRINT"FUEL SUPPLY:";F;"UNITS"
2550 PRINT"MAXIMUM BURN:";F2;"UNITS/SEC"
2560 PRINT"BURN TO CANCEL GRAVITY OF ";G$;":";G;"UNITS/SEC"
2570 PRINT"
          CRASH TIME:";T9;"SEC"
2580 PRINT"CRASH SPEED:";V9;"FT/SEC"
2590 RETURN
2600REM    ** RANDOM VALUES FOR A NEW GAME  **
2610REM    BURN RATE
2620 LET F2=2*G+5*INT(7*RND(X)+1)
2630REM   BURN PERIOD
2640 LET T3=INT(6*RND(X))+3
2650REM    ACCELERATIN FOR BURN
2660 LET A=F2-G
2670REM    VELOCITY AT START OF BURN
2680 LET V1=A*T3
2690REM    HEIGHTH AT START OF BURN
2700 LET H1=V1*T3/2
2710REM    FUEL USED
2720 LET F1=F2*T3
2730REM  COASTING PERIOD
2740 LET T4=1+INT(T3/2+3*RND(X))
2750REM    INITIAL SPEED
2760 LET V5=V=V1-G*T4
2770 LET H=H1-G*T4*T4/2+V1*T4
2780REM    INITIAL HEIGHTH
2790 LET H5=H=5*INT(H/5+.5)
2800REM    INITIAL FUEL SUPPLY
2810 LET F5=F=5*INT(1.25*F2/5+.5)
2820REM    MAX. BURN RATE
2830 LET F2=5*INT(1.25*F2/5+.5)
2840 GOTO 2440
2850REM     FALLING BODY TABLE
```

```
2860 PRINT"

           HOW A BODY FALLS FROM REST ON THE ";G$
2870 PRINT"
           (ACCELERATION =";G;"FT/SEC/SEC)"
2880 PRINT TAB(2);"TIME";TAB(11);"DISTANCE";TAB(22);"SPEED"
2890 PRINT TAB(2);"(SEC)";TAB(13);"(FT)";TAB(21);"(FT/SEC)"
2900 PRINT
2910 FOR T=0 TO 10
2920 PRINT TAB(3);T;TAB(13);G*T*T/2;TAB(23);G*T
2930 NEXT T
2940 PRINT"
           DISTANCES ARE MEASURED FROM POINT OF RELEASE"
2950 PRINT"DOWNWARD TO THE POSITION AT THE END OF EACH"
2960 PRINT"PERIOD OF TIME.

                                "
2970 RETURN
2980REM
2990REM        INPUT ERROR MESSAGES    *******
3000REM
3010REM     # OF SPEED CATAGORIES
3020 L0=4
3030 FOR L=1 TO L0
3040REM      LANDING SPEEDS FOR MESSAGES
3050 READ L(L)
3060 NEXT L
3070 DATA 5,15,30,99999
3080 X7=37
3090 FOR I=1 TO X7
3100 READ L
3110 LET S(L)=S(L)+1
3120REM           #  MESSAGES    *****
3130 LET S=S+1
3140REM           MESSAGES    ******
3150 READ R$(S)
3160 LET R(S(L),L)=S
3170 NEXT I
3180 DATA 3,NO WAY.,1,YOUR MISSION WAS AS THEY SAY- NOMINAL.
3190 DATA 4,OOH...I CAN'T LOOK AT THAT MESS.,3,WELL BACK TO THE DRAWING BOARD
3200 DATA 4,BLOOD-GUTS-TWISTED METAL...YUCK!,3,THIS LEM COST $73-257-892.25
3210 DATA 3,PLEASE DON'T LITTER,2,DA CAPO,2,OTRA VEZ.,2,REPITEZ.,1,YES
3220 DATA 4,IS YOUR INSURANCE PAID UP?,1,GLORYOSKY-HE MADE IT
3230 DATA 4,YOUR NEXT OF KIN WILL BE NOTIFIED,4,THAT'S A SOFT LANDING?
3240 DATA 3,YOU'RE ALIVE- MAJOR ARMSTRONG -BUT YOUR FLYING DAYS ARE OVER
3250 DATA 4,WHY DON'T YOU TAKE UP GOLF?,4,HAVE YOU TRIED TIDDLEWINKS?
3260 DATA 3,SIMPLY SMASHING...,3,A CRASH PROGRAM,1,OUTASIGHT.,1,RIGHT ON
3270 DATA 1,OH WOW,2,HO HUM.,3,IT SEEMS YOU'RE GROUNDED.
3280 DATA 3,MAYBE YOU'RE JUST NOT CUT OUT FOR THIS KIND OF WORK.
3290 DATA 4,DID YOU SEE WHAT I SAW- ORVILLE?,1,IT'S CHARLES LINDBERG
```

```
3300 DATA 4,WHEEE.,3,MAYBE YOU COULD GET A POOLED-RISK POLICY?
3310 DATA 2,EVERYTHING HAS IT'S UPS AND DOWNS.
3320 DATA 4,ZONK.,4,TO DIE- TO SLEEP- NO MORE...
3330 DATA 3,IT'S A BIRD!!  IT'S A PLANE!!!  IT'S A MISCALCULATION.
3340 DATA 4,ACTION UNGOVERENED BY THOUGHT ENDS IN DISASTER.
3350 DATA 2,ARE YOU ACCIDENT PRONE?,2,TERRA-FIED???
3360 FOR L=1 TO L0
3370 FOR J=S(L) TO 2 STEP-1
3380 LET I=RND(X)*J+1
3390 LET R1=R(I,L)
3400 LET R(I,L)=R(J,L)
3410 LET R(J,L)=R1
3420 NEXT J
3430 NEXT L
3440 RETURN
3450 END
```



ASTRONAUT INSTRUCTIONS

YOU ARE THE PILOT OF A LUNAR LANDER (LEM). INITIALLY YOUR LEM IS, SEVERAL HUNDRED FEET ABOVE THE LUNAR SURFACE AND IS HURTLING STRAIGHT, DOWN TOWARDS IT- PICKING UP SPEED AS IT FALLS- WITH ITS ROCKET, ENGINES TURNED OFF. YOUR OBJECTIVE IS TO MAKE A SOFT LANDING ON THE, MOON. THE ONLY THING YOU HAVE TO BRAKE YOUR FALL WITH IS YOUR, ROCKET ENGINE. YOU HAVE TO DECIDE WHEN TO TURN IT ON AND HOW MUCH, THRUST TO USE. ONCE A SECOND YOU GET A CHANCE TO CHANGE YOUR MIND, AND USE A DIFFERENT AMOUNT OF THRUST. AT THE END OF EVERY SECOND OF, YOUR FLIGHT THE COMPUTER WILL TELL YOU HOW HIGH YOU ARE- HOW FAST, YOU ARE FALLING- AND HOW MUCH FUEL IS LEFT.,

1. ABOUT YOUR ENGINE. YOUR ENGINE HAS TWO LIMITATIONS: THERE IS A, MAXIMUM AMOUNT OF THRUST IT CAN EXERT- AND THERE IS A LIMITED, AMOUNT OF FUEL ON BOARD. ONCE YOUR FUEL IS GONE YOU FALL LIKE A, BRICK. YOU HAVE ENOUGH EXCESS TO GIVE A SAFETY FACTOR- BUT NOT, ENOUGH TO BE SLOPPY.,

2. HOW TO SPECIFY YOUR THRUST. THE FORCE OF YOUR THRUST IS DETERMINED, BY THE AMOUNT OF FUEL BURNED EACH SECOND IN YOUR ENGINE. AT THE END, OF EACH SECOND OF YOUR FLIGHT YOUR TERMINAL WILL TYPE A QUESTION, MARK IN A COLUMN LABELLED 'BURN'. YOU MUST THEN TYPE THE NUMBER OF, UNITS OF FUEL YOU WANT BURNED DURING THE NEXT SECOND. MORE FUEL, EQUALS MORE THRUST.,

3. DEFINITION OF 'UNIT OF FUEL'. THE EFFECT OF BURNING ONE UNIT OF, FUEL PER SECOND IS TO REDUCE YOUR ACCELERATION TOWARDS THE MOON, BY ONE FOOT PER SECOND EACH SECOND. SINCE LUNAR GRAVITY CAUSES, YOUR LEM TO ACCELERATE 5 FT/SEC EACH SECOND- THIS MEANS THAT IF YOU, BURN 5 UNITS OF FUEL PER SECOND LUNAR GRAVITY WILL BE CANCELLED AND, YOUR SPEED WILL NOT CHANGE DURING THAT SECOND. TO SLOW DOWN- YOUR, BURN MUST BE LARGER THAN 5 UNITS/SEC. LESS THAN 5 UNITS, MEANS A SPEED-UP.,

4. HOW SOFT IS 'SOFT'? YOUR LANDING WILL BE CONSIDERED SOFT IF YOUR, SPEED AT TOUCHDOWN IS 5 FT/SEC OR LESS. IF YOU HIT TOO HARD- ALL IS, NOT LOST. THE PROGRAM WILL RESTART WITH THE OLD INITIAL VALUES FOR, HEIGHT- SPEED- AND FUEL SUPPLY AND- UNLIKE REAL LIFE- YOU CAN TRY, AGAIN. ONCE YOU HAVE MADE A GOOD LANDING THE PROGRAM WILL TYPE THE, PHRASE 'COMMAND--?' IF YOU WANT TO TRY FOR AN EVEN SOFTER LANDING, FOR THE SAME INITIAL VALUES YOU SHOULD TYPE 'OLD'. IF YOU WANT A NE, SET OF INITIAL VALUES- TYPE 'NEW'.,

5. IF IT'S HARD TO LAND ON THE MOON YOU SHOULD TRY IT ON EARTH. AND YO; CAN IF YOU WANT TO. WHEN 'COMMAND--?' APPEARS- TYPE 'EARTH' IN; ORDER TO CHANGE TO EARTH GRAVITATION. SINCE GRAVITATIONAL ACCELERA-; TION ON EARTH IS 32 FT/SEC/SEC- YOU MUST BURN MORE THAN 32 UNITS OF; FUEL PER SECOND TO SLOW DOWN. (TO GO BACK TO LUNAR GRAVITATION TYPE; 'MOON' THE NEXT TIME 'COMMAND--?' APPEARS.);

6. HELPFUL (?) TABLES. YOU MAY FIND IT HELPFUL TO HAVE SOME INFORMA-; TION ON THE WAY A BODY FALLS FROM REST ON THE MOON (OR EARTH). IF; YOU RESPOND TO 'COMMAND--?' BY TYPING 'TABLE' YOUR TERMINAL WILL PRO; DUCE A TABLE SHOWING- AT ONE SECOND INTERVALS- THE DISTANCE A BODY; HAS FALLEN BELOW ITS INITIAL HEIGHT AND THE SPEED IT HAS REACHED.;

7. INPUT CONVENIENCES.;
   A. COMMANDS SHOULD BE ABBREVIATED TO THEIR FIRST 3 LETTERS.;
   B. COMMANDS WILL BE REQUESTED UNTIL AN; 'END' COMMAND IS TYPED IN.;
   C. A SERIES OF BURNS CAN BE TYPED; AT THE SAME TIME. THEY WILL BE EXECUTED IN LEFT-RIGHT ORDER.;
   D. THE NUMBERS MUST BE SEPARATED BY COMMAS; AND ONLY NUMBERS MAY BE ENTERED;

8. FOR THE NOVICE. IF YOU HAVE NEVER USED THIS PROGRAM BEFORE YOU; SHOULD EXPERIMENT WITH A STANDARD SITUATION FIRST. NORMALLY; INITIAL VALUES ARE SELECTED AT RANDOM WHENEVER A 'NEW' GAME BEGINS.; HOWEVER- IF YOU INPUT THE COMMAND 'STANDARD' YOU WILL ALWAYS GET; THE SAME INITIAL VALUES. ONCE YOU HAVE MASTERED THE STANDARD GAME; YOU CAN (A) IMPRESS YOUR DATE WITH YOUR SKILL- AND (B) MOVE ON TO; MORE INTERESTING THINGS.;

9. HAPPY LANDINGS.;

```
RUN ASTRONAUT




FOR INSTRUCTIONS TYPE 'INS' AFTER 'COMMAND--?' APPEARS.

FOR STANDARD GAME TYPE 'STA' AFTER 'COMMAND--?' APPEARS.
COMMAND--?STA
STA



STARTING HEIGHT:  500 FT
STARTING SPEED:   50 FT/SEC
FUEL SUPPLY:  120 UNITS
MAXIMUM BURN:   30 UNITS/SEC
BURN TO CANCEL GRAVITY OF M00N:    5 UNITS/SEC

CRASH TIME:   7.320508 SEC
CRASH SPEED:   86.60254 FT/SEC
  BURN TIME    HEIGHT   SPEED              FUEL
            0     500       50              120
?2
            1      448.5    53              118
?3
            2      394.5    55              115
?0
            3     337       60              115
?4
            4      276.5    61              111
?2
            5     214       64              109
?2
            6      148.5    67              107
?5
            7    81.5       67              102
?0
            8      12       72              102
?102
BURN RATE TOO BIG.--LIMIT     30
?30
        8.17        0       67.71    96.85

HE'S BLASTED OFF TO THAT GREAT SPACESHIP IN THE SKY.

WANT ANOTHER TRY WITH THIS DATA??-(YES OR NO)
?NO
COMMAND--?END
END
```

BAGEL:

DESCRIPTION

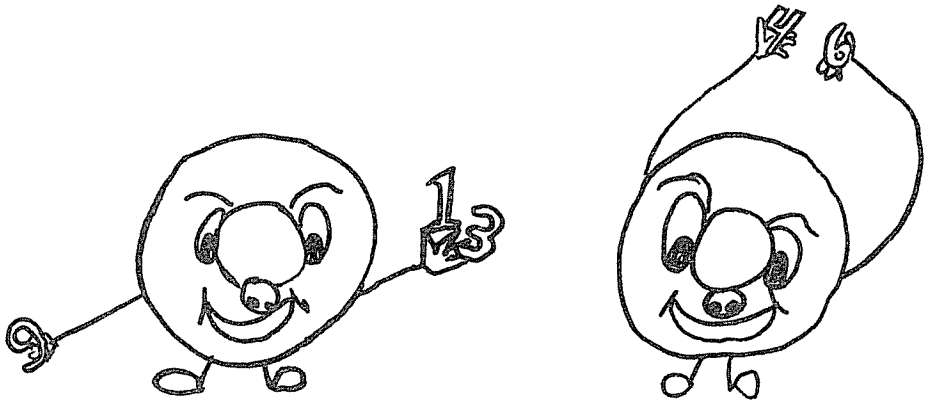
In this game the computer guesses a four digit number. The number may be plus or minus and is chosen randomly. The computer gives you clues every time you make a guess.

INSTRUCTIONS

The program will provide prompting where necessary. For additional instructions list the program.

LIMITATIONS

Nine K Bytes of memory are required to store the source code for this program. The game should execute in 11K Bytes of memory. There is a sample run of the game following the source code listing.



BAGEL

```
100 REM THIS IS BAGEL
120  REM PROGRAMMED BY ROGER BROWN
140 REM EDITED BY MORT BERGER (SINCE ROGER BROWN CAN NEITHER ADD,
160 REM SUBTRACT, NOR SPELL)
180 PRINT "THIS IS A GAME OF SKILL AND ABILITY; IT'S CALLED BAGEL."
200 PRINT "THE COMPUTER WILL SELECT A FOUR-DIGIT NUMBER AND YOU"
220 PRINT "MUST GUESS WHAT THE NUMBER IS."
240  PRINT
260 PRINT "THE RULES ARE SIMPLE. YOU CAN PLAY A 'CREAM-PUFF' VERSION"
280 PRINT "OR A HIGH-LEVEL GAME WHICH IS MORE COMPLICATED."
300 PRINT "IN THE HIGH LEVEL GAME THE FOUR-DIGIT NUMBER MAY BE "
320  PRINT "EITHER POSITIVE OR NEGATIVE."
340  PRINT "AFTER I HAVE SELECTED MY NUMBER YOU WILL GUESS WHAT IT IS"
360 PRINT "BY ENTERING A FOUR-DIGIT NUMBER. I WILL TELL YOU HOW CLOSE"
380 PRINT "YOU HAVE COME BY GIVING YOU THE FOLLOWING CLUES;"
400  PRINT "   BAGELS  -  NO DIGITS CORRECT"
420  PRINT "   PICO    -  ONE DIGIT CORRECT BUT IN THE WRONG POSITION"
440  PRINT "   FERMI   -  ONE DIGIT CORRECT AND IN THE RIGHT POSITION"
460  GOTO 800
480 S1=0
500 PRINT "DO YOU WANT A HIGH-LEVEL GAME (1) OR A CREAM-PUFF GAME (2)"
520 PRINT
540 INPUT P1
560  IF P1=1 GOTO 680
580  IF P1=2 GOTO 680
600  PRINT
620  PRINT "TYPE EITHER A 1 FOR A HIGH-LEVEL GAME OR"
640  PRINT"A 2 FOR A CREAM-PUFF GAME"
660  GOTO520
680  PRINT
700  P2=INT(RND(-5)+1.5)
720  B3=(-1)**P2
740 IF P1=2 GOTO 960
760 PRINT "GOOD LUCK"
780 GOTO 1060
800  PRINT
820  PRINT
840 PRINT "IF TWO NUMBERS ARE IN THE PROPER POSITION THE"
860  PRINT "COMPUTER WILL PRINT 'FERMI FERMI.'  IF THREE NUMBERS"
880 PRINT "ARE IN THE PROPER POSITION, THE COMPUTER WILL PRINT"
900 PRINT "'FERMI, FERMI, FERMI' AND SO FORTH."
```

```
920 PRINT
940 GOTO 500
960 P3=1
980 PRINT
1000 N1=0
1020 PRINT "FINE. I HAVE SELECTED MY NUMBER."
1040 GOTO 1120
1060 PRINT
1080 N1=0
1100 PRINT "NOW! I'VE PICKED A NUMBER"
1120  X1=(RND(-1)+1)*(10000)
1140  X2=(X1-10000)
1160  X3=INT(X2)*P3
1180  X7=INT(X3/1000)
1200  IF P3=1 GOTO 1240
1220 X7=X7+1
1240  X6=(INT(X3/100)-(10*X7))
1260  IF P3=1 GOTO 1300
1280  X6=X6+1
1300 X5=(INT(X3/10)-(100*X7)-(10*X6))
1320 IF P3=1 GOTO 1360
1340 X5=X5+1
1360 X4=(X3-(1000*X7)-(100*X6)-(10*X5))
1380 L1=0
1400 PRINT
1420 PRINT "WHAT'S YOUR GUESS"
1440 GOTO 1520
1460 GOTO 1480
1480 L1=0
1500 PRINT "O.K.! WHAT'S YOUR NEXT GUESS"
1520 N1=N1+1
1540 INPUT I
1560  I7=INT(I/1000)
1580  IF I=>0 GOTO 1620
1600  I7=I7+1
1620  I6=(INT(I/100)-(10*I7))
1640  IF I=>0 GOTO 1680
1660 I6=I6+1
1680 I5=(INT(I/10)-(100*I7)-(10*I6))
1700 IF I=>0 GOTO 1740
1720 I5=I5+1
1740 I4=(I-(1000*I7)-(100*I6)-(10*I5))
1760  IF I7<>X7 GOTO 2000
1780  IF I6<>X6 GOTO 1860
1800  IF I5<>X5 GOTO 1960
1820  IF I4<>X4 GOTO 2400
1840 GOTO 3320
1860  IF I5<>X5 GOTO 1920
1880  IF I4<>X4 GOTO 5900
1900  GOTO 2400
1920  IF I4<>X4 GOTO 5940
```

```
1940  GOTO 5900
1960  IF I4<>X4 GOTO 5900
1980  GOTO 2400
2000  IF I6<>X6 GOTO 2120
2020  IF I5<>X5 GOTO 2080
2040  IF I4<>X4 GOTO 5900
2060  GOTO 2400
2080  IF I4<>X4 GOTO 5940
2100  GOTO 5900
2120  IF I5<>X5 GOTO 2180
2140  IF I4<>X4 GOTO 5940
2160  GOTO 5900
2180  IF I4<>X4 GOTO 2220
2200  GOTO 5940
2220  IF I7=X6 GOTO 2300
2240 IF I7=X5 GOTO 2300
2260  IF I7=X4 GOTO 2300
2280  GOTO 2540
2300  IF L1=1 GOTO 2440
2320  IF L1=2 GOTO 2520
2340 IF L1=11 GOTO 2480
2360  L1=9
2380  GOTO 2540
2400 L1=1
2420 GOTO 2220
2440  L1=3
2460  GOTO 2540
2480 L1=13
2500 GOTO 5600
2520 L1=4
2540  IF I6=X7 GOTO 2620
2560  IF I6=X5 GOTO 2620
2580  IF I6=X4 GOTO 2620
2600  GOTO 6020
2620  IF L1=1 GOTO 2820
2640  IF L1=2 GOTO 2860
2660  IF L1=3 GOTO 2900
2680  IF L1=4GOTO 2940
2700  IF L1=9 GOTO 5980
2720 IF L1=11 GOTO 2780
2740  L1=9
2760  GOTO 6020
2780 L1=13
2800 GOTO 5600
2820  L1=3
2840  GOTO 6020
2860  L1=4
2880  GOTO 6020
2900  L1=5
2920  GOTO 6020
2940  L1=6
```

```
 2960  GOTO 5600
 2980  PRINT
 3000  PRINT "FERMI"
 3020  IF P1=1 GOTO 3040
 3040  PRINT
 3060  GOTO 1460
 3080  PRINT
 3100  PRINT "FERMI"
 3120  PRINT "FERMI"
 3140 PRINT
 3160 GOTO 1460
 3180  IF P1=1 GOTO 2980
 3200  PRINT
 3220  PRINT "FERMI"
 3240  PRINT "FERMI"
 3260  PRINT "FERMI"
 3280  PRINT
 3300  GOTO 1460
 3320  PRINT
 3340  PRINT "YOU GOT IT!"
 3360  PRINT "IT ONLY TOOK YOU "; N1;"GUESSES"
 3380  PRINT
 3400  IF N1=1 GOTO 3720
 3420 IF N1<5 GOTO 3780
 3440  IF P1=1 GOTO 3540
 3460  IF N1<8 GOTO 3820
 3480  IF N1<15 GOTO 3860
 3500  IF N1<24 GOTO 3900
 3520  IF N1>17 GOTO 3940
 3540  IF N1<18 GOTO 3680
 3560  IF N1<27 GOTO 3820
 3580  IF N1<38 GOTO 3640
 3600  IF N1<55 GOTO 3900
 3620  IF N1>32 GOTO 3940
 3640  PRINT "NOT BAD."
 3660  GOTO 3960
 3680  PRINT "EXCELLENT!  YOU DID IT IN LESS THAN 18 TRIES."
 3700  GOTO 3960
 3720  PRINT "THE ODDS ARE 10000 TO 1 AGAINST GUESSNG THE NUMBER IN"
 3740  PRINT "ONE TRY.  YOU MUST BE A SUPER-LUCKY PERSON."
 3760  GOTO 3960
 3780  PRINT " YOU MUST BE EITHER VERY GOOD OR VERY LUCKY."
 3800  GOTO 3960
 3820  PRINT "VERY GOOD JOB."
 3840  GOTO 3960
 3860  PRINT "NOT BAD. NOT BAD AT ALL."
 3880  GOTO 3960
 3900  PRINT "I THINK YOU NEED MORE PRACTICE."
 3920  GOTO 3960
 3940 PRINT "YOU WEREN'T REALLY TRYING HARD, WERE YOU ?"
 3960  PRINT
```

```
3980  PRINT
4000  S1=S1+1
4020  IF S1>=7 THEN 7540
4040  PRINT "WOULD YOU LIKE TO TRY IT AGAIN"
4060  INPUT M$
4080  PRINT
4100  PRINT
4120  PRINT
4140  IF M$="Y" GOTO 500
4160  IF M$="ч" GOTO 500
4180  IF M$="YES" GOTO 500
4200  IF M$="чEs" GOTO 500
4220  PRINT
4240  PRINT
4260  PRINT
4280  GOTO 7580
4300  PRINT
4320  PRINT "BAGELS"
4340  PRINT
4360  GOTO 1460
4380  PRINT
4400  PRINT "PICO"
4420  IF P1=1 GOTO 4440
4440  PRINT
4460  GOTO 1460
4480  PRINT
4500  PRINT "PICO"
4520  PRINT "PICO"
4540  PRINT
4560  GOTO 1460
4580  PRINT
4600  PRINT "PICO"
4620  PRINT "PICO"
4640  PRINT "PICO"
4660  PRINT
4680  GOTO 1460
4700  PRINT
4720  PRINT "PICO"
4740  PRINT "PICO"
4760  PRINT "PICO"
4780  PRINT "PICO"
4800  PRINT
4820  GOTO 1460
4840  PRINT
4860  PRINT "FERMI"
4880  PRINT "FERMI"
4900  PRINT "PICO"
4920  PRINT "PICO"
4940  PRINT
4960  GOTO 1460
4980  PRINT
```

```
5000  PRINT "FERMI"
5020  PRINT "PICO"
5040  PRINT
5060  GOTO 1460
5080  PRINT
5100  PRINT "FERMI"
5120  PRINT "PICO"
5140  PRINT "PICO"
5160  PRINT
5180  GOTO 1460
5200  PRINT
5220  PRINT "FERMI"
5240  PRINT "PICO"
5260  PRINT "PICO"
5280  PRINT "PICO"
5300  PRINT
5320  GOTO 1460
5340 PRINT
5360 PRINT "FERMI"
5380 PRINT "FERMI"
5400 PRINT "FERMI"
5420 PRINT "PICO"
5440 PRINT
5460 GOTO 1460
5480  PRINT
5500  PRINT "FERMI"
5520  PRINT "FERMI"
5540  PRINT "PICO"
5560  PRINT
5580  GOTO 1460
5600  IF P1=1 GOTO 7260
5620  IF L1=1  GOTO 2980
5640  IF L1=2 GOTO 3080
5660  IF L1=3 GOTO 4980
5680  IF L1=4 GOTO 5480
5700  IF L1=5 GOTO 5080
5720  IF L1=6 GOTO 4840
5740  IF L1=7 GOTO 5200
5760  IF L1=8 GOTO 4580
5780  IF L1=9 GOTO 4380
5800  IF L1=10 GOTO 4480
5820 IF L1=11 GOTO 3180
5840  IF L1=12 GOTO 4700
5860 IF L1=13 GOTO 5340
5880  IF L1=0 GOTO 4300
5900  L1=2
5920  GOTO 2220
5940  L1=1
5960  GOTO 2220
5980  L1=10
6000  GOTO 6020
```

```
6020  IF I5=X7 GOTO 6100
6040  IF I5=X6 GOTO 6100
6060  IF I5=X4 GOTO 6100
6080  GOTO 6600
6100  IF L1=1 GOTO 6300
6120  IF L1=2 GOTO 6340
6140  IF L1=3 GOTO 6380
6160  IF L1=4 GOTO 6420
6180  IF L1=5 GOTO 6460
6200  IF L1=9 GOTO 6500
6220  IF L1=10 GOTO 6580
6240  IF L1=11 GOTO 6540
6260  L1=9
6280  GOTO 6600
6300  L1=3
6320  GOTO 6600
6340  L1=4
6360  GOTO 6600
6380  L1=5
6400  GOTO 6600
6420  L1=6
6440  GOTO 5600
6460  L1=7
6480  GOTO 5600
6500  L1=10
6520  GOTO 6600
6540  L1=13
6560  GOTO 5600
6580  L1=8
6600  IF I4=X7 GOTO 6680
6620  IF I4=X6 GOTO 6680
6640  IF I4=X5 GOTO 6680
6660  GOTO 5600
6680  IF L1=1 GOTO 6900
6700  IF L1=2 GOTO 6940
6720  IF L1=3 GOTO 6980
6740  IF L1=4 GOTO 7020
6760  IF L1=5 GOTO 7060
6780  IF L1=8 GOTO 7220
6800  IF L1=9 GOTO 7100
6820  IF L1=10 GOTO 7180
6840  IF L1=11 GOTO 7140
6860  L1=9
6880  GOTO 5600
6900  L1=3
6920  GOTO 5600
6940  L1=4
6960  GOTO 5600
6980  L1=5
7000  GOTO 5600
7020  L1=6
```

```
7040  GOTO 5600
7060  L1=7
7080  GOTO 5600
7100  L1=10
7120  GOTO 5600
7140  L1=13
7160  GOTO 5600
7180  L1=8
7200  GOTO 5600
7220  L1=12
7240  GOTO 5600
7260   IF L1=0 GOTO 4300
7280   IF L1=1 GOTO 2980
7300   IF L1=2 GOTO 2980
7320   IF L1=3 GOTO 2980
7340   IF L1=4 GOTO 2980
7360   IF L1=5 GOTO 2980
7380   IF L1=6 GOTO 2980
7400   IF L1=7 GOTO 2980
7420   IF L1=8 GOTO 4380
7440   IF L1=9 GOTO 4380
7460   IF L1=10 GOTO 4380
7480 IF L1=11 GOTO 2980
7500   IF L1=12 GOTO 4380
7520 IF L1=13 GOTO 2980
7540   PRINT "YOUR EYES APPEAR TO BE GETTING BLOODSHOT; TIME FOR A NAP."
7560   GOTO 7580
7580   PRINT "THANK YOU FOR PLAYING. HOPE YOU ENJOYED YOURSELF."
7600 END
```

```
BAGEL


THIS IS A GAME OF SKILL AND ABILITY; IT'S CALLED BAGEL.
THE COMPUTER WILL SELECT A FOUR-DIGIT NUMBER AND YOU
MUST GUESS WHAT THE NUMBER IS.

THE RULES ARE SIMPLE.  YOU CAN PLAY A 'CREAM-PUFF' VERSION
OR A HIGH-LEVEL GAME WHICH IS MORE COMPLICATED.
IN THE HIGH-LEVEL GAME THE FOUR-DIGIT NUMBER MAY BE
EITHER POSITIVE OR NEGATIVE.
AFTER I HAVE SELECTED MY NUMBER YOU WILL GUESS WHAT IT IS
BY ENTERING A FOUR-DIGIT NUMBER.  I WILL TELL YOU HOW CLOSE
YOU HAVE COME BY GIVING YOU THE FOLLOWING CLUES:
   BAGELS  -  NO DIGITS CORRECT
   PICO    -  ONE DIGIT CORRECT BUT IN THE WRONG POSITION
   FERMI   -  ONE DIGIT CORRECT AND IN THE RIGHT POSITION

THE CREAM-PUFF GAME GIVES YOU ADDITIONAL CLUES.
IF TWO NUMBERS ARE IN THE PROPER POSITION THE
COMPUTER WILL PRINT 'FERMI FERMI.'  IF THREE NUMBERS
ARE IN THE PROPER POSITION, THE COMPUTER WILL PRINT
'FERMI, FERMI, FERMI' AND SO FORTH.

DO YOU WANT A HIGH-LEVEL GAME (1) OR A CREAM-PUFF GAME (2)

?2


FINE.  I HAVE SELECTED MY NUMBER.

WHAT'S YOUR GUESS
?2346

PICO

O.K.! WHAT'S YOUR NEXT GUESS
?5179

FERMI
PICO

O.K.! WHAT'S YOUR NEXT GUESS
```

BIO * CYCLE:

DESCRIPTION

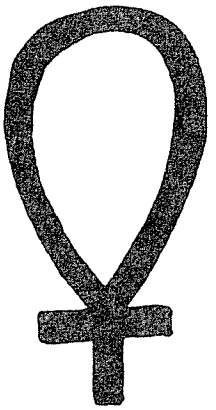
This program produces the famous Bio — Rhythm chart and provides you with a list of your critical days. On a critical day you are considerably more accident prone then on a non-critical day. A plot of your three rhythms — Cognitive, Emotional and Physical, may be produced in addition to the listing of your critical days.

INSTRUCTIONS

The program is self prompting and contains a detailed set of instructions. Once loaded into memory type RUN, you will then be asked if you want instructions. If you do you type in a Y or YES otherwise N or NO. List the program for subroutine details.

LIMITATIONS

This program is 9K Bytes in length and should execute in standard Basic. A sample run is included after the source code listing. This program contains a Julian Date subroutine and a Calender Dating subroutine.



BIO CYCLE

```
100 REM THIS IS  BIO-CYCLE
110 PRINT "* WELCOME TO * BIO-CYCLE * - IF YOU WOULD LIKE"
120 PRINT "INFORMATION TYPE A - 1, ELSE -2";
130 INPUT S5
140 PRINT
150 PRINT
160 IF S5<>1 THEN 650
170 PRINT "  HELLO. I AM GOING TO DRAW A GRAPH OF YOUR BIO-CYCLE. ?? !"
180 PRINT "WHAT IS A   BIO-CYCLE !   INDEED !  IT CONSIST OF THE THREE"
190 PRINT "RHYTHM'S THAT YOUR BODY IS CONSTANTLY GOING THROUGH. THESE"
200 PRINT "RHYTHM'S ARE AS FOLLOWS:"
210 PRINT
220 PRINT "   1. YOUR PHYSICAL CYCLE. THIS CYCLE AFFECTS THE MUSCLE FIBERS"
230 PRINT "IN YOUR BODY. IN TURN THIS EFFECTS YOUR ENDURANCE, STRENGTH,"
240 PRINT "AND PHYSICAL WELL BEING. EFFECTS WORSEN ON THE DOWN CYCLE (MINUS"
250 PRINT "SIDE OF THE CURVE) AND LESSEN ON THE (POSITIVE SIDE). THE PEAK"
260 PRINT "OF THE CURVE (POSITIVE - TO THE RIGHT) REPRESENTS YOUR GREATEST"
270 PRINT "PERIOD OF STRENGTH AND ENDURANCE, WHILE THE VALLEY (THE MINUS"
280 PRINT "SIDE - TO THE LEFT) IS THE POINT OF LEAST PHYSICAL RESISTANCE."
290 PRINT "   2. YOUR EMOTIONAL CYCLE. THIS CYCLE IS RELATED TO YOUR NERVOUS"
300 PRINT "SYSTEM AND IT AFFECTS YOUR EMOTIONAL SENSITIVITY. THIS EFFECTS"
310 PRINT "YOUR FRIENDLINESS, COOPERATIVENESS, AND YOUR OPTIMISM. WHILE"
320 PRINT "THIS CYCLE, WHICH IS REPRESENTED BY THE CURVE DRAWN WITH THE"
330 PRINT "LETTER 'E' , IS NEGATIVE YOU ARE LIKELY TO BE IRRITABLE, EASILY"
340 PRINT "FRUSTRATED AND POSSIABLY STUBBORN."
350 PRINT "   3. YOUR COGNITIVE CYCLE. THIS CYCLE AFFECTS YOUR THOUGHT"
360 PRINT "PROCESSES, AND YOUR ABILITY TO ANSWER QUESTIONS RAPIDLY"
370 PRINT "AND ACCURATELY, AND YOUR ABILITY TO ABSORB NEW INFORMATION"
380 PRINT "AND TO BE ORIGINAL AND CREATIVE. ON THE DOWN CYCLE OF THIS RHYTHM"
390 PRINT "YOU SHOULD REVIEW OLD CONCEPTS AND AVOID SPENDING TOO MUCH"
400 PRINT "TIME BEING CREATIVE, AS YOU WOULD BE CONSIDERABLY BETTER AT SUCH"
410 PRINT "TASKS ON THE RISING PORTION OF THIS CYCLE ESPECIALLY IF IT IS"
420 PRINT "ON THE POSITIVE SIDE OF THE CYCLE."
430 PRINT
440 PRINT "  WHEN ANY OF THESE CYCLES ARE POSITIVE YOU ARE MOST ABLE IN"
450 PRINT "THE AREAS GOVERNED. WHEN THEY ARE NEGATIVE AND OR FALLING"
460 PRINT "(GOING FROM POSITIVE TO NEGATIVE) YOU LOSE SOME OF YOUR ABILITIES"
470 PRINT "IN THE AREAS GOVERNED. YOU SHOULD USE THIS PERIOD FOR THE"
```

```
480 PRINT "RECUPERATION OF THE LOW RHYTHM. THE THREE CYCLES ARE"
490 PRINT "REPRESENTED BY THE LETTERS 'P' - FOR THE PHYSICAL CYCLE"
500 PRINT "'E' - FOR THE EMOTIONAL CYCLE, AND 'C' - FOR THE COGNITIVE"
510 PRINT "CYCLE."
520 PRINT "  THE DAY WHEN EACH RHYTHM OR CYCLE CHANGES SIGN, CROSSES ZERO"
530 PRINT "REPRESENTED BY 'I', IS A CRITICAL DAY FOR YOU. WHEN ALL THREE"
540 PRINT "CYCLES CROSS ZERO ON THE SAME DAY REGUARDLESS OF THE DIRECTION"
550 PRINT "IT WOULD BE A GOOD IDEA TO STAY IN BED. FOR YOUR CHANCES OF"
560 PRINT "HAVING AN ACCIDENT IS ** 9 ** TIMES THAT OF A NORMAL NON-"
570 PRINT "CRITICAL DAY. ON ALL CRITICAL DAYS YOU ARE HIGHLY ACCIDENT PRONE"
580 PRINT "AND SHOULD AVOID DANGEROUS CIRCUMSTANCES. THESE DAYS ONLY OCCUR"
590 PRINT "20% OF THE TIME, OR ONE DAY OUT OF EVERY FIVE. A STUDY WAS MADE"
600 PRINT "ON 1000 RANDOM ACCIDENTS AND DEATHS , THIS STUDY UNCOVERED THAT"
610 PRINT "ALMOST 600 OF THESE ACCIDENTS OCCURED ON A CRITICAL DAY FOR THE"
620 PRINT "PERSON INVOLVED. THIS IS ALMOST 60% ! THREE TIMES THAT OF A"
630 PRINT "NORMAL DAY. ON DAYS WHERE TWO CYCLES CROSS ZERO YOU ARE ONLY 6"
640 PRINT "TIMES ACCIDENT PRONE AS NORMAL."
650 DIM M$(12)
660 M$(1)="JAN."
670 M$(2)="FEB."
680 M$(3)="MAR."
690 M$(4)="APR."
700 M$(5)="MAY "
710 M$(6)="JUNE"
720 M$(7)="JULY"
730 M$(8)="AUG."
740 M$(9)="SEP."
750 M$(10)="OCT."
760 M$(11)="NOV."
770 M$(12)="DEC."
780 IF SS<>1 THEN 900
790 PRINT "  THE DATES LISTED ARE FOR MIDNIGHT, THE BEGINNING OF"
800 PRINT "THE DAY PRINTED. IF YOU WOULD LIKE THE CHART PLOTTED FOR"
810 PRINT "YOUR ACTUAL BIRTH TIME ENTER THE DAY IN DECIMAL FORM."
820 PRINT "FOR EXAMPLE: IF YOU WERE BORN  6:00 P.M. ON NOVEMBER 28, 1948"
830 PRINT "YOU WOULD ENTER YOUR BIRTH DATE AS: 11,28.75,1948. NOW EACH"
840 PRINT "DATE PLOTTED REPRESENTS THE CYCLES ASPECT WITH RESPECT TO YOUR"
850 PRINT "EXACT BIRTH. AND FROM THE EXAMPLE EACH DATE WOULD BE FOR"
860 PRINT "MIDNIGHT ON THE DAY LISTED. IF YOU WOULD LIKE IT FOR ANOTHER"
870 PRINT "TIME OF DAY , SAY NOON - ENTER THE STARTING DAY IN DECIMAL "
880 PRINT "FORM. EX: 2,17.75,1976 WOULD LIST DATA AS OF 6:00 P.M. AND"
890 PRINT "STARTING ON FEBRUARY 17,1976 AT 6:00, INCREMENTED 24 HRS. DAILY."
900 PRINT
910 D$(1)="SUN."
920 D$(2)="MON."
930 D$(3)="TUE."
940 D$(4)="WED."
950 D$(5)="THUR"
960 D$(6)="FRI."
970 D$(7)="SAT."
```

```
980 PRINT
990 PRINT "NOW THEN, ENTER YOUR BIRTH DATE IN MONTH, DAY AND YEAR"
1000 PRINT "AS (EX. 11,28,1948) HERE:";
1010 INPUT M,D,Y1
1020 GOSUB 1830
1030 J4=J2
1040 W1=W
1050 PRINT
1060 PRINT "  YOU WERE BORN ON A "D$(W1)
1070 PRINT "HOW ABOUT THAT! .. ...."
1080 PRINT
1090 PRINT
1100 PRINT "NOW TYPE IN THE MONTH DAY AND YEAR AS ABOVE"
1110 PRINT "FOR THE STARTING DATE OF YOUR BIO-CYCLE PLOT:";
1120 INPUT M,D,Y1
1130 GOSUB 1830
1140 J5=J2
1150 W1=W
1160 PRINT
1170 PRINT "HOW MANY DAYS DO YOU WANT YOUR CHART TO COVER:";
1180 INPUT J7
1190 J6=J7+J5
1200 PRINT
1210 PRINT "IF YOU WOULD LIKE TO PLOT YOUR BIO-CYCLE TYPE PLOT"
1220 PRINT "IF YOU ONLY WANT A LIST OF YOUR CRITICAL DAYS TYPE LIST:";
1230 INPUT Z$
1240 IF Z$="L" GOTO 1310
1250 IF Z$="LIST" THEN 1310
1260 IF Z$="P" THEN 1300
1270 IF Z$="PLOT" THEN 1300
1280 PRINT "ILLEGAL INPUT PLEASE RETYPE."
1290 GOTO 1200
1300 GOTO 1790
1310 PRINT
1320 PRINT
1330 PRINT
1340 PRINT
1350 PRINT "  ";"  THIS IS A LIST OF YOUR CRITICAL DAYS FOR THE PERIOD"
1360 PRINT "  ";"  BEGINNING "M$(M);"  "D;", ";Y1
1370 PRINT
1380 PRINT " DAY","       DATE        ","  CYCLE  ";" (0=CRITICAL DAY) "
1390 PRINT
1400 FOR X=J5 TO (J5+J7)
1410 J2=X
1420 GOSUB 1960
1430 D9=X-J4
1440 P=(D9/23)-INT((D9/23)+C9)
1450 P=INT(23*P+C9)
1460 IF P<19 THEN 1480
1470 P=23-P
1480 E=(D9/28)-INT((D9/28)+C9)
```

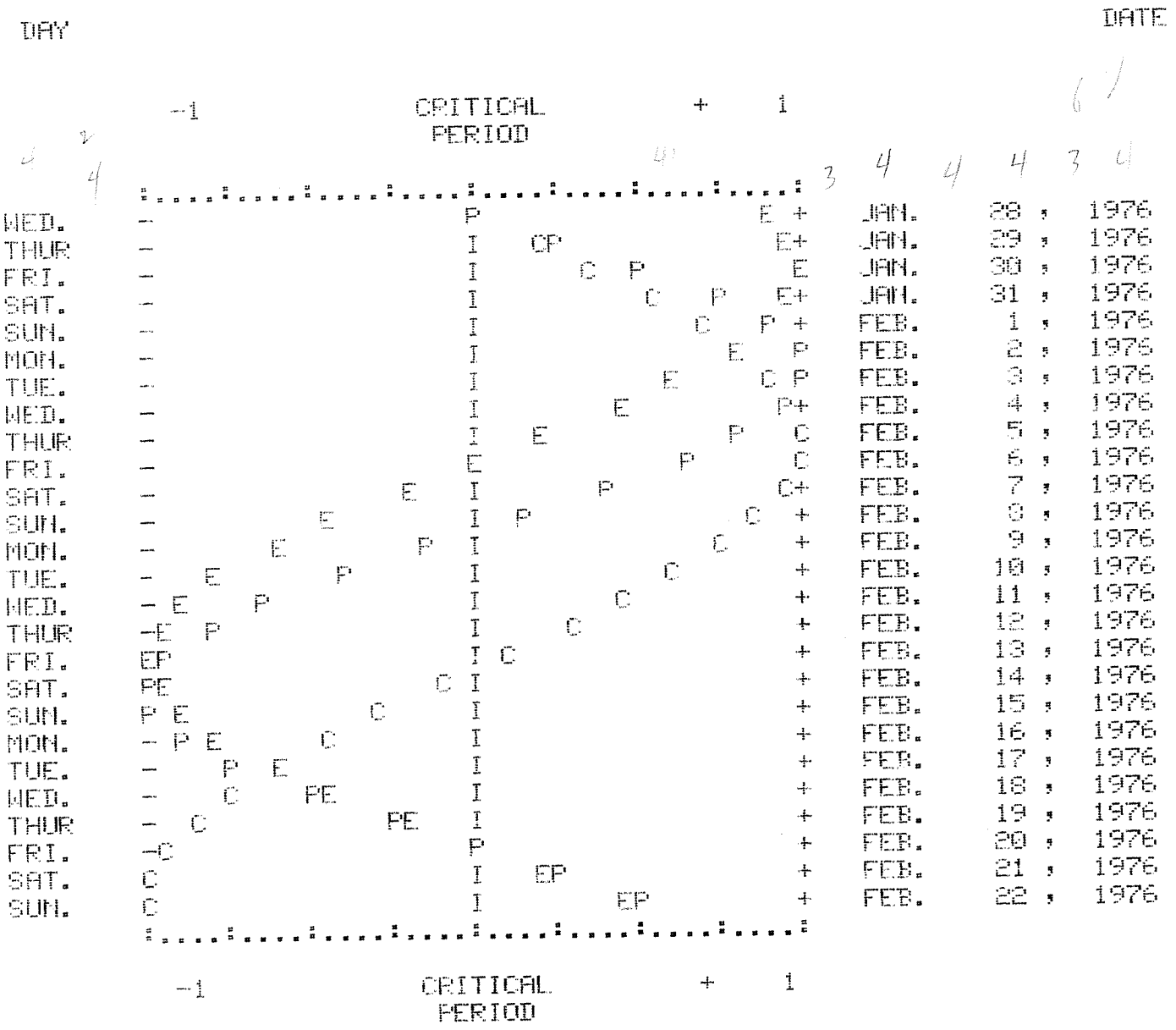
```
1490 E=INT(28*E+C9)
1500 IF E<19 THEN 1520
1510 E=28-E
1520 C=(D9/33)-INT((D9/33)+C9)
1530 C=INT(33*C+C9)
1540 IF C<19 THEN 1560
1550 C=33-C
1560 REM
1570 IF P=0 THEN 1660
1580 IF P=11 THEN 1660
1590 REM
1600 IF E=0 THEN 1690
1610 IF E=14 THEN 1690
1620 REM
1630 IF C=0 THEN 1720
1640 IF C=16 THEN 1720
1650 GOTO 1740
1660 PRINT D$(W),M$(M1);"  "D1;", ";Y2," PHYSICAL ","0"
1670 F6=F6+1
1680 GOTO 1590
1690 PRINT D$(W),M$(M1);"  "D1;", ";Y2," EMOTIONAL","0"
1700 F6=F6+1
1710 GOTO 1620
1720 PRINT D$(W),M$(M1);"  "D1;", ";Y2," COGNITIVE","0"
1730 F6=F6+1
1740 IF F6<2 THEN 1760
1750 PRINT "   ","CAREFUL TODAY "F6" CYCLES CROSS ZERO *****"
1760 F6=0
1770 NEXT X
1780 GOTO 3100
1790 GOTO 2200
1800 REM
1810 REM ***************************************
1820 REM
1830 REM THIS IS THE JULIAN DATE SUB. CONVERSION
1840 C9=.001
1850 M9=(-1)*INT(((14-M)/12)+C9)
1860 J1=D-2447095+INT((1461*(Y1+4800+M9)/4)+C9)
1870 J2=J1+INT((367*(M-2-12*M9)/12)+C9)
1880 J1=J2-INT((3*(Y1+4900+M9)/400)+C9)
1890 J2=J1
1900 W=J2-7*INT((J1/7)+C9)+1
1910 W=INT(W+C9)
1920 RETURN
1930 REM
1940 REM ***************************************
1950 REM
1960 REM THIS IS THE CALENDAR SUB. CONVERSION
1970 J3=INT(J2+C9)
1980 D8=J2-J3
```

```
1990 J2=J3
2000 L=J2+2483589
2010 N=INT((4*L/146097)+C9)
2020 L=L-INT(((146097*N+3)/4)+C9)
2030 Y2=INT((4000*(L+1)/1461001)+C9)
2040 L=L-INT(1461*(Y2/4)+C9)+31
2050 M1=INT(80*(L/2447)+C9)
2060 D1=L-INT((2447*M1/80)+C9)
2070 IF M1>0 THEN 2090
2080 D1=D1-1
2090 L=INT((M1/11)+C9)
2100 D8=INT(10*D8+.5)
2110 D1=D1+(D8/10)
2120 M1=M1+2-12*L
2130 Y2=100*(N-49)+Y2+L
2140 W=J2-7*INT((J2/7)+C9)+1
2150 W=INT(W+C9)
2160 RETURN
2170 REM
2180 REM ************************************
2190 REM
2200 REM THIS IS THE PLOTTING SUB.
2210 A1=7
2220 H=J5
2230 I=J6
2240 E1=-1
2250 F1=1
2260 J=1
2270 D=-1
2280 E=0
2290 F=1
2300 LET G=(F1-E1)/40
2310 LET G1=G/2
2320 PRINT
2330 PRINT
2340 PRINT
2350 PRINT "   "," THIS IS A ** BIO-CYCLE ** RHYTHM CHART "
2360 PRINT
2370 PRINT " DAY ",TAB(65) "  DATE "
2380 GOSUB 3020
2390 GOSUB 3080
2400 PRINT
2410 LET X=H-J
2420 REM
2430 LET L1=0
2440 LET X=X+J
2450 J2=X
2460 GOSUB 1960
2470 W1=W
2480 IF X>I THEN 2970
```

```
2490 PRINT D$(W1);"    ";
2500 D9=2*(X-J4)*(3.14159927)
2510 A=SIN(D9/23)
2520 B=SIN(D9/28)
2530 C=SIN(D9/33)
2540 LET Y=E1-G
2550 PRINT" ";
2560 IF (Y+G)<1 THEN 2590
2570 PRINT "    ";M$(M1);" ";D1;", ";Y2
2580 GOTO 2420
2590 Y=Y+G
2600 IF Y>F1THEN 2420
2610 IF ABS(A-Y)<G1THEN 2730
2620 IF A1<2THEN 2550
2630 IF ABS(B-Y)<G1THEN 2770
2640 IF A1<3THEN 2550
2650 IF ABS(C-Y)<G1THEN 2810
2660 IF A1<4THEN 2550
2670 IF ABS(D-Y)<G1THEN 2850
2680 IF A1<5THEN 2550
2690 IF ABS(E-Y)<G1THEN 2890
2700 IF A1<6THEN 2550
2710 IF ABS(F-Y)<G1THEN 2930
2720 GOTO  2550
2730 PRINT "P";
2740 LET L1=L1+1
2750 IF L1=A1THEN 2420
2760 GOTO  2560
2770 PRINT "E";
2780 LET L1=L1+1
2790 IF L1=A1THEN 2420
2800 GOTO  2560
2810 PRINT "C";
2820 LET L1=L1+1
2830 IF L1=A1THEN 2420
2840 GOTO  2560
2850 PRINT "-";
2860 LET L1=L1+1
2870 IF L1=A1THEN 2420
2880 GOTO  2560
2890 PRINT "I";
2900 LET L1=L1+1
2910 IF L1=A1THEN 2420
2920 GOTO  2560
2930 PRINT "+";
2940 LET L1=L1+1
2950 IF L1=A1THEN 2420
2960 GOTO  2560
2970 REM
2980 GOSUB 3080
2990 GOSUB 3020
```

```
3000 PRINT
3010 GOTO  3100
3020 PRINT
3030 PRINT
3040 PRINT E1;TAB(25);"CRITICAL";TAB(42);"+";F1
3050 PRINT TAB(25);" PERIOD"
3060 PRINT
3070 RETURN
3080 PRINT"       ";" :....:....:....:....:....:....:....:....:";
3090 RETURN
3100 PRINT
3110 PRINT
3120 PRINT " - WOULD YOU LIKE TO DO ANOTHER * BIO-CYCLE * (YES OR NO)";
3130 INPUT Z$
3140 PRINT
3150 PRINT
3160 IF Z$="Y" THEN 1080
3170 IF Z$="YES" THEN 1080
3180 GOTO 3210
3190 PRINT
3200 PRINT
3210 PRINT
3220 PRINT
3230 END

*RUN


* WELCOME TO * BIO-CYCLE * - IF YOU WOULD LIKE
INFORMATION TYPE A - 1, ELSE -2?2




NOW THEN, ENTER YOUR BIRTH DATE IN MONTH, DAY AND YEAR
AS (EX. 11,28,1948) HERE:?3,20,1953

  YOU WERE BORN ON A FRI.
HOW ABOUT THAT! .. ....


NOW TYPE IN THE MONTH DAY AND YEAR AS ABOVE
FOR THE STARTING DATE OF YOUR BIO-CYCLE PLOT:?1,28,1976

HOW MANY DAYS DO YOU WANT YOUR CHART TO COVER:?25

IF YOU WOULD LIKE TO PLOT YOUR BIO-CYCLE TYPE PLOT
IF YOU ONLY WANT A LIST OF YOUR CRITICAL DAYS TYPE LIST:?P
```

THIS IS A ** BIO-CYCLE ** RHYTHM CHART



- WOULD YOU LIKE TO DO ANOTHER * BIO-CYCLE * (YES OR NO)?N

CANNONS:

DESCRIPTION

This is a war game simulation in which you learn to shoot a big gun at a stationary target. After you have destroyed your target the computer grades your shooting by the number of shots required to do the job. A comment is then rendered about your shooting ability. A good gunner with a slide rule can hit the target in two shots every time.

INSTRUCTIONS

The program will prompt for all necessary information and give instructions. Load the program into memory and type LIST or RUN.

LIMITATIONS

This simulation game requires less then 3K Bytes of memory for both storage and execution. A sample run is provided following the source code listing.

CANNON

```
100 REM THIS IS CANNON
110 REM THIS IS A LITTLE ARTILLERY GAME
120 PRINT "FIRING A FIELD ARTILLERY WEAPON"
130 PRINT "A HIT WITHIN 100 YDS OF TGT WILL WIN"
140 PRINT "MAX RANGE IS 46500 YDS"
150 PRINT "THE ELEVATION IS IN DEGREES AND TENTHS OF DEGREES"
160 REM T=DISTANCE TO TGT
170 REM I=DISTANCE OF SHOT
180 REM E=DISTANCE OVER(NEG),OR UNDER(POS)TGT
190 LET W2=0
200 LET T=43000-30000*RND(-1)
210 LET S=0
220 PRINT
230 IF W2=0 GOTO 640
240 GOTO 680
250 PRINT"MIN ELEVATION IS 1 DEG."
260 GOTO 690
270 PRINT "MAX ELEVATION IS 89 DEG"
280 GOTO 690
290 IF B>45 GOTO 320
300 PRINT"OVER TGT BY ";ABS(E);"YDS-LOWER ELEVATION"
310 GOTO 690
320 PRINT "OVER TGT BY ";ABS(E);"YDS-RAISE ELEVATION"
330 GOTO 690
340 IF B>45 GOTO 370
350 PRINT"SHORT TGT BY ";ABS(E);"YDS-RAISE ELEVATION"
360 GOTO 690
370 PRINT"SHORT OF TGT BY";ABS(E);"YDS-LOWER ELEVATION"
380 GOTO 690
390 GOTO 400
400 PRINT"  *****TARGET DESTROYED***** ";S;"ROUNDS EXPENDED"
410 IF S>2 GO TO 440
420 PRINT " THAT'S DAMN GOOD SHOOTING, SON"
430 GO TO 560
440 IF S>5 GO TO 470
450 PRINT " VERY GOOD SHOOTING. WE NEED MORE LIKE YOU"
460 GOTO 560
470 IF S>9 GO TO 500
480 PRINT " ABOUT AVERAGE, TRY TO IMPROVE"
490 GO TO 560
```

```
500 IF S>14 GO TO 540
510 PRINT " I GUESS YOU KNOW YOUR A LOUSY SHOT. YOU SHOULD "
520 PRINT " BE INSIDE WITH THE COOK FOR ALL OUR SAKES"
530 GO TO 560
540 IF S>21 GO TO 820
550 PRINT " OUR FATHER WHO ART IN HEAVEN H.....  !! ! "
560 PRINT
570 PRINT
580 PRINT
590 PRINT "DO YOU WANT TO PLAY ANOTHER GAME"
600 INPUT R$
610 IF R$="Y" GO TO 640
620 IF R$="YES" GO TO 640
630 GOTO 860
640 PRINT"THE ENEMY HAS BEEN SIGHTED,LETS BLOW THEM UP!!!!"
650 LET W2=1
660 PRINT
670 GOTO 200
680 PRINT"  DISTANCE TO TGT IS";INT(T);"YDS"
690 PRINT
700 PRINT "ELEVATION:";
710 INPUT B
720 IF B=90 GOTO 820
730 IF B<1 THEN 250
740 LET S=S+1
750 LET B2=2*B/57.3
760 LET I=46500*SIN(B2)
770 LET X=T-I
780 LET E=INT(X)
790 IF ABS(E)<100 THEN 390
800 IF E>100 THEN 340
810 IF E<-100 THEN 290
820 PRINT
830 PRINT " #### BANG - YOU BLEW YOURSELF UP ####"
840 PRINT
850 GOTO 560
860 PRINT
870 PRINT
880 END
```

```
RUN CANNONS


FIRING A FIELD ARTILLERY WEAPON
A HIT WITHIN 100 YDS OF TGT WILL WIN
MAX RANGE IS 46500 YDS
THE ELEVATION IS IN DEGREES AND TENTHS OF DEGREES

THE ENEMY HAS BEEN SIGHTED.LETS BLOW THEM UP!!!!


  DISTANCE TO TGT IS   24588 YDS

ELEVATION:?46
OVER TGT BY    21883 YDS-RAISE ELEVATION

ELEVATION:?20
OVER TGT BY  5299 YDS-LOWER ELEVATION

ELEVATION:?15
SHORT TGT BY  1340 YDS-RAISE ELEVATION

ELEVATION:?16
  *****TARGET DESTROYED*****      4 ROUNDS EXPENDED
 VERY GOOD SHOOTING. WE NEED MORE LIKE YOU


DO YOU WANT TO PLAY ANOTHER GAME
?NO
```

CHECKERS:

DESCRIPTION

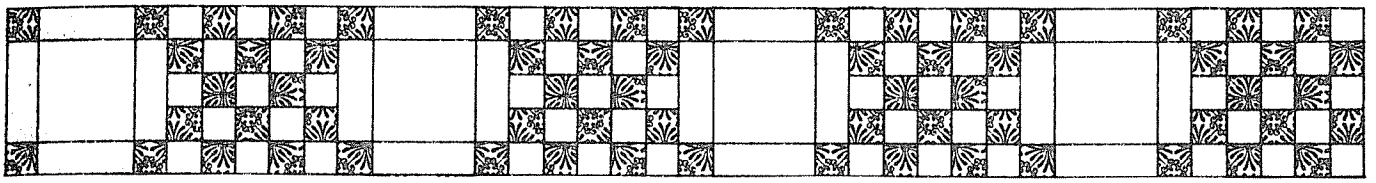
In this game you and the computer play a game of regulation Checkers. The computer is Black and you are White; you move first. The game has a time limit so don't take too long in making your moves. The game is programmed to recognize one, two, three, or even four jumps, whether made by you or your opponent. The computer won't move into a jump if it has any other choice and it advances whenever possible toward your king row. The games highest priority is to jump any non-protected opposing piece, your men. This game is very aggressive and allows no quarter.

INSTRUCTIONS

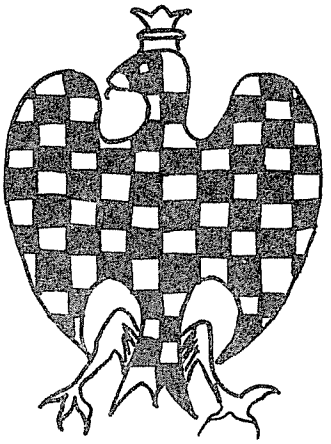
List the program for instructions. The game offers instructions while being run. The program prompts are sufficient for even the novice player.

LIMITATIONS

There is a Restore statement in line 10780. The program length is 22K Bytes and execution requires 48K Bytes in most systems. A partial game run is presented along with the game board patterns after the source code listing.



CHECKERS



```
100 REM THIS IS CHECKERS
115 REM PROGRAMMED BY ROGER BROWN
130 REM SCIENTIFIC RESEARCH INSTRUMENTS CO.

160 REM ************************************************
175 REM THIS IS THE INSTRUCTIONS FOR THE CHECKER GAME.
190 PRINT "THIS IS A CHECKER GAME. IT IS PLAYED BETWEEN YOU"
205 DIM A$(64),B$(32),C$(32),E$(32),H(64),L(64),O(64),P(64)
220 DIM F(64),S(64),T(64),U(64),V(64),G(32),R(64),C(64)
235 PRINT "AND THE COMPUTER. THE RULES ARE SIMPLE - ALL PIECES"
250 PRINT "EXCEPT KINGS CAN ONLY MOVE FORWARD, DIAGONALLY, AVOIDING"
265 PRINT "ALL DARK ( XX ) SQUARES, IF THE SPACE IS UNOCCUPIED."
280 PRINT
295 PRINT "IF THE SPACE IS OCCUPIED BY ONE OF YOUR MEN-YOU CAN NOT"
310 PRINT "PROCEED FURTHER."
325 PRINT
340 PRINT "IF THE SPACE IS OCCUPIED BY YOUR OPPONENT-YOU MUST JUMP"
355 PRINT "IF POSSIABLE."
370 PRINT
385 PRINT "IF YOUR PIECE HAS BEEN KINGED-THE RULES ARE THE SAME "
400 PRINT "EXCEPT IT MAY ALSO MOVE BACKWARDS, AVOIDING ALL OF"
415 PRINT "THE DARK SQUARES ( XX )."
430 PRINT
445 PRINT "YOUR MOVES ARE LIMITED TO   O N E * SPACE * ONLY.."
460 PRINT "UNLESS YOU ARE JUMPING PIECES."
475 PRINT
490 PRINT "TO MOVE-"
505 PRINT
520 PRINT "       1-ENTER THE SQUARE # THE PIECE IS ON THAT YOU PLAN TO MOVE"
535 PRINT "       2-THEN ENTER THE SQUARE # YOU ARE MOVING TOO"
550 PRINT "       3-THEN ENTER THE NUMBER OF THE COMPUTER'S MEN YOU ARE "
565 PRINT "         GOING TO JUMP IN THE PROCESS."
580 PRINT "       4-AND FINALLY TYPE (YES OR NO) IF YOU WANT A PRINT"
595 PRINT "         OUT OF THE BOARD AFTER THE MOVE OR NOT."
610 PRINT
625 PRINT
640 PRINT " THE FOLLOWING IDENTIFICATIONS WILL BE USED ON ALL"
655 PRINT " OF THE GAME BOARD PRINT OUTS."
670 PRINT
685 PRINT "     YP -MEANS YOUR PAWN."
700 PRINT "     YK -MEANS YOUR KING."
```

```
715 PRINT
730 PRINT "     CP -MEANS THE COMPUTERS PAWN."
745 PRINT "     CK -MEANS THE COMPUTERS KING."
760 PRINT
775 PRINT
790 PRINT "  HERE IS A SAMPLE MOVE-"
805 PRINT
820 PRINT "WHAT IS YOUR MOVE?"
835 PRINT "? 23,19,0,YES"
850 PRINT
865 PRINT "YOUR MOVES CAN BE MADE ON ANY OF THE UNOCCUPIED"
880 PRINT "SQUARES NUMBERED FROM 1 TO 32."
895 PRINT
910 PRINT
925 PRINT "  DON'T WASTE TOO MUCH TIME AS THE GAME HAS A TIME LIMIT."
940 PRINT
955 PRINT
970 PRINT "        YOU ARE  W H I T E  AND MOVE FIRST."
985 PRINT "                    GOOD LUCK!..."
1000 PRINT
1015 PRINT
1030 PRINT
1045 GOTO 10795
1060 REM THIS SUB IS WHERE THE COMP. MAKES ITS MOVE
1075 IF J=0 GOTO 1315
1090 PRINT
1105 PRINT "TYPE IN THE SQUARE # OF EACH PIECE YOU "
1120 PRINT "JUMPED , AS YOU ARE ASKED !"
1135 FOR J1=1 TO J
1150 INPUT J8
1165 IF J8>32 GOTO 1090
1180 B1=1
1195 M7=J8
1210 GOSUB 13345
1225 IF A$(N4)="CP" GOTO 1270
1240 IF A$(N4)="CK" GOTO 1270
1255 GOTO 1090
1270 M8=N4
1285 GOSUB 11740
1300 NEXT J1
1315 B1=D7=0
1330 FOR I=1 TO 8
1345 IF A$(I)="YP" GOTO 1390
1360 NEXT I
1375 GOTO 1450
1390 A$(I)="YK"
1405 PRINT
1420 PRINT "  ** YOU GOT A KING ** "
1435 PRINT
1450 FOR I=1 TO 64
```

```
1465 IF A$(I)="CP" GOTO 1600
1480 IF A$(I)="CK" GOTO 1600
1495 NEXT I
1510 PRINT
1525 PRINT " ** THE GAME IS OVER.   Y O U  WIN !... "
1540 PRINT "             BUT I'LL BEAT YOU NEXT TIME.  "
1555 PRINT
1570 D4=D4+1
1585 GOTO 14965
1600 REM THIS IS WHERE THE COMPUTERS MOVING STARTS
1615 FOR I=1 TO 64
1630 L(I)=O(I)=P(I)=F(I)=S(I)=T(I)=U(I)=V(I)=R(I)=C(I)=0
1645 NEXT I
1660 B9=B6=0
1675 D7=D7+1
1690 FOR I=1 TO 64
1705 IF A$(I)="CK" GOTO 1825
1720 IF A$(I)="CP" GOTO 1855
1735 IF A$(I)="YK" GOTO 1885
1750 IF A$(I)="YP" GOTO 1915
1765 IF A$(I)="XX" GOTO 1795
1780 H(I)=5
1795 NEXT I
1810 GOTO 1945
1825 H(I)=1
1840 GOTO 1795
1855 H(I)=2
1870 GOTO 1795
1885 H(I)=4
1900 GOTO 1795
1915 H(I)=3
1930 GOTO 1795
1945 REM H(I) IS THE PRIORITY OF THE SQUARE
1960 H(1)=H(2)
1975 H(2)=H(4)
1990 H(3)=H(6)
2005 H(4)=H(8)
2020 H(5)=H(9)
2035 H(6)=H(11)
2050 H(7)=H(13)
2065 H(8)=H(15)
2080 H(9)=H(18)
2095 H(10)=H(20)
2110 H(11)=H(22)
2125 H(12)=H(24)
2140 H(13)=H(25)
2155 H(14)=H(27)
2170 H(15)=H(29)
2185 H(16)=H(31)
2200 H(17)=H(34)
2215 H(18)=H(36)
```

```
2230 H(19)=H(38)
2245 H(20)=H(40)
2260 H(21)=H(41)
2275 H(22)=H(43)
2290 H(23)=H(45)
2305 H(24)=H(47)
2320 H(25)=H(50)
2335 H(26)=H(52)
2350 H(27)=H(54)
2365 H(28)=H(56)
2380 H(29)=H(57)
2395 H(30)=H(59)
2410 H(31)=H(61)
2425 H(32)=H(63)
2440 FOR I=1 TO 32
2455 IF H(I)=4 GOTO 2560
2470 IF H(I)=3 GOTO 2620
2485 IF H(I)=2 GOTO 2680
2500 IF H(I)=1 GOTO 2740
2515 IF H(I)=5 GOTO 2800
2530 NEXT I
2545 GOTO 2845
2560 P(I)=I
2575 REM THIS IS SQ. # 'S WITH  YK
2590 S(I)=I
2605 GOTO 2530
2620 P(I+32)=I
2635 REM THIS IS SQ.#'S WITH YP
2650 S(I)=I
2665 GOTO 2530
2680 O(I)=I
2695 REM THIS IS SQ. #'S WITH CP
2710 T(I)=I
2725 GOTO 2530
2740 O(I+32)=I
2755 REM THIS IS SQ. #'S WITH CK
2770 T(I)=I
2785 GOTO 2530
2800 L(I)=I
2815 REM THESE SQ. #'S ARE EMPTY
2830 GOTO 2530
2845 REM HERE THE COMP. IS CK. FOR ADJ. SQ. AND MOVE PRIORITY
2860 FOR I=1 TO 32
2875 I9=-5
2890 I8=I9+2
2905 FOR I1=I9 TO I8
2920 IF (I+I1)<1 GOTO 2980
2935 IF (I+I1)>32 GOTO 2980
2950 IF T(I)=S(I+I1)-I1 GOTO 3040
2965 IF T(I)=L(I+I1)-I1 GOTO 3295
2980 NEXT I1
```

```
2995 IF I9=3 GOTO 3325
3010 I9=3
3025 GOTO 2890
3040 IF I>(I+I1) GOTO 3070
3055 GOTO 3100
3070 IF T(I)=O(I+32) GOTO 3100
3085 IF S(I+I1)=P(I+I1+32) GOTO 2980
3100 L(I+32)=1
3115 B6=B6+1
3130 ON B6 GOTO 3145,3175,3205,3235,3265,3145,3175,3205,3235,3265,3145,3175
3145 T(I+32)=(I+I1)
3160 GOTO 2980
3175 R(I)=(I+I1)
3190 GOTO 2980
3205 R(I+32)=(I+I1)
3220 GOTO 2980
3235 C(I)=(I+I1)
3250 GOTO 2980
3265 C(I+32)=(I+I1)
3280 GOTO 2980
3295 S(I+32)=1
3310 GOTO 2980
3325 I2=-9
3340 I3=-6
3355 FOR I1=I2 TO I3
3370 I4=I1
3385 IF (I+I4)<1 GOTO 3445
3400 IF (I+I4)>32 GOTO 3445
3415 IF T(I)=S(I+I4)-I4 GOTO 3475
3430 IF T(I)=L(I+I4)-I4 GOTO 3565
3445 NEXT I1
3460 GOTO 3595
3475 IF I>(I+I4) GOTO 3505
3490 GOTO 3520
3505 IF S(I+I4)=P(I+I4+32) GOTO 3445
3520 U(I)=2
3535 V(I)=(I+I4)
3550 GOTO 3445
3565 F(I)=2
3580 GOTO 3445
3595 IF I3=9 GOTO 3655
3610 I2=6
3625 I3=9
3640 GOTO 3355
3655 I2=-18
3670 I3=-10
3685 FOR I1=I2 TO I3
3700 I5=I1
3715 IF (I+I5)<1 GOTO 3775
3730 IF (I+I5)>32 GOTO 3775
3745 IF T(I)=S(I+I5)-I5 GOTO 3805
```

```
3760 IF T(I)=L(I+I5)-I5 GOTO 3895
3775 NEXT I1
3790 GOTO 3925
3805 IF I>(I+I5) GOTO 3835
3820 GOTO 3850
3835 IF S(I+I5)=P(I+I5+32) GOTO 3775
3850 U(I+32)=3
3865 V(I+32)=(I+I5)
3880 GOTO 3775
3895 F(I+32)=3
3910 GOTO 3775
3925 IF I3=18 GOTO 3985
3940 I2=10
3955 I3=18
3970 GOTO 3685
3985 B6=0
4000 NEXT I
4015 REM THIS COMPLETES THE INITIAL SEARCH FOR POSITIONS
4030 REM L(I) IS THE FLAG FOR AN OPEN SQ.
4045 REM O(I+32) IS THE FLAG FOR  CK
4060 REM O(I) IS THE FLAG FOR     CP
4075 REM P(I) IS THE FLAG FOR     YK
4090 REM P(I+32) IS THE FLAG FOR  YP
4105 REM T(I) IS THE FLAG FOR     CX
4120 REM S(I) IS THE FLAG FOR     YX
4135 REM           X     IS EITHER   A   P OR A  K  IN THE ABOVE.
4150 REM L(I+32)=Z  IS THE FLAG FOR A CLOSE OPPONENT
4165 REM T(I+32)    IS THE SQ. MARKER FOR ABOVE.
4180 REM         Z   IS THE CLOSENESS IN SQUARES. IE: 1,2,3
4195 REM S(I+32)=Z  IS THE FLAG FOR A CLOSE EMPTY SQ.
4210 REM H(I) REMEMBERS THE ENTIRE BOARD.
4225 REM H(I+32)    REMEMBERS THE ENTIRE (WHITE HALF) OF THE BOARD XX AND ALL
4240 REM FOR ALL OF THE ABOVE I=1 TO 32 STEP 1
4255 FOR I=1 TO 32
4270 IF B9=0 GOTO 4300
4285 I=C2
4300 IF I=1 GOTO 4795
4315 IF I=2 GOTO 4795
4330 IF I=3 GOTO 4795
4345 IF I=4 GOTO 4855
4360 IF I=5 GOTO 4900
4375 IF I=6 GOTO 4945
4390 IF I=7 GOTO 4945
4405 IF I=8 GOTO 4945
4420 IF I=9 GOTO 5005
4435 IF I=10 GOTO 5005
4450 IF I=11 GOTO 5005
4465 IF I=12 GOTO 5065
4480 IF I=13 GOTO 4900
4495 IF I=14 GOTO 4945
4510 IF I=15 GOTO 4945
```

```
4525 IF I=16 GOTO 4945
4540 IF I=17 GOTO 5005
4555 IF I=18 GOTO 5005
4570 IF I=19 GOTO 5005
4585 IF I=20 GOTO 5065
4600 IF I=21 GOTO 4900
4615 IF I=22 GOTO 4945
4630 IF I=23 GOTO 4945
4645 IF I=24 GOTO 4945
4660 IF I=25 GOTO 5005
4675 IF I=26 GOTO 5005
4690 IF I=27 GOTO 5005
4705 IF I=28 GOTO 5065
4720 IF I=29 GOTO 5110
4735 IF I=30 GOTO 5155
4750 GOTO 5155
4765 IF B9=0 GOTO 6025
4780 GOTO 9835
4795 I8=I9=0
4810 I5=4
4825 I6=5
4840 GOTO 5200
4855 I6=I8=I9=0
4870 I5=4
4885 GOTO 5200
4900 I5=I8=0
4915 I6=I9=4
4930 GOTO 5200
4945 I8=5
4960 I6=I9=4
4975 I5=3
4990 GOTO 5200
5005 I5=I8=4
5020 I6=5
5035 I9=3
5050 GOTO 5200
5065 I8=I5=4
5080 I6=I9=0
5095 GOTO 5200
5110 I5=I6=I8=0
5125 I9=4
5140 GOTO 5200
5155 I5=I6=0
5170 I8=5
5185 I9=4
5200 IF B3=6 GOTO 6670
5215 IF B9=0 GOTO 5245
5230 GOTO 9115
5245 REM ***** ADDITIONAL FLAGS
5260 REM U(I)=2 IS THE FLAG FOR AN OPPONENT 2 SQ. AWAY
5275 REM V(I)   IS THE SQ. MARKER FOR THIS U(I)=2 FLAG
```

```
5290 REM F(I)=2 IS THE FLAG FOR AN EMPTY SPACE 2 SQ. AWAY
5305 REM U(I+32)=3 IS THE FLAG FOR AN OPPONENT 3 SPACES AWAY
5320 REM V(I+32)    IS THE MARKER FOR THE U()=3 FLAG
5335 REM F(I+32)=3 IS THE FLAG FOR AN EMPTY SPACE 3 SPACES AWAY.
5350 REM
5365 IF T(I+32)=(I-I9) GOTO 5680
5380 IF R(I)=I-I9 GOTO 5680
5395 IF R(I+32)=I-I9 GOTO 5680
5410 IF C(I)=I-I9 GOTO 5680
5425 IF C(I+32)=I-I9 GOTO 5680
5440 IF T(I+32)=(I-I8) GOTO 5680
5455 IF R(I)=I-I8 GOTO 5680
5470 IF R(I+32)=I-I8 GOTO 5680
5485 IF C(I)=I-I8 GOTO 5680
5500 IF C(I+32)=I-I8 GOTO 5680
5515 IF T(I+32)=(I+I6) GOTO 5860
5530 IF R(I)=I+I6 GOTO 5860
5545 IF R(I+32)=I+I6 GOTO 5860
5560 IF C(I+32)=I+I6 GOTO 5860
5575 IF C(I)=I+I6 GOTO 5860
5590 IF T(I+32)=(I+I5) GOTO 5860
5605 IF C(I)=I+I5 GOTO 5860
5620 IF R(I)=I+I5 GOTO 5860
5635 IF C(I+32)=I+I5 GOTO 5860
5650 IF R(I+32)=I+I5 GOTO 5860
5665 GOTO 4765
5680 IF T(I+32)=P(I+32-I9) GOTO 5845
5695 IF C(I)=P(I+32-I9) GOTO 5845
5710 IF R(I)=P(I+32-I9) GOTO 5845
5725 IF C(I+32)=P(I+32-I9) GOTO 5845
5740 IF R(I+32)=P(I+32-I9) GOTO 5845
5755 IF T(I+32)=P(I+32-I8) GOTO 5845
5770 IF R(I)=P(I+32-I8) GOTO 5845
5785 IF C(I)=P(I+32-I8) GOTO 5845
5800 IF R(I+32)=P(I+32-I8) GOTO 5845
5815 IF C(I+32)=P(I+32-I8) GOTO 5845
5830 L(I+32)=3
5845 IF T(I)=0(I) GOTO 5515
5860 IF B9=1 GOTO 6085
5875 L(I+32)=4
5890 GOTO 4765
5905 REM
5920 REM IF L()=4 AN OPPOSING PIECE IS NEXT TO COMP. PIECE
5935 REM IF L()=3 AS ABOVE ONLY, CP CANT JUMP
5950 GOTO 6025
5965 IF B4>12 GOTO 9940
5980 B9=0
5995 I=C1
6010 GOTO 7615
6025 NEXT I
```

```
6040 REM
6055 IF D7>1 GOTO 6145
6070 GOTO 6115
6085 I=C1+1
6100 GOTO 6160
6115 FOR I=1 TO 32
6130 GOTO 6160
6145 I=C2
6160 IF L(I+32)=4 GOTO 6250
6175 IF D7>1 GOTO 6205
6190 NEXT I
6205 GOTO 6235
6220 IF D7<2 GOTO 6190
6235 GOTO 7465
6250 FOR I4=1 TO 5
6265 ON I4 GOTO 6280,6310,6340,6370,6400
6280 C3=T(I+32)
6295 IF C3<>0 GOTO 6445
6310 C3=R(I)
6325 IF C3<>0 GOTO 6445
6340 C3=C(I)
6355 IF C3<>0 GOTO 6445
6370 C3=R(I+32)
6385 IF C3<>0 GOTO 6445
6400 C3=C(I+32)
6415 IF C3<>0 GOTO 6445
6430 GOTO 6220
6445 C1=I
6460 IF C1>C3 GOTO 6865
6475 C4=C3-C1
6490 IF ABS(C4)=5 GOTO 6535
6505 IF ABS(C4)=3 GOTO 6535
6520 GOTO 6895
6535 IF C4<0 GOTO 6580
6550 C2=(C1+C4+4)
6565 GOTO 6595
6580 C2=(C1+C4-4)
6595 IF C2>32 GOTO 6760
6610 IF H(C2)<5 GOTO 6775
6625 B3=6
6640 I=C1
6655 GOTO 4300
6670 B3=0
6685 IF C1-I8=C3 GOTO 6805
6700 IF C1-I9=C3 GOTO 6805
6715 IF C1+I5=C3 GOTO 6805
6730 IF C1+I6=C3 GOTO 6805
6745 GOTO 6775
6760 C2=B7
6775 NEXT I4
6790 GOTO 6220
```

```
6805 IF ABS(C4)<3 GOTO 6775
6820 J9=J9+1
6835 G(J9)=C3
6850 GOTO 9835
6865 IF H(C1)=1 GOTO 6475
6880 GOTO 6775
6895 IF I>4 GOTO 6955
6910 C2=(C1+C4+3)
6925 IF I=1 GOTO 6775
6940 GOTO 6595
6955 IF I>5 GOTO 7000
6970 C2=(C1+C4+5)
6985 GOTO 6595
7000 IF I>7 GOTO 7060
7015 IF C4<0 GOTO 6775
7030 C2=(C1+C4+5)
7045 GOTO 6595
7060 IF I>8 GOTO 7090
7075 GOTO 6775
7090 IF I>12 GOTO 7195
7195 IF I=9 GOTO 6775
7120 IF C4<0 GOTO 7165
7135 C2=(C1+C4+3)
7150 GOTO 6595
7165 C2=(C1+C4+5)
7180 GOTO 6595
7195 IF I>16 GOTO 7255
7210 IF I=16 GOTO 6775
7225 IF C4<0 GOTO 7135
7240 GOTO 7165
7255 IF I>20 GOTO 7300
7270 IF I=17 GOTO 6775
7285 GOTO 7120
7300 IF I>24 GOTO 7345
7315 IF I=24 GOTO 6775
7330 GOTO 7225
7345 IF I>28 GOTO 7420
7360 IF C4>0 GOTO 6775
7375 IF I=25 GOTO 6775
7390 C2=(C1+C4+5)
7405 GOTO 6595
7420 IF I=32 GOTO 6775
7435 C2=(C1+C4+3)
7450 GOTO 6595
7465 IF J9>0 GOTO 10675
7480 FOR I=1 TO 32
7495 IF L(I+32)=3 GOTO 7525
7510 NEXT I
7525 REM RESERVED FOR  CP  DEFENSIVE MOVES
7540 REM FROM  YK  IN BACK OF THE  CP.
7555 IF B9>0 GOTO 7585
```

```
7570 IF A<3 GOTO 7840
7585 FOR I=32 TO 1 STEP -1
7600 IF T(I)=I GOTO 7720
7615 NEXT I
7630 GOTO 8110
7645 REM ************************************************************************
7660 PRINT
7675 PRINT "  # #  I CAN'T MOVE !!! ....  "
7690 PRINT
7705 GOTO 1510
7720 C1=I
7735 IF I>28 GOTO 7780
7750 C2=(I+4)
7765 GOTO 7795
7780 C2=I-4
7795 IF H(C2)<5 GOTO 7615
7810 J9=0
7825 GOTO 9835
7840 IF H(20)<>5 GOTO 7900
7855 IF H(17)<>5 GOTO 7900
7870 IF A=1 GOTO 7960
7885 GOTO 7945
7900 C2=13
7915 C1=09
7930 GOTO 8020
7945 REM THIS SPACE RESERVED FOR THE SECOND MOVE
7960 C1=INT(2*RND(-1)+.5)+9
7975 C2=C1+5
7990 D9=D9+1
8005 IF D9>200 GOTO 8080
8020 IF H(C2)<5 GOTO 7870
8035 IF H(C1)<>2 GOTO 7870
8050 D9=0
8065 GOTO 9835
8080 D9=0
8095 GOTO 7585
8110 FOR I=8 TO 2 STEP -2
8125 I4=(I-1)*4
8140 FOR I1=2 TO 4
8155 I5=I1+I4
8170 IF T(I5)=I5 GOTO 8335
8185 NEXT I1
8200 NEXT I
8215 FOR I=7 TO 1 STEP -2
8230 I4=(I-1)*4
8245 FOR I1=1 TO 3
8260 I5=I1+I4
8275 IF T(I5)=I5 GOTO 8455
8290 NEXT I1
8305 NEXT I
8320 GOTO 8515
```

```
8335 C1=I5
8350 IF I<8 GOTO 8410
8365 C2=C1-5
8380 IF H(C2)<5 GOTO 8185
8395 GOTO 9835
8410 C2=C1+3
8425 IF H(C2)<5 GOTO 8185
8440 GOTO 9835
8455 C1=I5
8470 C2=C1+5
8485 IF H(C2)<5 GOTO 8290
8500 GOTO 9835
8515 I9=27
8530 I8=I9-2
8545 FOR I=I9 TO I8 STEP -1
8560 IF O(I+32)=I GOTO 8605
8575 NEXT I
8590 GOTO 8695
8605 C1=I
8620 J9=0
8635 C2=C1-3
8650 IF I<5 GOTO 8575
8665 IF H(C2)<5 GOTO 8575
8680 GOTO 9835
8695 IF I9=19 GOTO 8755
8710 IF I9=11 GOTO 8785
8725 I9=19
8740 GOTO 8530
8755 I9=11
8770 GOTO 8530
8785 I9=22
8800 FOR I=I9 TO (I9+2)
8815 IF O(I+32)=I GOTO 8860
8830 NEXT I
8845 GOTO 8920
8860 C1=I
8875 C2=C1-5
8890 IF H(C2)<5 GOTO 8830
8905 GOTO 9835
8920 IF I9=14 GOTO 8980
8935 IF I9=6 GOTO 9010
8950 I9=14
8965 GOTO 8800
8980 I9=6
8995 GOTO 8800
9010 REM THIS IS THE END OF THE MOVING SUB.
9025 IF B4>0 GOTO 9055
9040 GOTO 9100
9055 B4=15
9070 B9=0
9085 GOTO 4255
```

```
9100 GOTO 7660
9115 IF H(I+I6)>2 GOTO 9160
9130 IF H(I+I5)>2 GOTO 9160
9145 GOTO 9940
9160 IF H(I+I6)<5 GOTO 9205
9175 IF H(I+I5)<5 GOTO 9205
9190 GOTO 9940
9205 B4=B4+1
9220 GOTO 5965
9235 REM THESE LINES ARE FOR EXPANSION (FUTURE EXP...  )
9250 REM
9265 REM
9280 REM
9295 REM
9310 REM
9325 REM
9340 REM
9355 REM
9370 REM
9385 REM
9400 REM
9415 REM
9430 REM
9445 REM
9460 REM
9475 REM
9490 REM
9505 REM
9520 REM
9535 REM
9550 REM
9565 REM
9580 REM
9595 REM
9610 REM
9625 REM
9640 REM
9655 REM
9670 REM
9685 REM
9700 REM
9715 REM
9730 REM
9745 REM
9760 REM
9775 REM
9790 REM
9805 REM
9820 REM
9835 REM ************************************************
9850 IF J9>0 GOTO 9955
```

```
9865 B9=B9+1
9880 REM B9 IS THE FLAG FOR SO THE COMP. WONT MOVE INTO A JUMPING.
9895 IF B9>1 GOTO 9940
9910 GOTO 4285
9925 REM ENTER C1 C2 AND J9 HERE FOR TESTING
9940 B9=B4=0
9955 PRINT
9970 PRINT "I MOVED FROM "C1" TO "C2"."
9985 IF J9=0 GOTO 10120
10000 J4=J9
10015 PRINT "I JUMPED YOUR MAN ON SQUARE "G(J4)
10030 B1=1
10045 M7=G(J4)
10060 GOSUB 13345
10075 M8=N4
10090 GOSUB 11740
10105 B1=0
10120 REM
10135 M7=C2
10150 B1=2
10165 GOSUB 13345
10180 Q9=N4
10195 M7=C1
10210 GOSUB 13345
10225 E$(C1)=A$(N4)
10240 A$(Q9)=E$(C1)
10255 Q7=N4
10270 B1=2
10285 GOSUB 11695
10300 B1=0
10315 FOR I=1 TO 64
10330 IF A$(I)="YP" GOTO 10450
10345 IF A$(I)="YK" GOTO 10450
10360 NEXT I
10375 PRINT
10390 PRINT " ** THE GAME IS OVER.  I    W I N .... !!  ** "
10405 PRINT
10420 D3=D3+1
10435 GOTO 14965
10450 REM
10465 FOR I=57 TO 64
10480 IF A$(I)="CP" GOTO 10525
10495 NEXT I
10510 GOTO 10585
10525 A$(I)="CK"
10540 PRINT
10555 PRINT " *** I GOT A KING *** "
10570 PRINT
10585 REM
10600 IF J9=0 GOTO 10720
10615 IF C2>24 GOTO 10645
```

```
10630 GOTO 10660
10645 B7=C2
10660 IF D7<8 GOTO 1600
10675 PRINT
10690 PRINT "YOU LOST "J4" OF YOUR MEN THIS TIME!    "
10705 PRINT
10720 D7=J9=0
10735 REM  ****  D7  *****  IS THE FLAG FOR MULTIPLE JUMPS
10750 RETURN
10765 GOTO 10825
10780 RESTORE
10795 A3=Q7=Q9=0
10810 D2=D3=D4=0
10825 A=B=C=D=B4=A1=B1=C1=D1=0
10840 PRINT
10855 PRINT "WOULD YOU LIKE TO PRINT THE BOARD?"
10870 INPUT D$
10885 IF D$="Y" GOTO 10930
10900 IF D$="YES" GOTO 10930
10915 GOTO 14560
10930 B=1
10945 GOSUB 14125
10960 PRINT
10975 PRINT "WOULD YOU LIKE TO PRINT THE INITIAL GAME BOARD?"
10990 INPUT D$
11005 IF D$="Y" GOTO 11065
11020 IF D$="YES" GOTO 11065
11035 GOSUB 11125
11050 GOTO 11245
11065 B=1
11080 C=1
11095 GOSUB 11125
11110 GOTO 11245
11125 REM **THIS SUB INITIALIZES THE BOARD **
11140 A$(2)=A$(4)=A$(6)=A$(8)=A$(9)=A$(11)=A$(13)=A$(15)="CP"
11155 A$(18)=A$(20)=A$(22)=A$(24)="CP"
11170 A$(41)=A$(43)=A$(45)=A$(47)=A$(50)=A$(52)=A$(54)=A$(56)="YP"
11185 A$(57)=A$(59)=A$(61)=A$(63)="YP"
11200 IF C=0 GOTO 11230
11215 GOSUB 14125
11230 RETURN
11245 B=C=1
11260 PRINT
11275 B1=Q7=Q9=M7=D7=C1=C2=D=0
11290 A=A+1
11305 REM A IS THE # OF GOOD MOVES TAKEN
11320 PRINT
11335 X1=30
11350 REM X1 DETERMINES WHEN THE GAMES TIME LIMIT IS UP
11365 IF A<X1 GOTO 11455
11380 PRINT
```

```
11395 PRINT "* SORRY *  TIME IS UP! THIS GAME IS A DRAW.."
11410 PRINT
11425 D2=D2+1
11440 GOTO 14965
11455 PRINT "WHAT IS YOUR MOVE?"
11470 INPUT M1,M2,J,D$
11485 IF M1>32 GOTO 11455
11500 IF M2>32 GOTO 11455
11515 IF M1<0 GOTO 11455
11530 IF M2<0 GOTO 11455
11545 M1=INT(M1)
11560 M2=INT(M2)
11575 GOSUB 13285
11590 IF D=0 GOTO 13195
11605 D=0
11620 PRINT "  **  ILLEGAL MOVE!! TRY AGAIN  ** "
11635 A1=A1+1
11650 IF A1>8 GOTO 10375
11665 REM A1 IS THE # OF ILLEGAL MOVES MADE
11680 GOTO 11320
11695 M8=07
11710 GOTO 11740
11725 REM THE FOLLOWING RESETS THE EMPTY SQ.'S
11740 IF M8=2 GOTO 12235
11755 IF M8=4 GOTO 12265
11770 IF M8=6 GOTO 12295
11785 IF M8=8 GOTO 12325
11800 IF M8=9 GOTO 12355
11815 IF M8=11 GOTO 12385
11830 IF M8=13 GOTO 12415
11845 IF M8=15 GOTO 12445
11860 IF M8=18 GOTO 12475
11875 IF M8=20 GOTO 12505
11890 IF M8=22 GOTO 12535
11905 IF M8=24 GOTO 12565
11920 IF M8=25 GOTO 12595
11935 IF M8=27 GOTO 12625
11950 IF M8=29 GOTO 12655
11965 IF M8=31 GOTO 12685
11980 IF M8=34 GOTO 12715
11995 IF M8=36 GOTO 12745
12010 IF M8=38 GOTO 12775
12025 IF M8=40 GOTO 12805
12040 IF M8=41 GOTO 12835
12055 IF M8=43 GOTO 12865
12070 IF M8=45 GOTO 12895
12085 IF M8=47 GOTO 12925
12100 IF M8=50 GOTO 12955
12115 IF M8=52 GOTO 12985
12130 IF M8=54 GOTO 13015
12145 IF M8=56 GOTO 13045
```

```
12160 IF M8=57 GOTO 13075
12175 IF M8=59 GOTO 13105
12190 IF M8=61 GOTO 13135
12205 A$(63)="32"
12220 GOTO 13150
12235 A$(M8)="01"
12250 GOTO 13150
12265 A$(M8)="02"
12280 GOTO 13150
12295 A$(M8)="03"
12310 GOTO 13150
12325 A$(M8)="04"
12340 GOTO 13150
12355 A$(M8)="05"
12370 GOTO 13150
12385 A$(M8)="06"
12400 GOTO 13150
12415 A$(M8)="07"
12430 GOTO 13150
12445 A$(M8)="08"
12460 GOTO 13150
12475 A$(M8)="09"
12490 GOTO 13150
12505 A$(M8)="10"
12520 GOTO 13150
12535 A$(M8)="11"
12550 GOTO 13150
12565 A$(M8)="12"
12580 GOTO 13150
12595 A$(M8)="13"
12610 GOTO 13150
12625 A$(M8)="14"
12640 GOTO 13150
12655 A$(M8)="15"
12670 GOTO 13150
12685 A$(M8)="16"
12700 GOTO 13150
12715 A$(M8)="17"
12730 GOTO 13150
12745 A$(M8)="18"
12760 GOTO 13150
12775 A$(M8)="19"
12790 GOTO 13150
12805 A$(M8)="20"
12820 GOTO 13150
12835 A$(M8)="21"
12850 GOTO 13150
12865 A$(M8)="22"
12880 GOTO 13150
12895 A$(M8)="23"
12910 GOTO 13150
```

```
12925 A$(M8)="24"
12940 GOTO 13150
12955 A$(M8)="25"
12970 GOTO 13150
12985 A$(M8)="26"
13000 GOTO 13150
13015 A$(M8)="27"
13030 GOTO 13150
13045 A$(M8)="28"
13060 GOTO 13150
13075 A$(M8)="29"
13090 GOTO 13150
13105 A$(M8)="30"
13120 GOTO 13150
13135 A$(M8)="31"
13150 IF B1=0 GOTO 13180
13165 RETURN
13180 REM
13195 IF D$="Y" GOTO 13255
13210 IF D$="YES" GOTO 13255
13225 GOTO 11260
13240 REM ************************************************************************
13255 GOSUB 14125
13270 GOTO 13225
13285 REM **THIS SUB DEFINES THE SQUARES**
13300 M7=M1
13315 GOTO 13345
13330 M7=M2
13345 IF M7>28 GOTO 13480
13360 IF M7>24 GOTO 13450
13375 IF M7>20 GOTO 13480
13390 IF M7>16 GOTO 13450
13405 IF M7>12 GOTO 13480
13420 IF M7>8 GOTO 13450
13435 IF M7>4 GOTO 13480
13450 N4=2*M7
13465 GOTO 13495
13480 N4=(2*M7)-1
13495 IF B1=0 GOTO 13525
13510 RETURN
13525 IF M7=M2 GOTO 13585
13540 B$(M1)=A$(N4)
13555 Q8=N4
13570 GOTO 13330
13585 C$(M2)=A$(N4)
13600 M9=N4
13615 IF B$(M1)="YP" GOTO 13690
13630 IF B$(M1)="YK" GOTO 13690
13645 PRINT
13660 D=1
13675 GOTO 14110
```

```
13690 IF C$(M2)="YP" GOTO 13645
13705 IF C$(M2)="YK" GOTO 13645
13720 IF C$(M2)="CP" GOTO 13645
13735 IF C$(M2)="CK" GOTO 13645
13750 IF B$(M1)="YK" GOTO 13810
13765 IF M1>M2 GOTO 13810
13780 IF B$(M1)="YK" GOTO 13810
13795 GOTO 13645
13810 REM
13825 IF ABS(M1-M2)>5 GOTO 13855
13840 GOTO 14020
13855 IF J=0 GOTO 13645
13870 REM THE COMP. DOESNT CK. THE MIDDLE SQ. ON MULTIPLE JUMPS
13885 IF ABS(M1-M2)>18 GOTO 13975
13900 IF ABS(M1-M2)>9 GOTO 13945
13915 IF J>0 GOTO 14020
13930 GOTO 13645
13945 IF J>1 GOTO 14020
13960 GOTO 13645
13975 IF J>2 GOTO 14020
13990 GOTO 13645
14005 REM
14020 A$(M9)=B$(M1)
14035 B1=2
14050 M8=08
14065 GOSUB 11740
14080 B1=0
14095 GOSUB 1060
14110 RETURN
14125 REM THIS SUB DRAWS THE BOARD
14140 X=15
14155 FOR I=1 TO 5
14170 PRINT
14185 NEXT I
14200 PRINT TAB(X+20);" B L A C K "
14215 PRINT
14230 FOR N=1 TO 33
14245 PRINT TAB(X);"II";
14260 FOR N1=1 TO 33 STEP 4
14275 IF N1=N GOTO 14320
14290 NEXT N1
14305 GOTO 14395
14320 FOR N2=1 TO 23
14335 PRINT "II";
14350 NEXT N2
14365 PRINT "II"
14380 GOTO 14740
14395 FOR N1=2 TO 32 STEP 2
14410 IF N1=N GOTO 14455
14425 NEXT N1
14440 GOTO 14530
```

```
14455 FOR N2=1 TO 7
14470 PRINT "    II";
14485 NEXT N2
14500 PRINT "    II"
14515 GOTO 14740
14530 REM
14545 N3=(N+1)/4
14560 IF A3>0 GOTO 14635
14575 A3=1
14590 FOR N4=1 TO 64
14605 READ A$(N4)
14620 NEXT N4
14635 IF B=0 GOTO 10960
14650 FOR N2=1 TO 7
14665 N5=8*(N3-1)
14680 N6=N5+N2
14695 PRINT " ";A$(N6);" II";
14710 NEXT N2
14725 PRINT " ";A$(N6+1);" II"
14740 NEXT N
14755 PRINT
14770 PRINT TAB(X+20);" W H I T E "
14785 FOR I=1 TO 6
14800 PRINT
14815 NEXT I
14830 DATA XX,"01",XX,"02",XX,"03",XX,"04"
14845 DATA "05",XX,"06",XX,"07",XX,"08",XX
14860 DATA XX,"09",XX,"10",XX,"11",XX,"12"
14875 DATA "13",XX,"14",XX,"15",XX,"16",XX
14890 DATA XX,"17",XX,"18",XX,"19",XX,"20"
14905 DATA "21",XX,"22",XX,"23",XX,"24",XX
14920 DATA XX,"25",XX,"26",XX,"27",XX,"28"
14935 DATA "29",XX,"30",XX,"31",XX,"32",XX
14950 RETURN
14965 PRINT
14980 PRINT "YOU MADE "A+A1" MOVES DURING THIS GAME."
14995 IF A1=0 GOTO 15055
15010 PRINT "OF THESE MOVES "A1" WERE ILLEGAL."
15025 IF A1<3 GOTO 15055
15040 PRINT "    DO YOU CHEAT OFTEN?  ...  "
15055 REM
15070 PRINT
15085 IF D1>6 GOTO 15205
15100 REM D1 DETERMINES HOW MANY GAMES THAT CAN BE PLAYED
15115 IF D1=9 GOTO 15280
15130 PRINT "WOULD YOU LIKE TO PLAY ANOTHER GAME?"
15145 D1=D1+1
15160 INPUT D$
15175 IF D$="Y" GOTO 10780
15190 IF D$="YES" GOTO 10780
15205 PRINT
```

```
15220 PRINT "YOU WON "D4" GAMES. I WON "D3" GAMES. AND WE "
15235 PRINT "PLAYED "D2" DRAW GAMES."
15250 PRINT
15265 IF D4=D3 GOTO 15115
15280 PRINT
15295 PRINT "THANK YOU FOR PLAYING."
15310 PRINT
15325 END
```

```
RUN CHECKERS
```

```
THIS IS A CHECKER GAME. IT IS PLAYED BETWEEN YOU
AND THE COMPUTER. THE RULES ARE SIMPLE - ALL PIECES
EXCEPT KINGS CAN ONLY MOVE FORWARD, DIAGONALLY, AVOIDING
ALL DARK ( XX ) SQUARES, IF THE SPACE IS UNOCCUPIED.

IF THE SPACE IS OCCUPIED BY ONE OF YOUR MEN-YOU CAN NOT
PROCEED FURTHER.

IF THE SPACE IS OCCUPIED BY YOUR OPPONENT-YOU MUST JUMP
IF POSSIABLE.

IF YOUR PIECE HAS BEEN KINGED-THE RULES ARE THE SAME
EXCEPT IT MAY ALSO MOVE BACKWARDS, AVOIDING ALL OF
THE DARK SQUARES ( XX ).

YOUR MOVES ARE LIMITED TO   O N E * SPACE * ONLY..
UNLESS YOU ARE JUMPING PIECES.
```

TO MOVE-

1-ENTER THE SQUARE # THE PIECE IS ON THAT YOU PLAN TO MOVE
2-THEN ENTER THE SQUARE # YOU ARE MOVING TOO
3-THEN ENTER THE NUMBER OF THE COMPUTER'S MEN YOU ARE
GOING TO JUMP IN THE PROCESS.
4-AND FINALLY TYPE (YES OR NO) IF YOU WANT A PRINT
OUT OF THE BOARD AFTER THE MOVE OR NOT.

THE FOLLOWING IDENTIFICATIONS WILL BE USED ON ALL
OF THE GAME BOARD PRINT OUTS.

YP -MEANS YOUR PAWN.
YK -MEANS YOUR KING.

CP -MEANS THE COMPUTERS PAWN.
CK -MEANS THE COMPUTERS KING.

HERE IS A SAMPLE MOVE-

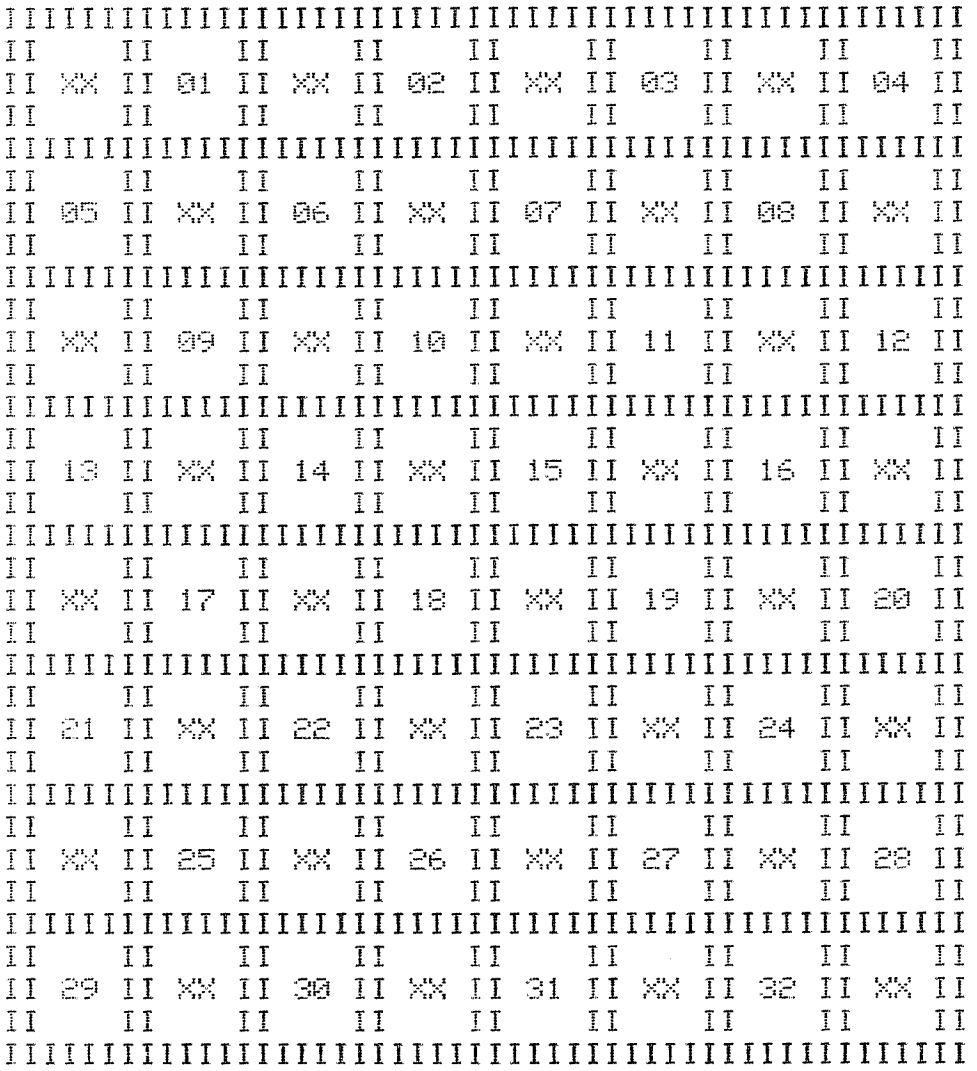
```
WHAT IS YOUR MOVE?
? 23,19,0,YES

YOUR MOVES CAN BE MADE ON ANY OF THE UNOCCUPIED
SQUARES NUMBERED FROM 1 TO 32.
```

DON'T WASTE TOO MUCH TIME AS THE GAME HAS A TIME LIMIT.

YOU ARE W H I T E AND MOVE FIRST.
GOOD LUCK!...

```
WOULD YOU LIKE TO PRINT THE BOARD?
?Y
```

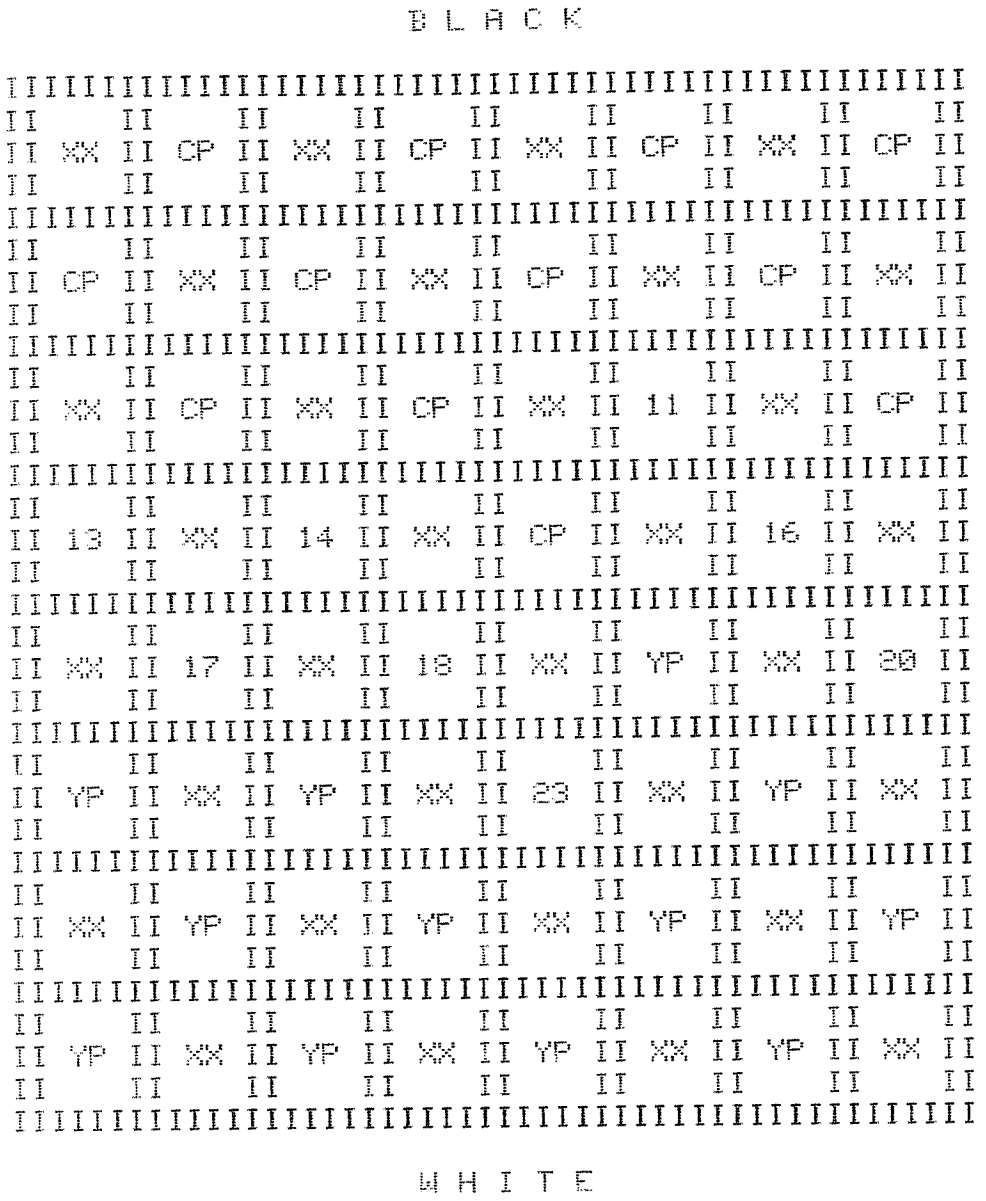
B L A C K



W H I T E

WOULD YOU LIKE TO PRINT THE INITIAL GAME BOARD?
?N

```
WHAT IS YOUR MOVE?
?23,19,0,Y
```




```
WHAT IS YOUR MOVE?
?
```

CRAPS:

DESCRIPTION

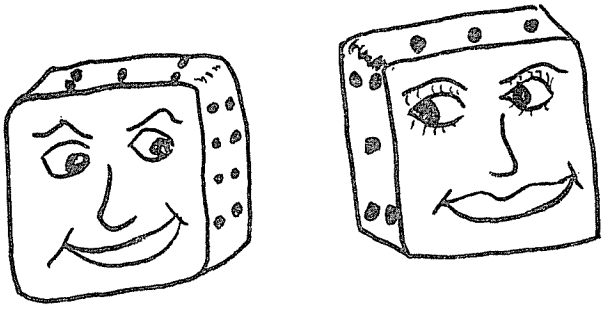
This program simulates a crap game. The computer rolls the dice and keeps score. In this simulation the computer is one of the two players, you are the other player. For hard way rolls the computer gives you the hard way odds but does not accept hard way bets. You may bet against yourself or the computer if you don't think the point will be made.

INSTRUCTIONS

For instructions list the program. Upon execution the program will prompt you for all the required information necessary for game operation.

LIMITATIONS

In line 370 the RND(-1) function is used. The (-1) may be changed to a positive integer without effecting program operation. Program storage and execution will require about 5K Bytes of memory. A sample run of this game is included after the program listing.



CRAPS

```
10 REM THIS IS THE GAME OF CRAPS
20 DIM E(13), F(13)
30 PRINT"THIS IS THE GAME OF CRAPS"
40 PRINT"YOU AND THE COMPUTER PLAY A CRAP GAME"
50 PRINT"TO BET AGAINST YOURSELF BET (-) DOLLARS"
60 PRINT
70 PRINT"  TO STOP PLAYING BET 0 DOLLARS"
80 PRINT
90 PRINT
100 PRINT"WHAT NUMBER BETWEEN 1 AND 711 IS LUCKY FOR YOU TODAY"
110 INPUT A
120 PRINT
130 IF A<1 GOTO 100
140 IF A>711 GOTO 100
150 X=RND(-A)
160 Y=INT(250*X)+50
170 PRINT"GOOD... YOU HAVE "Y" DOLLARS TO PLAY WITH."
180 Z=1
190 PRINT
200 PRINT"YOU ROLL FIRST..."
210 PRINT
220 IF Z=1 GOTO 290
230 PRINT
240 PRINT"YOU NOW HAVE "Y" DOLLARS"
250 PRINT
260 IF Y=0 GOTO 650
270 PRINT"CHANGE THE DICE, TOO THE LEFT."
280 PRINT
290 PRINT"HOW MUCH DO YOU BET"
300 INPUT B
310 IF B=0 GOTO 1030
320 IF B>Y GOTO 350
330 L=0
340 GOTO 370
350 PRINT"DON'T TRY TO BET MORE THAN YOU HAVE, PLEASE."
360 GOTO 290
370 C=INT(6*RND(-1))+1
380 D=INT(6*RND(-4))+1
390 L=L+1
400 F=C+D
```

```
410 IF L>1 GOTO 710
420 E=C+D
430 IF Z=2 GOTO 810
440 IF E=2 GOTO 510
450 IF E=3 GOTO 510
460 IF E=7 GOTO 550
470 IF E=11 GOTO 550
480 IF E=12 GOTO 510
490 PRINT"YOU ROLL "C" AND "D" SO YOUR POINT IS "E
500 GOTO 1060
510 PRINT"YOU ROLL "C" AND "D" AND CRAP OUT..."
520 Y=Y-B
530 IF Y=0 GOTO 650
540 GOTO 590
550 PRINT"YOU ROLL "C" AND "D" AND PASS...."
560 GOTO 580
570 PRINT"YOU ROLL "C" AND "D" AND MAKE YOUR POINT.."
580 Y=Y+B
590 IF Y=0 GOTO 650
600 PRINT
610 PRINT"YOU NOW HAVE "Y" DOLLARS"
620 PRINT
630 GOTO 290
640 PRINT
650 PRINT
660 PRINT
670 PRINT"YOU HAVE GONE BANKRUPT..... SORRY ABOUT THAT."
680 PRINT
690 PRINT
700 GOTO 1290
710 IF Z=2 GOTO 920
720 IF F=E GOTO 570
730 IF F=7 GOTO 760
740 PRINT"YOU ROLL "C" AND "D" ...ROLL AGAIN."
750 GOTO 370
760 PRINT"YOU ROLL "C" AND "D" AND LOSE..."
770 Z=2
780 Y=Y-B
790 IF Y=0 GOTO 650
800 GOTO 240
810 IF E=2 GOTO 880
820 IF E=3 GOTO 880
830 IF E=7 GOTO 900
840 IF E=11 GOTO 900
850 IF E=12 GOTO 880
860 PRINT"  I ROLL "C" AND "D" SO MY POINT IS "E
870 GOTO 1060
880 PRINT"  I ROLL "C" AND "D" AND CRAP OUT..."
890 GOTO 580
900 PRINT"  I ROLL "C" AND "D" AND PASS..."
910 GOTO 520
```

```
920 IF F=E GOTO 1010
930 IF F=7 GOTO 960
940 PRINT"  I ROLL "C" AND "D" ...ROLL AGAIN."
950 GOTO 370
960 PRINT"  I ROLL "C" AND "D" AND LOSE..."
970 Y=Y+B
980 IF Y=0 GOTO 650
990 Z=1
1000 GOTO 240
1010 PRINT"  I ROLL "C" AND "D" AND MAKE MY POINT"
1020 GOTO 520
1030 PRINT"THANKS FOR PLAYING THE GAME. AND CONGRATULATIONS"
1040 PRINT"FOR BEING ABLE TO QUIT WHILE YOU WERE AHEAD."
1050 GOTO 1390
1060 IF E=4 GOTO 1110
1070 IF E=6 GOTO 1170
1080 IF E=8 GOTO 1200
1090 IF E=10 GOTO 1260
1100 GOTO 370
1110 W=2
1120 U=7
1130 PRINT
1140 PRINT"THE ODDS ARE 8:1 YOU CAN'T MAKE IT THE HARD WAY.."
1150 PRINT
1160 GOTO 370
1170 W=3
1180 U=7
1190 GOTO 1130
1200 W=4
1210 U=7
1220 PRINT
1230 PRINT"THE ODDS ARE 10:1 THAT YOU CAN'T MAKE IT THE HARD WAY.."
1240 PRINT
1250 GOTO 370
1260 W=5
1270 U=7
1280 GOTO 1220
1290 PRINT
1300 PRINT
1310 PRINT"WOULD YOU LIKE TO PLAY ANOTHER GAME"
1320 INPUT A$
1330 IF A$="YES" GOTO 1360
1340 IF A$="Y" GOTO 1360
1350 GOTO 1390
1360 PRINT
1370 PRINT
1380 GOTO 100
1390 END
```

```
RUN CRAPS




THIS IS THE GAME OF CRAPS
YOU AND THE COMPUTER PLAY A CRAP GAME
TO BET AGAINST YOURSELF BET (-) DOLLARS

  TO STOP PLAYING BET 0 DOLLARS


WHAT NUMBER BETWEEN 1 AND 711 IS LUCKY FOR YOU TODAY
?25

GOOD... YOU HAVE   156  DOLLARS TO PLAY WITH.

YOU ROLL FIRST...

HOW MUCH DO YOU BET
?100
YOU ROLL     4  AND     4  SO YOUR POINT IS     8

THE ODDS ARE 10:1 THAT YOU CAN'T MAKE IT THE HARD WAY..

YOU ROLL     2  AND     6  AND MAKE YOUR POINT..

YOU NOW HAVE   256  DOLLARS

HOW MUCH DO YOU BET
?-200
YOU ROLL     4  AND     3  AND PASS....

YOU NOW HAVE    56  DOLLARS

HOW MUCH DO YOU BET
?56
YOU ROLL     5  AND     3  SO YOUR POINT IS     8

THE ODDS ARE 10:1 THAT YOU CAN'T MAKE IT THE HARD WAY..

YOU ROLL     1  AND     6  AND LOSE...


YOU HAVE GONE BANKRUPT..... SORRY ABOUT THAT.



WOULD YOU LIKE TO PLAY ANOTHER GAME
?NO
```

DOGFIGHT:

DESCRIPTION

This is a simulated dogfight between a Phantom jet and a Mig fighter. You are the Phantom pilot and your plane is equipped with missiles. The mig is also equipped with missiles and is capable of taking evasive action. If you are outmaneuvered the mig will fire at you. After each missile launching the computer will issue a damage report. The object of the game is to shoot down the mig before you loose your plane.

INSTRUCTIONS

The game asks all the questions necessary to play. For additional information list the program.

LIMITATIONS

This game should execute in standard Basic. It will require 4K Bytes of memory for execution. A partial run of this game is included after the program listing.

DOGFIGHT

```
120 PRINT "THIS IS A SIMPLIFIED AERIAL DOGFIGHT"
140 PRINT "IT IS BETWEEN YOUR PHANTOM AND AN ENEMY MIG"
160 PRINT
180 PRINT "FLY WELL - GOOD LUCK!"
200 PRINT
220 E1=D1=R=L=M=N=0
240 PRINT
260 A4=20
280 REM A4 IS THE HIT RADIUS
300 A3=A4
320 PRINT
340 PRINT "AN ENEMY MIG HAS BEEN SPOTTED ON RADAR"
360 PRINT "ALERT YOUR WEAPON'S CONTROL OFFICER AND ARM YOUR WEAPONS"
380 PRINT
400 PRINT "ENTER YOUR DEFENSIVE MANEUVERS NUMBER (1-100)"
420 PRINT
440 INPUT X4
460 X2=(-1)**X4
480 X4=X2*X4
500 PRINT
520 PRINT "MIG IS TAKING EVASIVE ACTION"
560 GOTO 580
580 X=(RND(X4)+0.5)*60
600 M=M+1
620 A=(RND(-1)+0.5)*60
640 C=(RND(-2)+0.5)*60
660 PRINT
680 Y=X*A
700 X1=(INT(Y/100)*100+INT(X))
720 IF M<35 GOTO 760
740 A3=2*A4
760 IF L=1 GOTO 1000
780 PRINT "ENEMY VECTOR RANGE IS";X1;"METERS"
800 PRINT "ENTER YOUR MISSILE DETONATION RANGE"
820 INPUT B
840 PRINT
860 Y1=INT(Y)
880 IF ABS (B-Y1)<A3 GOTO 1120
900 R=ABS(B-Y1)
920 IF (B-Y1)>0 GOTO 980
940 PRINT "MISSED - MISSILE SHORT BY";R;"METERS"
```

```
960 GOTO 1000
980 PRINT "MISSED - MISSILE LONG BY";R;"METERS"
1000 PRINT
1020 L=0
1040 PRINT "ENEMY LAUNCHING MISSILE - TAKE EVASIVE ACTION"
1060 IF ABS (A-C)<A3 GOTO 1360
1080 PRINT "MISS - YOU EVADED HIS MISSILE"
1100 GOTO 580
1120 IF ABS(B-Y1)<(A3/2) GOTO 1260
1140 D1=D1+1
1160 IF D1>4 GOTO 1220
1180 PRINT "NEAR MISS - MINOR DAMAGE TO MIG"
1200 GOTO 500
1220 PRINT "DIRECT HIT - ENEMY MIG DESTROYED"
1240 GO TO 1700
1260 IF ABS(B-Y1)<(A3/6) GOTO 1220
1280 IF D1>4 GOTO 1220
1300 PRINT "DIRECT HIT, MAJOR DAMAGE TO MIG - STILL FLYABLE"
1320 D1=D1+3
1340 GOTO 500
1360 IF ABS(A-C)<(A3/3) GOTO 1540
1380 E1=E1+1
1400 IF E1>4 GOTO 1480
1420 PRINT "YOU'VE BEEN HIT! MINOR DAMAGE TO PHANTOM"
1440 GOTO 1100
1460 PRINT
1480 PRINT "BOOM! AIRCRAFT UNCONTROLLABLE - EJECT! EJECT!"
1500 PRINT "BETTER LUCK NEXT TIME, GUYS!"
1520 GOTO 1780
1540 IF ABS(A-C)<(A3/9) GOTO 1460
1560 IF E1>4 GOTO 1480
1580 PRINT "DIRECT HIT ON PHANTOM"
1600 PRINT "MAJOR DAMAGE; CONTROLLABILITY MARGINAL"
1620 L=0
1640 REM IF L=1 YOU LOSE TURN AFTER A DIRECT HIT
1660 E1=E1+4
1680 GOTO 580
1700 PRINT
1720 IF A3=(2*A4) GOTO 1780
1740 PRINT "MESSAGE RECEIVED FROM HEADQUARTERS"
1760 PRINT "NICE GOING YOU GUYS!"
1780 PRINT
1800 PRINT
1820 PRINT
1840 PRINT "WOULD YOU LIKE ANOTHER DOGFIGHT"
1860 INPUT Z$
1880 PRINT
1900 PRINT
1920 PRINT
1940 IF Z$="Y" GOTO 200
1960 IF Z$="YES" GOTO 200
1980 END
```

```
RUN DOGFIGHT



THIS IS A SIMPLIFIED AERIAL DOGFIGHT
IT IS BETWEEN YOUR PHANTOM AND AN ENEMY MIG

FLY WELL - GOOD LUCK!


AN ENEMY MIG HAS BEEN SPOTTED ON RADAR
ALERT YOUR WEAPON'S CONTROL OFFICER AND ARM YOUR WEAPONS

THE MISSILE HIT RADIUS IS   20 METERS

MIG IS TAKING EVASIVE ACTION

ENEMY VECTOR RANGE IS          3249 METERS
ENTER YOUR MISSILE DETONATION RANGE
?3200

DIRECT HIT, MAJOR DAMAGE TO MIG - STILL FLYABLE

MIG IS TAKING EVASIVE ACTION

ENEMY VECTOR RANGE IS          3038 METERS
ENTER YOUR MISSILE DETONATION RANGE
?3100

MISSED - MISSILE LONG BY         62 METERS

ENEMY LAUNCHING MISSILE - TAKE EVASIVE ACTION
MISS - YOU EVADED HIS MISSILE

ENEMY VECTOR RANGE IS          2945 METERS
ENTER YOUR MISSILE DETONATION RANGE
?2950

MISSED - MISSILE LONG BY         24 METERS

ENEMY LAUNCHING MISSILE - TAKE EVASIVE ACTION
YOU'VE BEEN HIT! MINOR DAMAGE TO PHANTOM
```

```
ENEMY VECTOR RANGE IS           6687 METERS
ENTER YOUR MISSILE DETONATION RANGE
?6650

MISSED - MISSILE LONG BY          20 METERS

ENEMY LAUNCHING MISSILE - TAKE EVASIVE ACTION
YOU'VE BEEN HIT! MINOR DAMAGE TO PHANTOM

ENEMY VECTOR RANGE IS           5473 METERS
ENTER YOUR MISSILE DETONATION RANGE
?5465

DIRECT HIT, MAJOR DAMAGE TO MIG - STILL FLYABLE

MIG IS TAKING EVASIVE ACTION

ENEMY VECTOR RANGE IS           1432 METERS
ENTER YOUR MISSILE DETONATION RANGE
?1450

MISSED - MISSILE LONG BY          25 METERS

ENEMY LAUNCHING MISSILE - TAKE EVASIVE ACTION
MISS - YOU EVADED HIS MISSILE

ENEMY VECTOR RANGE IS           1948 METERS
ENTER YOUR MISSILE DETONATION RANGE
?1940

MISSED - MISSILE LONG BY          32 METERS

ENEMY LAUNCHING MISSILE - TAKE EVASIVE ACTION
YOU'VE BEEN HIT! MINOR DAMAGE TO PHANTOM

ENEMY VECTOR RANGE IS           4274 METERS
ENTER YOUR MISSILE DETONATION RANGE
?
```

GOLF:

DESCRIPTION

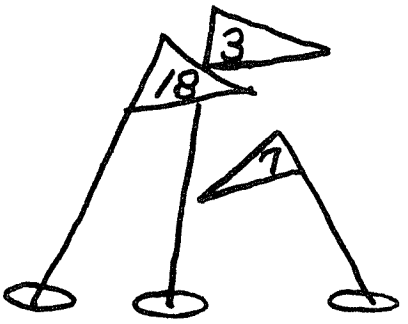
This version of Golf was originally called Super Golf. The major difference between it and Golf was that in Super Golf you had the option of playing less then a full 18 hole game. This particular game also has more obstacles and more difficult shots then the standard Golf game. The game is set up for only one player. The computer will keep your score and tell you how you are doing on the course. FOUR.....

INSTRUCTIONS

All necessary instructions will be provided when the program is run.

LIMITATIONS

The source code for this game requires 8K Bytes of memory for storage. An executed run of this game is included after the source listing.



GOLF

```
120 PRINT"*************************************************************"
130 REM THIS IS THE GAME OF GOLF
140 PRINT"***** WELCOME TO THE COUNTRY CLUB! THIS COURSE IS"
150 Z9=0.7
160 REM ****** Z9 DETER. THE CLOSENESS TO THE CUP TO SINK THE BALL
170 Z8=3*Z9
180 REM Z8 IS THE DIST. OF Z9 IN FEET.
190 PRINT"***** AN EIGHTEEN HOLE , CHAMPIONSHIP LAYOUT."
200 Z=18
210 PRINT
220 PRINT"DO YOU WANT TO PLAY ALL 18 HOLES? (YES OR NO)"
230 INPUT A$
240 IF A$="YES" GOTO 350
250 IF A$="Y" GOTO 350
260 PRINT
270 PRINT"  HOW MANY HOLES DO YOU WANT TO PLAY? <19"
280 INPUT Z
290 Z=INT(Z)
300 IF Z>8 GOTO 340
310 PRINT
320 PRINT"              YOU MUST BE A TENDERFOOT!......."
330 PRINT
340 Z1=Z+1
350 PRINT
360 PRINT"***** THE COMMENTATOR WILL EXPLAIN THE COURSE AS YOU"
370 PRINT"***** PLAY. ENJOY YOUR GAME, SEE YOU ON THE 19TH TEE..."
380 PRINT
390 PRINT"WHAT IS YOUR HANDICAP ? (FOR "Z" HOLES)"
400 INPUT H
410 PRINT
420 PRINT"DIFFICULTIES AT GOLF INCLUDE:"
430 PRINT"0=HOOK, 1=SLICE, 2=POOR DISTANCE, 4=TRAP SHOTS, 5=PUTTING"
440 PRINT"   WHICH ONE IS YOUR WORST (ONLY ONE)?"
450 INPUT D
460 IF D<0 GOTO 430
470 IF D=3 GOTO 440
480 IF D>5 GOTO 430
490 PRINT
500 PRINT
510 H1=1
520 REM H1 IS THE HOLE #
530 S=S2=S3=S8=P9=0
540 REM Z1 IS THE # OF HOLES PLAYED
```

```
550 REM C7 IS THE DIST. THE SHOT WENT
560 REM S IS THE # OF STROKES TAKEN PER HOLE
570 REM S2 IS THE # OF STROKES TAKEN PER GAME
580 REM P7 IS THE PUTT DIST          .
590 REM P8 IS P7 IN FEET
600 REM H IS YOUR HANDICAP
610 REM H1 IS THE HOLE #
620 REM D2 IS THE DIST. D1 IN FEET
630 D1=361
640 REM D1 IS THE DIST. TO THE CUP
650 P=4
660 REM P IS PAR FOR THE HOLE YOU ARE ON
670 PRINT
680 PRINT"THESE ARE THE CLUBS YOU HAVE IN YOUR BAG"
690 PRINT"YARDAGE DESIRED                          SUGGESTED CLUBS"
700 PRINT" 200 TO 300 YDS.                           1 TO  4"
710 PRINT" 100 TO 200 YDS.                          13 TO 19"
720 PRINT"   0 TO 100 YDS.                                20"
730 PRINT
740 PRINT
750 PRINT"YOU ARE AT THE TEE OF HOLE "H1" DISTANCE "D1" YARDS , PAR "P
760 IF H1>1 GOTO 790
770 A1$="AN ADJACENT FAIRWAY."
780 A2$="ROUGH."
790 PRINT"ON YOUR RIGHT IS "A1$
800 PRINT"ON YOUR LEFT IS "A2$
810 PRINT
820 PRINT" WHAT CLUB DO YOU CHOOSE?"
830 INPUT C
840 IF C<1 GOTO 810
850 IF D1<100 GOTO 910
860 IF C>19 GOTO 930
870 IF C>4 GOTO 890
880 GOTO 1060
890 IF C<13 GOTO 930
900 GOTO 1110
910 IF C=20 GOTO 960
920 PRINT
930 PRINT"  IMPROPER SELECTION! CHOOSE AGAIN"
940 PRINT
950 GOTO 830
960 C1=100
970 PRINT"YOU MAY NOW GAUGE YOUR DISTANCE BY"
980 PRINT"PERCENT OF YOUR FULL SWING - FROM .01 TO 1.00"
990 INPUT C7
1000 IF C7<.01 GOTO 970
1010 IF C7>1.00 GOTO 970
1020 C1=C1*C7
1030 C7=C1*RND(-P)+.5
1040 C7=C7+10
1050 GOTO 1150
```

```
1060 C8=C+4
1070 C7=(1/C8)*1000
1080 C7=C7*RND(-C)
1090 C7=C7+150
1100 GOTO 1150
1110 C6=(1/C)
1120 C6=C6*2000
1130 C7=C6*RND(-C)+60
1140 GOTO 1150
1150 S=S+1
1160 R1=RND(-5)
1170 IF R1>.15 GOTO 1310
1180 R2=INT(100*R1)
1190 IF R2=0 GOTO 1240
1200 IF R2=1 GOTO 1260
1210 D3=D1-INT(C7)
1220 PRINT" YOU SLICED YOUR **** SHOT, WENT OUT OF BOUNDS."
1230 GOTO 1280
1240 PRINT" YOU SLICED YOUR **** SHOT, WENT INTO WATER ...."
1250 GOTO 1280
1260 PRINT" YOU HOOKED YOUR **** SHOT, WENT  ????  ...."
1270 GOTO 1280
1280 PRINT"PENALTY STROKE ASSESSED. HIT FROM PREVIOUS LOCATION."
1290 S=S+1
1300 GOTO 810
1310 C7=INT(C7)
1320 D3=D1-INT(C7)
1330 IF D3<0 GOTO 1380
1340 D1=D3
1350 IF D1<Z9 GOTO 2970
1360 PRINT"SHOT WENT "C7" YARDS . IT'S "D1" YARDS FROM THE CUP."
1370 GOTO 1420
1380 D1=(-1)*D3
1390 IF D1<Z9 GOTO 2970
1400 PRINT"TOO MUCH CLUB. YOU'RE PAST THE CUP."
1410 PRINT"SHOT WENT "C7" YARDS. IT'S "D1" YARDS FROM THE CUP."
1420 IF D1<20 GOTO 1460
1430 R3=INT(30*RND(D1))
1440 PRINT"YOUR BALL IS "R3" YARDS OFF LINE....IN FAIRWAY."
1450 GOTO 810
1460 D2=3*D1
1470 IF D2=0 GOTO 1840
1480 PRINT
1490 PRINT
1500 PRINT"YOU ARE ON THE GREEN "D2" FEET FROM THE PIN."
1510 PRINT" EVERYONE PLEASE TALK SOFTLY, NOW!"
1520 PRINT"CHOOSE YOUR PUTT DISTANCE BY POTENCY NUMBER FROM  1 TO 13"
1530 INPUT P1
1540 IF P1>13 GOTO 1520
1550 IF P1<1 GOTO 1520
1560 P7=(3*P1)*RND(-P1)+(.5)
```

```
1570 P7=INT(P7)
1580 P7=P7+1
1590 REM P7 IS THE DIST. THE PUTT WILL GO
1600 P8=2*P7
1610 G=D2-P8
1620 IF ABS(G)<29 GOTO 1710
1630 IF R1>.5 GOTO 1660
1640 PRINT"YOU OVERSHOT THE CUP AND LANDED IN THE FAIRWAY."
1650 GOTO 1670
1660 PRINT"YOU OVERSHOT THE GREEN, AND LANDED IN A SAND TRAP!!"
1670 PRINT"YOU LOST ONE STROKE GETTING BACK TO THE GREEN"
1680 S=S+1
1690 D2=ABS(G)
1700 GOTO 1490
1710 IF G<0 GOTO 1780
1720 D2=G
1730 IF G<29 GOTO 1840
1740 PRINT"YOUR PUTT IS SHORT."
1750 PRINT
1760 S=S+1
1770 GOTO 1500
1780 S=S+1
1790 D2=(-1)*G
1800 IF G<29 GOTO 1840
1810 PRINT"PASSED THE CUP."
1820 PRINT
1830 GOTO 1500
1840 S2=S2+S
1850 IF S=1 GOTO 1860
1860 PRINT"     YOU  H*O*L*E*D  IT "
1870 PRINT
1880 PRINT"YOUR SCORE ON HOLE "H1" WAS "S
1890 P9=P9+P
1900 PRINT"TOTAL PAR FOR "H1" HOLES IS "P9" YOUR TOTAL IS "S2
1910 A=P-S
1920 REM A DETER. YOUR RATING
1930 IF A=(-1) GOTO 1980
1940 IF A=0 GOTO 2010
1950 IF A=1 GOTO 2030
1960 IF A=2 GOTO 2050
1970 GOTO 2070
1980 PRINT"A BOGEY...."
1990 REM
2000 GOTO 2070
2010 PRINT"A PAR"
2020 GOTO 2070
2030 PRINT"VERY GOOD A BIRDIE"
2040 GOTO 2070
2050 PRINT"  *** AN  EAGLE  !! * .."
2060 GOTO 2070
2070 H1=H1+1
```

```
2080 S=0
2090 IF H1=21 GOTO 3240
2100 IF H1=2 GOTO 2320
2110 IF H1=3 GOTO 2370
2120 IF H1=4 GOTO 2420
2130 IF H1=5 GOTO 2470
2140 IF H1=6 GOTO 2520
2150 IF H1=7 GOTO 2570
2160 IF H1=8 GOTO 2620
2170 IF H1=9 GOTO 2670
2180 IF H1=10 GOTO 2720
2190 IF H1=11 GOTO 2770
2200 IF H1=12 GOTO 2820
2210 IF H1=13 GOTO 2870
2220 IF H1=14 GOTO 3040
2230 IF H1=15 GOTO 3090
2240 IF H1=16 GOTO 3140
2250 IF H1=17 GOTO 3190
2260 IF H1=19 GOTO 3240
2270 D1=389
2280 P=4
2290 A1$="TREES."
2300 A2$=A1$
2310 GOTO 730
2320 D1=206
2330 P=3
2340 A1$="ADJACENT FAIRWAY."
2350 A2$="ROUGH."
2360 GOTO 730
2370 D1=500
2380 P=5
2390 A1$="OUT OF BOUNDS."
2400 A2$="ROUGH."
2410 GOTO 730
2420 D1=408
2430 P=4
2440 A1$="ROUGH."
2450 A2$="ADJACENT FAIRWAY."
2460 GOTO 730
2470 D1=359
2480 P=4
2490 A1$="WATER."
2500 A2$="ADJACENT FAIRWAY."
2510 GOTO 730
2520 D1=424
2530 P=4
2540 A1$=A2$
2550 A2$="ROUGH."
2560 GOTO 730
2570 D1=388
2580 P=4
```

```
2590 A1$=A1$
2600 A2$=A1$
2610 GOTO 730
2620 D1=196
2630 P=3
2640 A1$="OUT OF BOUNDS."
2650 A2$="ROUGH."
2660 GOTO 730
2670 D1=400
2680 P=4
2690 A1$=A1$
2700 A2$=A2$
2710 GOTO 730
2720 D1=560
2730 P=5
2740 A1$=A1$
2750 A2$=A2$
2760 GOTO 730
2770 D1=132
2780 P=3
2790 A1$=A2$
2800 A2$=A2$
2810 GOTO 730
2820 D1=357
2830 P=4
2840 A1$="ADJACENT FAIRWAY."
2850 A2$=A1$
2860 GOTO 730
2870 D1=294
2880 P=4
2890 A1$="ROUGH."
2900 A2$=A2$
2910 GOTO 730
2920 IF S>1 GOTO 1460
2930 PRINT
2940 PRINT
2950 PRINT"**********************************************************"
2960 GOTO 2980
2970 GOTO 2920
2980 PRINT"**A*HOLE*IN*ONE*A*HOLE*IN*ONE*A*HOLE*IN*ONE**"
2990 PRINT"**********************************************************"
3000 PRINT
3010 PRINT
3020 PRINT
3030 GOTO 1840
3040 D1=475
3050 P=5
3060 A1$=A1$
3070 A2$="TREES."
3080 GOTO 730
3090 D1=375
```

```
3100 P=4
3110 A1$="ADJACENT FAIRWAY."
3120 A2$=A1$
3130 GOTO 730
3140 D1=180
3150 P=3
3160 A1$="WATER."
3170 A2$="ROUGH."
3180 GOTO 730
3190 D1=550
3200 P=5
3210 A1$=A1$
3220 A2$=A1$
3230 GOTO 730
3240 S3=S2-H
3250 PRINT
3260 PRINT
3270 PRINT"TOTAL PAR FOR THESE "Z" HOLES IS "P9" , YOUR TOTAL WAS "S2
3280 PRINT"MINUS YOUR HANDICAP YOUR SCORE IS "S3
3290 PRINT
3300 IF S3>(P9+1) GOTO 3560
3310 IF S3=(P9+1) GOTO 3400
3320 IF S3=P9 GOTO 3440
3330 IF S3=(P9-1) GOTO 3480
3340 IF S3=(P9-2) GOTO 3520
3350 PRINT
3360 PRINT
3370 PRINT"  I DON'T BELIEVE IT! I DON'T BELIEVE IT!! ....   "
3380 PRINT
3390 GOTO 3560
3400 PRINT
3410 PRINT" YOU GOT A 'BOGEY' FOR THE COURSE."
3420 PRINT
3430 GOTO 3560
3440 PRINT
3450 PRINT" YOU MADE PAR FOR THE COURSE."
3460 PRINT
3470 GOTO 3560
3480 PRINT
3490 PRINT" YOU GOT A 'BIRDIE' FOR THE COURSE."
3500 PRINT
3510 GOTO 3560
3520 PRINT
3530 PRINT" ** YOU EAGLED THE COURSE ** "
3540 PRINT
3550 GOTO 3560
3560 PRINT
3570 PRINT
3580 PRINT
3590 PRINT
3600 PRINT"DO YOU FEEL UP TO ANOTHER "Z" HOLES?"
```

```
3610 INPUT A6$
3620 IF A6$="Y" GOTO 490
3630 IF A6$="YES" GOTO 490
3640 PRINT
3650 PRINT
3660 PRINT
3670 PRINT
3680 END
```

```
RUN GOLF
```

```
***** WELCOME TO THE COUNTRY CLUB! THIS COURSE IS
***** AN EIGHTEEN HOLE , CHAMPIONSHIP LAYOUT.

DO YOU WANT TO PLAY A FULL 18 HOLES?
?NO
HOW MANY HOLES DO YOU WANT TO PLAY? <19
?2

***** THE COMMENTATOR WILL EXPLAIN THE COURSE AS YOU
***** PLAY. ENJOY YOUR GAME, SEE YOU ON THE 19TH TEE...

WHAT IS YOUR HANDICAP? (FOR     2  HOLES)
?4

DIFFICULTIES AT GOLF INCLUDE:
0=HOOK, 1=SLICE, 2=POOR DISTANCE, 4=TRAP SHOTS, 5=PUTTING
   WHICH ONE IS YOUR WORST (ONLY ONE)?
?2
```

```
THESE ARE THE CLUBS YOU HAVE IN YOUR BAG
YARDAGE DESIRED                    SUGGESTED CLUBS
 200 TO 300 YDS.                       1 TO  4
 100 TO 200 YDS.                      13 TO 19
   0 TO 100 YDS.                           20


YOU ARE AT THE TEE OF HOLE      1  DISTANCE    361  YARDS , PAR      4
ON YOUR RIGHT IS AN ADJACENT FAIRWAY.
ON YOUR LEFT IS ROUGH.

 WHAT CLUB DO YOU CHOOSE?
?1
SHOT WENT    310  YARDS . IT'S     51  YARDS FROM THE CUP.
YOUR BALL IS     26  YARDS OFF LINE....IN FAIRWAY.

 WHAT CLUB DO YOU CHOOSE?
?20
YOU MAY NOW GAUGE YOUR DISTANCE BY
PERCENT OF YOUR FULL SWING - FROM .01 TO 1.00
?.7
TOO MUCH CLUB. YOU'RE PAST THE CUP.
SHOT WENT     53  YARDS. IT'S      2  YARDS FROM THE CUP.


YOU ARE ON THE GREEN      6  FEET FROM THE PIN.
 EVERYONE PLEASE TALK SOFTLY, NOW!
CHOOSE YOUR PUTT DISTANCE BY POTENCY NUMBER FROM  1 TO 13
?3
      YOU  H*O*L*E*D  IT

YOUR SCORE ON HOLE      1  WAS      3
TOTAL PAR FOR      1  HOLES IS      4  YOUR TOTAL IS      3
VERY GOOD A BIRDIE


YOU ARE AT THE TEE OF HOLE      2  DISTANCE    206  YARDS , PAR      3
ON YOUR RIGHT IS ADJACENT FAIRWAY.
ON YOUR LEFT IS ROUGH.

 WHAT CLUB DO YOU CHOOSE?
?16
SHOT WENT    150  YARDS . IT'S     56  YARDS FROM THE CUP.
YOUR BALL IS     23  YARDS OFF LINE....IN FAIRWAY.
```

```
 WHAT CLUB DO YOU CHOOSE?
?20
YOU MAY NOW GAUGE YOUR DISTANCE BY
PERCENT OF YOUR FULL SWING - FROM .01 TO 1.00
?.8
SHOT WENT     44  YARDS . IT'S     12  YARDS FROM THE CUP.


YOU ARE ON THE GREEN     36  FEET FROM THE PIN.
 EVERYONE PLEASE TALK SOFTLY, NOW!
CHOOSE YOUR PUTT DISTANCE BY POTENCY NUMBER FROM  1 TO 13
?9
YOUR PUTT IS SHORT.
YOU ARE ON THE GREEN     14  FEET FROM THE PIN.
 EVERYONE PLEASE TALK SOFTLY, NOW!
CHOOSE YOUR PUTT DISTANCE BY POTENCY NUMBER FROM  1 TO 13
??
YOUR PUTT IS SHORT.
YOU ARE ON THE GREEN      4  FEET FROM THE PIN.
 EVERYONE PLEASE TALK SOFTLY, NOW!
CHOOSE YOUR PUTT DISTANCE BY POTENCY NUMBER FROM  1 TO 13
?2
      YOU  H*O*L*E*D  IT

YOUR SCORE ON HOLE      2  WAS      4
TOTAL PAR FOR      2  HOLES IS      7  YOUR TOTAL IS      7
A BOGEY....


TOTALPAR FOR THESE      2  HOLES IS      7  , YOUR TOTAL WAS      7
MINUS YOUR HANDICAP YOUR SCORE IS      3


  I DON'T BELIEVE IT! I DON'T BELIEVE IT!! ....




DO YOU FEEL UP TO ANOTHER      2  HOLES?
?N
```

JUDY:

DESCRIPTION

"Hi! I'm Judy", this is how the game starts off. It is a simulated rap session with Judy. Judy is played by the computer. Judy can carry on a fairly decent conversation and she listens very well. So the next time you feel you would like to talk to someone, try Judy.

INSTRUCTIONS

Instructions are included in the program listing. In order to play just type RUN. Judy will ask you a question and your rap session will have begun.

LIMITATIONS

Judy will require 7K Bytes of memory for execution. This simulation uses string variables extensively for comment storage. A typical rap session is presented at the end of the program listing.

JUDY

```
10 REM THIS IS JUDY
20 PRINT"  HI !  I'AM  JUDY"
30 PRINT"THIS IS JUST A LITTLE RAP SESSION"
40 PRINT"WHEN YOU ARE READY TO LEAVE TYPE    END"
50 PRINT"SO SIT DOWN AND RELAX. TELL ME"
60 PRINT"HOW ARE YOU?"
70 IF RND(-5)>.5 GOTO 110
80 X8=1
90 X9=1
100 GOTO 130
110 X8=0
120 X9=0
130 J=K=L=M=N=X8
140 A=B=C=D=E=F=G=X9
150 INPUT A$
160 A9$=A$
170 GOTO 1050
180 PRINT
190 PRINT"WHY DID YOU SAY "A9$
200 RETURN
210 PRINT
220 PRINT"DON'T YOU REALLY KNOW?"
230 C=1
240 RETURN
250 PRINT
260 PRINT"YOU SEEM QUITE POSITIVE, WHY?"
270 K=(-1)
280 RETURN
290 PRINT
300 PRINT"PERHAPS YOU WOULD RATHER TALK ABOUT SOMETHING ELSE"
310 A=1
320 RETURN
330 PRINT
340 PRINT"ARN'T YOU SURE"
350 C=1
360 RETURN
370 PRINT
380 PRINT"DOES THAT TROUBLE YOU?"
390 RETURN
400 PRINT
410 PRINT"PLEASE GO ON"
```

```
420 RETURN
430 PRINT
440 PRINT A9$
450 RETURN
460 PRINT
470 PRINT"ARE YOU SURE?"
480 RETURN
490 PRINT
500 PRINT"I SEE, BUT I'AM NOT SURE THAT I AGREE"
510 RETURN
520 PRINT
530 PRINT"I'AM NOT SURE I UNDERSTAND YOUR QUESTION"
540 RETURN
550 PRINT
560 PRINT"WHAT IS IT YOU REALLY WANT TO KNOW"
570 RETURN
580 PRINT
590 PRINT"I WOULD TELL YOU IF I KNEW"
600 RETURN
610 PRINT
620 PRINT"DO I DETECT SOME UNCERTAINTY THERE?"
630 RETURN
640 PRINT
650 PRINT"WHY DO YOU THINK I CAN TELL YOU?"
660 D=1
670 RETURN
680 PRINT
690 PRINT"ARE SUCH QUESTIONS OFTEN IN YOUR MIND?"
700 B=1
710 RETURN
720 PRINT
730 PRINT"CAN YOU THINK OF A SPECIFIC EXAMPLE"
740 A=2
750 RETURN
760 PRINT
770 PRINT"WHAT DOES THAT SUGGEST TO YOU?"
780 G=1
790 RETURN
800 PRINT
810 PRINT"HMMMMMMMM  ...."
820 B=B+1
830 RETURN
840 PRINT
850 PRINT"I'AM HAVING TROUBLE , PLEASE TALK IN SIMPLE SENTENCES"
860 RETURN
870 PRINT
880 PRINT"DO YOU FEEL STRONGLY ABOUT DISCUSSING SUCH THINGS?"
890 RETURN
900 PRINT
910 PRINT"I DON'T QUITE UNDERSTAND YOU"
920 RETURN
```

```
930 PRINT
940 PRINT"I'AM NOT SURE THAT I UNDERSTAND YOU FULLY"
950 RETURN
960 PRINT
970 PRINT"TELL ME MORE"
980 RETURN
990 PRINT
1000 PRINT A9$;A9$
1010 RETURN
1020 PRINT
1030 PRINT"WHY"
1040 RETURN
1050 IF J=1 GOTO 1090
1060 GOSUB 180
1070 J=1
1080 GOTO 150
1090 IF A$="I DONT KNOW" GOTO 1370
1100 IF A$="I DON'T KNOW" GOTO 1370
1110 IF A$="OK" GOTO 1420
1120 IF A$="O.K." GOTO 1430
1130 IF A$="O K" GOTO 1440
1140 IF A$="ALL RIGHT" GOTO 1510
1150 IF A$="WHY" GOTO 1530
1160 IF A$="YES" GOTO 1550
1170 IF A$="NO" GOTO 1630
1180 IF A$="Y" GOTO 1550
1190 IF A$="N" GOTO 1630
1200 IF A$="BECAUSE" GOTO 1690
1210 IF A$="CAUSE" GOTO 1690
1220 IF A$="MEBY" GOTO 1740
1230 IF A$="MAYBY" GOTO 1740
1240 IF A$="I DONT THINK SO" GOTO 1760
1250 IF A$="I DON'T THINK SO" GOTO 1760
1260 IF A$="NOT AT ALL" GOTO 1780
1270 IF A$="ALWAYS" GOTO 1800
1280 IF A$="STOP" GOTO 1840
1290 IF A$="I DON'T REALLY KNOW WHY" GOTO 1880
1300 IF A$="SOMETIMES" GOTO 1860
1310 IF A$="I DONT REALLY KNOW WHY" GOTO 1880
1320 IF A$="SEX" GOTO 1910
1330 IF A$="END" GOTO 1990
1340 IF LEN(A$)>25 GOTO 1720
1350 IF LEN(A$)<2 GOTO 1820
1360 GOTO 2080
1370 IF D=1 GOTO 2540
1380 IF K=2 GOTO 2040
1390 K=K+1
1400 GOSUB 210
1410 GOTO 150
1420 GOTO 1430
1430 GOTO 1440
```

```
1440 IF A=1 GOTO 1460
1450 GOTO 1480
1460 GOSUB 720
1470 GOTO 120
1480 IF G=1 GOTO 2230
1490 GOSUB 760
1500 GOTO 150
1510 GOSUB 720
1520 GOTO 150
1530 N=N+1
1540 GOTO 2430
1550 IF A>0 GOTO 1570
1560 GOSUB 720
1570 IF K<1 GOTO 1610
1580 K=K-1
1590 GOSUB 960
1600 GOTO 150
1610 GOSUB 250
1620 GOTO 150
1630 IF A=1 GOTO 1780
1640 IF L=1 GOTO 1760
1650 L=L+1
1660 IF C=1 GOTO 1840
1670 GOSUB 290
1680 GOTO 150
1690 IF D=1 GOTO 1740
1700 GOSUB 1020
1710 GOTO 150
1720 GOSUB 840
1730 GOTO 150
1740 GOSUB 720
1750 GOTO 120
1760 GOSUB 330
1770 GOTO 110
1780 GOSUB 490
1790 GOTO 120
1800 GOSUB 250
1810 GOTO 150
1820 GOSUB 870
1830 GOTO 150
1840 GOSUB 370
1850 GOTO 150
1860 GOSUB 610
1870 GOTO 150
1880 GOSUB 800
1890 GOSUB 760
1900 GOTO 150
1910 IF B=1 GOTO 1950
1920 GOSUB 870
1930 GOTO 110
1940 GOTO 1970
```

```
1950 GOSUB 800
1960 GOTO 150
1970 GOSUB 680
1980 GOTO 150
1990 PRINT
2000 PRINT"IT WAS NICE TO SEE YOU. COME BACK AGAIN.."
2010 PRINT"  BYE"
2020 PRINT
2030 GOTO 2640
2040 K=0
2050 GOSUB 290
2060 GOTO 150
2070 REM  M  IS THE FLAG FOR UNKNOWN ANSWER
2080 M=M+1
2090 IF M=1 GOTO 2190
2100 IF M=2 GOTO 2210
2110 IF M=3 GOTO 2230
2120 IF M=4 GOTO 2270
2130 IF M=5 GOTO 2290
2140 IF M=6 GOTO 2310
2150 IF M=7 GOTO 2330
2160 IF M=8 GOTO 2350
2170 IF M=9 GOTO 2370
2180 GOTO 2390
2190 GOSUB 180
2200 GOTO 150
2210 GOSUB 400
2220 GOTO 150
2230 GOSUB 520
2240 IF G=1 GOTO 120
2250 GOSUB 550
2260 GOTO 150
2270 GOSUB 610
2280 GOTO 150
2290 GOSUB 960
2300 GOTO 150
2310 GOSUB 900
2320 GOTO 150
2330 GOSUB 930
2340 GOTO 150
2350 GOSUB 460
2360 GOTO 150
2370 GOSUB 410
2380 GOTO 150
2390 M=0
2400 GOSUB 960
2410 GOTO 70
2420 REM  N  IS THE FLAG FOR THE ANS. WHY
2430 IF N=1 GOTO 2520
2440 IF N=2 GOTO 2540
2450 IF N=3 GOTO 2560
```

```
2460 IF N=4 GOTO 2580
2470 IF N=5 GOTO 2600
2480 IF N=6 GOTO 2620
2490 N=0
2500 GOSUB 680
2510 GOTO 70
2520 GOSUB 400
2530 GOTO 150
2540 GOSUB 580
2550 GOTO 150
2560 GOSUB 430
2570 GOTO 150
2580 GOSUB 370
2590 GOTO 150
2600 GOSUB 990
2610 GOTO 150
2620 GOSUB 640
2630 GOTO 150
2640 END
```

```
  HI !  I'AM  JUDY
THIS IS JUST A LITTLE RAP SESSION
WHEN YOU ARE READY TO LEAVE TYPE     END
SO SIT DOWN AND RELAX. TELL ME
HOW ARE YOU?
?FINE

PLEASE GO ON
?WHY

I WOULD TELL YOU IF I KNEW
?OK

CAN YOU THINK OF A SPECIFIC EXAMPLE
?NO

ARN'T YOU SURE
?I DONT KNOW

WHY DID YOU SAY I DONT KNOW
?I DONT KNOW
```

```
DON'T YOU REALLY KNOW?
?YES

CAN YOU THINK OF A SPECIFIC EXAMPLE

TELL ME MORE
?WHY

PLEASE GO ON
?WHY

I WOULD TELL YOU IF I KNEW
?OK

WHAT DOES THAT SUGGEST TO YOU?
?NOTHING

WHY DID YOU SAY NOTHING
?WHY NOT

PLEASE GO ON
?OK

I'AM NOT SURE I UNDERSTAND YOUR QUESTION
?FINE

WHY DID YOU SAY FINE
?BECAUSE

WHY
?CAUSE

WHY
?WHY NOT

WHY DID YOU SAY WHY NOT
?OK

WHAT DOES THAT SUGGEST TO YOU?
?END

IT WAS NICE TO SEE YOU. COME BACK AGAIN..
  BYE
```

LINE UP:

DESCRIPTION

This is a little number game. The computer selects a string of digits in some random sequence. The object of the game is to put the numbers in digit sequence from left to right in the least number of moves. It may sound very simple but just wait until you have tried it once.

INSTRUCTIONS

The program listing contains complete information on user instructions as well as subroutine information. During program execution all necessary instructions will be typed out. Additional inputs will be prompted for by the program.

LIMITATIONS

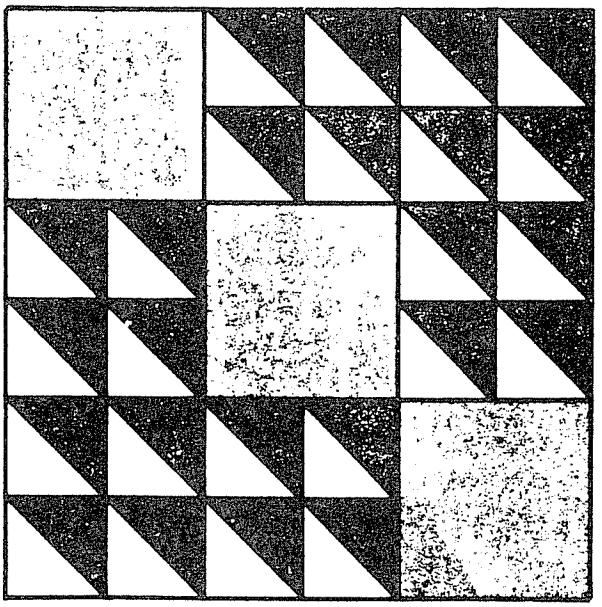
This game will execute in less then 4K Bytes of memory. The game requires no special Basic statements and should execute in standard Basic without any difficulties.

LINE UP

```
0010 DIM A(20)
0020 PRINT TAB(18);"***** LINE UP *****"
0030 PRINT TAB(19);"A GAME OF SKILL"
0040 REM *** ASK IF THEY WANT INSTRUCTIONS ***
0050 PRINT
0060 PRINT
0070 PRINT" DO YOU WANT INSTRUCTIONS";
0080 INPUT X$
0090 IF X$="NO" THEN 420
0100 IF X$="YES" THEN 140
0110 PRINT" PLEASE ANSWER YES OR NO !"
0120 PPINT" ANSWER";
0130 GOTO 80
0140 REM
0150 REM *** NOW PRINT THE INSTRUCTIONS IF REQUESTED ***
0160 REM
0170 PRINT
0180 PRINT" THIS IS THE GAME OF LINE UP. TO WIN ALL YOU HAVE"
0190 PRINT" TO DO IS ARRANGE A LIST OF NUMBERS INTO NUMERICAL"
0200 PRINT" ORDER FROM LEFT TO RIGHT. YOU SPECIFY THE LENGTH"
0210 PRINT" OF THE LIST; UP TO TWENTY NUMBERS IS OKAY."
0220 PRINT" TO MOVE: YOU TELL ME HOW MANY NUMBERS TO REVERSE"
0230 PRINT" (COUNTING FROM THE LEFT). FOR EXAMPLE; IF THE"
0240 PRINT" CURRENT LIST IS:"
0250 PRINT
0260 PRINT" 2 3 4 5 1 6 7 8 9"
0270 PRINT
0280 PRINT" AND YOU REVERSE FOUR; THE RESULT WILL BE:"
0290 PRINT
0300 PRINT" 5 4 3 2 1 6 7 8 9"
0310 PRINT
0320 PRINT" NOW; IF YOU REVERSE FIVE; YOU WILL WIN !"
0330 PRINT
0340 PRINT" 1 2 3 4 5 6 7 8 9"
0350 PRINT
0360 PRINT" I WILL WARN YOU NOW; THIS GAME IS VERY SIMPLE"
0370 PRINT" BUT IT MAY BECOME HABIT-FORMING. ANY TIME YOU"
0380 PRINT" WANT TO QUIT JUST REVERSE 0 (ZERO)."
0390 PRINT
0400 PRINT
0410 REM *** ASK FOR SIZE OF LIST ***
0420 PRINT
0430 PRINT" HOW MANY NUMBERS DO YOU WANT IN YOUR LIST";
```

```
0440 INPUT N
0450 IF N > 1 THEN 490
0460 PRINT" !!! NOT A VERY BIG LIST !!!"
0470 PRINT" PLEASE INPUT A LARGER LIST";
0480 GO TO 440
0490 IF N <=20 GOTO 530
0500 PRINT" !!! Maximum list size is 20 !!!"
0510 PRINT" How many";
0520 GOTO 440
0530 REM
0540 REM *** GENERATE LIST OF 'N' RANDOM NUMBERS ***
0550 A(1)=INT((N-1)*RND(-1))+1
0560 FOR K = 2 TO N
0570    A(K)=INT(N*RND(-1))+1
0580    FOR J = 1 TO K-1
0590       IF A(K)=A(J) THEN 570
0600    NEXT J
0610 NEXT K
0620 REM
0630 REM *** PRINT THE INITIAL LIST AND START THE GAME ***
0640 REM
0650 PRINT
0660 PRINT" Here we go . . . The list is :"
0670 T=0
0680 GOSUB 1040
0690 PRINT" How many shall I reverse";
0700 INPUT R
0710 IF R=0 THEN 1000
0720 IF R <= N THEN 750
0730 PRINT" !!! That's too many. You can reverse at most";N
0740 GOTO 690
0750 T=T+1
0760 REM
0770 REM *** REVERSE 'R' NUMBERS AND PRINT THE NEW LIST ***
0780 REM
0790 FOR K= 1 TO INT(R/2)
0800    Z=A(K)
0810    A(K)= A(R-K+1)
0820    A(R-K+1)=Z
0830 NEXT K
0840 GOSUB 1040
0850 REM
0860 REM *** CHECK FOR A WINNER ***
0870 REM
0880 FOR K= 1 TO N
0890    IF A(K) <> K THEN 690
0900 NEXT K
0910 REM
0920 REM *** IF THIS POINT IS REACHED THE PLAYER HAS WON ***
0930 PRINT"              ***** CONGRATULATIONS *****"
0940 PRINT
```

```
0950 PRINT"        YOU HAVE WON IN ONLY";T;" MOVES !!"
0960 PRINT
0970 PRINT" WANT TO TRY AGAIN";
0980 INPUT X$
0990 IF X$ ="YES" THEN 420
1000 STOP
1010 REM
1020 REM *** SUBROUTINE FOR PRINTING THE LIST OF NUMBERS ***
1030 REM
1040 PRINT
1050 FOR K= 1 TO N
1060    PRINT A(K);
1070 NEXT K
1080 PRINT
1090 PRINT
1100 RETURN
1110 END
```



PONY:

DESCRIPTION

In this game the computer simulates an authentic horse race. Any number of players may bet on the race. The betting odds are simulative of paramutuel betting. The race results are narrated by the computer all the way around the track.

INSTRUCTIONS

This program contains all necessary prompts and instructions for immediate execution. Detailed program information may be obtained by listing the program.

LIMITATIONS

The entire race can be run in about 7K Bytes of memory. A sample race is included following the source code listing.

PONY

```
20 REM THIS IS A HORSE RACE GAME
30 LET W7=0
40 PRINT"IN THIS GAME OF CHANCE THE COMPUTER RUNS A HORSE"
50 PRINT"RACE FOR YOU; ANY NUMBER OF PLAYERS CAN BET ON THE RESULTS."
60 PRINT
70 IF W7=1 GOTO 100
80 PRINT"    SEVENTH RACE, ONE MILE FOR 3-YR OLDS, POST TIME 2:34"
90 IF W7=0 GOTO 110
100 PRINT "NEXT RACE STARTS IN 3 MIN. PLACE YOUR BETS"
110 PRINT
120 LET W7=1
130 PRINT"1 MAN O'WAR            3:1"
140 PRINT"2 CITATION             4:1"
150 PRINT"3 WHIRLAWAY            5:1"
160 PRINT"4 ASSAULT              8:1"
170 PRINT"5 SEA BISCUIT          9:1"
180 PRINT"6 GALLANT FOX         11:1"
190 PRINT"7 STYMIE              20:1"
200 PRINT"8 COALTOWN            30:1"
210 PRINT
220 LET W8=0
230 LET S=0
240 LET S=S+1
250 PRINT
260 PRINT "BET NO. ";S
270 IF W8=1 GOTO 320
280 PRINT"ENTER HORSE (1-8), WIN,PLACE,SHOW (1,2,3), AND THE WAGER."
290 PRINT"EXAMPLE: 3,1,100 (FOR HORSE NO. 3, WIN, $100 WAGER)"
300 LET W8=1
310 PRINT
320 INPUT T(S),U(S),V(S)
330 LET T(S)=ABS(INT(T(S)))
340 IF T(S)>8 THEN 390
350 IF T(S)<1 THEN 390
360 LET U(S)=ABS(INT(U(S)))
370 IF U(S)>3 THEN 390
380 IF U(S)>0 THEN 420
390 PRINT "HORSE NUMBER OR WIN-PLACE-SHOW BET IN ERROR; BET AGAIN."
400 GO TO 280
410 INPUT V(S)
420 IF V(S)-2=ABS(V(S)-2) THEN 450
430 PRINT"BET MUST BE MORE THAN $2 AND LESS THAN $300, NOW HOW MUCH"
```

```
440 GO TO 410
450 IF U(S)>300 THEN 430
460 PRINT
470 PRINT
480 PRINT "THE RACE IS ABOUT TO START, ANY MORE BETS? (YES OR NO)"
490 PRINT
500 INPUT Y$
510 IF Y$="Y" GOTO 240
520 IF Y$="YES" GOTO 240
530 PRINT
540 PRINT
550 PRINT "      THEY'RE OFF AND RUNNING !!!! "
560 PRINT
570 LET M(0)=62.25
580 LET M(1)=60
590 LET M(3)=500/9
600 LET M(2)=350/6
610 LET0M(4)=55
620 LET M(5)=650/12
630 LET M(6)=1100/21
640 LET M(7)=1600/31
650 LET O(1)=6
660 LET O(2)=8
670 LET O(3)=10
680 LET O(4)=16
690 LET O(5)=18
700 LET O(6)=22
710 LET O(7)=40
720 LET O(8)=60
730 FOR N=0 TO 7
740 LET H(N)=0
750 NEXT N
760 LET K=0
770 LET G=1
780 LET J=0
790 LET N=3*T(1)-U(1)
800 IF N>0 THEN 820
810 LET N=1
820 FOR0Z5=S TO 5*U(8)+N
830 LET Z1=RND(Z1)
840 NEXT Z5
850 FOR Z5=1 TO 500000
860 IF INT (Z5/N)-G<>0 THEN 1040
870 LET H(J)=H(J)+RND(Z1)*M(J)
880 LET J=J+1
890 LET G=G+1
900 IF J<>8 THEN 1030
910 LET J=0
920 GO SUB 1710
930 LET D=H(B(0)-1)
940 LET K=K+1
```

```
950 PRINT
960 IF K=8 THEN 1000
970 GO SUB 2280
980 GO SUB 1950
990 GO TO 1040
1000 PRINT"     AS THEY CROSS THE FINISH LINE!"
1010 LET Z5=500001
1020 GO SUB 1950
1030 LET Z1=RND(Z1)
1040 NEXT Z5
1050 PRINT
1060 PRINT
1070 PRINT"$2.00 PARIMUTUEL BET PAYS:"
1080 PRINT "                                WIN      PLACE     SHOW"
1090 LET K=0
1100 FOR I=0 TO 2
1110 GO SUB 1990
1120 LET J=1
1130 IF J=0 THEN 1210
1140 PRINT "           ";
1150 IF I=0 GOTO 1190
1160 PRINT "          ";
1170 IF I=1 GOTO 1190
1180 PRINT "             ";
1190 LET J=J-1
1200 GO TO 1130
1210 FOR J=I TO 2
1220 LET L=I+I+J
1230 IF J>0 THEN 1260
1240 LET R=1
1250 GO TO 1270
1260 LET R=3*J
1270 LET E(L)=1.5+.01*INT((S(B(I))/R+RND(Z1))*100)
12800LET H1(L)=(0.4)*O(8-L)
1290 LET H2(L)=E(L)*H1(L)
1300 LET H3(L)=(0.01)+H2(L)
1310 LET H(L)=(0.01)*INT(100*H3(L))
1320 PRINT H(L);
1330 NEXT J
1340 PRINT
1350 NEXT I
1360 PRINT
1370 LET Q=0
1380 FOR J=1 TO S
1390 PRINT"BET NO. ";J
1400 LET P=0
1410 FOR I=0 TO 2
1420 IF B(I) <> T(J) THEN 1490
1430 IF U(J)<=I THEN 1540
1440 LET P=(.01)*INT((U(J)*50)*H(I+I+U(J)-1))
1450 PRINT"YOU COLLECT";P;"ON  ";
```

```
1460 GO SUB 1990
1470 PRINT
1480 GO TO 1560
1490 NEXT I
1500 PRINT"TEAR UP YOUR TICKET ON ";
1510 FOR I = 3 TO 7
1520 IF B(I) = T(J) THEN 1460
1530 NEXT I
1540 PRINT"NEXT TIME, PURCHASE A SHOW TICKET ON  ";
1550 GO TO 1460
1560 LET Q = Q+P-V(J)
1570 NEXT J
1580 IF Q<0 THEN 1610
1590 PRINT"YOUR TOTAL WINNINGS AMOUNT TO $";Q
1600 GO TO 1620
1610 PRINT"YOUR TOTAL LOSSES AMOUNT TO $";ABS(Q)
1620 PRINT
1630 PRINT
1640 PRINT
1650 PRINT "** DO YOU WISH TO TRY IT AGAIN **"
1660 PRINT
1670 INPUT R$
1680 IF R$="Y" GOTO 60
1690 IF R$="YES" GOTO 60
1700 STOP
1710 LET Q=0
1720 FOR L1=0 TO 7
1730 LET B(L1)=0
1740 LET A(L1)=0
1750 NEXT L1
1760 FOR L1=0 TO 7
1770 FOR L2=0 TO 7
1780 IF L1=L2 THEN 1820
1790 IF H(L1)<>H(L2) THEN 1820
1800 PRINT"RERUN PLEASE"
1810 STOP
1820 IF H(L1)<H(L2) THEN 1840
1830 LET A(L1)=A(L1)+1
1840 NEXT L2
1850 NEXT L1
1860 FOR L1=8 TO 1 STEP -1
1870 FOR L2=0 TO 7
1880 IF A(L2)<>L1 THEN 1920
1890 LET B(Q)=L2+1
1900 LET Q=Q+1
1910 LET L2=8
1920 NEXT L2
1930 NEXT L1
1940 RETURN
1950 PRINT"   POS.   HORSE          LENGTHS BEHIND"
1960 PRINT
```

```
1970 FOR I=0 TO 7
1980 PRINT I+1;
1990 IF B(I)=1 THEN 2200
2000 IF B(I)=2 THEN 2180
2010 IF B(I)=3 THEN 2160
2020 IF B(I)=4 THEN 2140
2030 IF B(I)=5 THEN 2120
2040 IF B(I)=6 THEN 2100
2050 IF B(I)=7 THEN 2080
2060 PRINT"COALTOWN    ";
2070 GO TO 2210
2080 PRINT"STYMIE      ";
2090 GO TO 2210
2100 PRINT"GALLANT FOX";
2110 GO TO 2210
2120 PRINT"SEA BISCUIT";
2130 GO TO 2210
2140 PRINT"ASSAULT     ";
2150 GO TO 2210
2160 PRINT"WHIRLAWAY   ";
2170 GO TO 2210
2180 PRINT"CITATION    ";
2190 GO TO 2210
2200 PRINT"MAN O'WAR   ";
2210 IF K=0 THEN 2270
2220 IF I>0 THEN 2250
2230 PRINT
2240 GO TO 2260
2250 PRINT .1*INT(D-H(B(I)-1))
2260 NEXT I
2270 RETURN
2280 IF K=1 THEN 2360
2290 IF K=2 THEN 2380
2300 IF K=3 THEN 2400
2310 IF K=4 THEN 2420
2320 IF K=5 THEN 2440
2330 IF K=6 THEN 2460
2340 PRINT"      COMING DOWN THE HOME STRETCH"
2350 GO TO 2470
2360 PRINT"       AS THEY BREAK FROM THE GATE"
2370 GO TO 2470
2380 PRINT"         AT THE QUARTER-MILE POLE"
2390 GO TO 2470
2400 PRINT"            AFTER THREE FURLONGS"
2410 GO TO 2470
2420 PRINT"                AT THE HALF"
2430 GO TO 2470
2440 PRINT"            AT 5/8 OF A MILE"
2450 GO TO 2470
2460 PRINT"        ROUNDING THE CLUBHOUSE TURN"
2470 RETURN
2480 END
```

```
RUN PONY



IN THIS GAME OF CHANCE THE COMPUTER RUNS A HORSE
RACE FOR YOU; ANY NUMBER OF PLAYERS CAN BET ON THE RESULTS.

     SEVENTH RACE, ONE MILE FOR 3-YR OLDS, POST TIME 2:34

1 MAN O'WAR              3:1
2 CITATION               4:1
3 WHIRLAWAY              5:1
4 ASSAULT                8:1
5 SEA BISCUIT            9:1
6 GALLANT FOX           11:1
7 STYMIE                20:1
8 COALTOWN              30:1


BET NO.      1
ENTER HORSE (1-8), WIN,PLACE,SHOW (1,2,3), AND THE WAGER.
EXAMPLE: 3,1,100 (FOR HORSE NO. 3, WIN, $100 WAGER)

?4,2,15


THE RACE IS ABOUT TO START, ANY MORE BETS? (YES OR NO)

?NO


      THEY'RE OFF AND RUNNING !!!!
```

AS THEY BREAK FROM THE GATE

POS.	HORSE	LENGTHS BEHIND
1	#5 SEA BISCUIT	
2	#7 STYMIE	1.1
3	#2 CITATION	2.3
4	#1 MAN O'WAR	2.6
5	#8 COALTOWN	3
6	#3 WHIRLAWAY	3.1
7	#6 GALLANT FOX	4.1
8	#4 ASSAULT	4.4

AT THE QUARTER-MILE POLE

POS.	HORSE	LENGTHS BEHIND
1	#7 STYMIE	
2	#1 MAN O'WAR	.5
3	#5 SEA BISCUIT	2.6
4	#2 CITATION	4.2
5	#8 COALTOWN	4.5
6	#4 ASSAULT	5.4
7	#3 WHIRLAWAY	5.5
8	#6 GALLANT FOX	7.3

AFTER THREE FURLONGS

POS.	HORSE	LENGTHS BEHIND
1	#1 MAN O'WAR	
2	#7 STYMIE	.9
3	#2 CITATION	4.2
4	#8 COALTOWN	5.4
5	#5 SEA BISCUIT	7.4
6	#4 ASSAULT	8.4
7	#6 GALLANT FOX	9
8	#3 WHIRLAWAY	9.9

AT THE HALF

POS.	HORSE	LENGTHS BEHIND

ROULETTE:

DESCRIPTION

This is a computer simulation of the game of Roulette. Only one player may play or bet with the computer but outside betting can be done if there is more then one player. The computer spins the ball and keeps score on the player's winnings or losses.

INSTRUCTIONS

The game is self instructing and contains all necessary information to play.

LIMITATIONS

This program will run in 5K Bytes of memory without any problems in any Basic speaking computer.

ROULETTE

```
100 REM THIS IS THE GAME OF ROULETTE
115 PRINT "WELCOME TO THE GAME OF ROULETTE"
130 PRINT
145 PRINT "WOULD YOU LIKE INSTRUCTIONS - YES OR NO";
160 INPUT A$
175 IF A$="YES" THEN 265
190 IF A$="Y" THEN 265
205 IF A$="N" THEN 460
220 IF A$="NO" THEN 460
235 PRINT "ANSWER - YES OR NO - PLEASE!"
250 GOTO 145
265 PRINT
280 PRINT "  IN THIS GAME YOU ARE ALLOWED TO BET ON INDIVIDUAL"
295 PRINT "NUMBERS, NUMBER SETS, OR ODD OR EVEN NUMBERS."
310 PRINT "THE NUMBERS GO FROM 00 TO 36.YOU BET BY ENTERING A"
325 PRINT "NUMBER BETWEEN 0 AND 44. THE NUMBERS 0 TO 36"
340 PRINT "REPRESENT THEMSELVES, AND 37 REPRESENTS 00."
355 PRINT "40 REPRESENTS  EVEN. 41 REPRESENTS  ODD BETS."
370 PRINT "38  BETS THE NUMBER SET FROM  1 TO 18"
385 PRINT "39  BETS THE NUMBER SET FROM 19 TO 36"
400 PRINT "42  BETS THE NUMBER SET FROM  1 TO 12"
415 PRINT "43  BETS THE NUMBER SET FROM 13 TO 24"
430 PRINT "44  BETS THE NUMBER SET FROM 25 TO 36."
445 PRINT "00 IS NOT INCLUDED WHEN YOU BET  ODD."
460 PRINT
475 PRINT
490 PRINT "IF YOU WOULD LIKE A PRINT OUT OF THE TABLE"
505 PRINT "TYPE THE WORD  PRINT";
520 INPUT A$
535 IF A$="PRINT" GOTO 580
550 IF A$="P" GOTO 580
565 GOTO 880
580 PRINT
595 PRINT
610 B$(1)="  ***************************************"
625 B$(2)="  * "
640 PRINT B$(1)
655 PRINT "  *     9          *         00    *"
670 B$(3)="  * "
685 PRINT B$(1)
700 U=-2
```

```
715 FOR I=1 TO 3
730 U=U+3
745 PRINT B$(2);U;B$(2);U+1;B$(2);U+2;B$(2)
760 PRINT B$(1)
775 NEXT I
790 FOR I=1 TO 9
805 U=U+3
820 PRINT B$(3);U;B$(3);U+1;B$(3);U+2;B$(3)
835 PRINT B$(1)
850 NEXT I
865 PRINT
880 PRINT
895 PRINT "HOW MUCH MONEY DO YOU HAVE TO SPEND";
910 INPUT A5
925 G=G+1
940 IF G>5 GOTO 985
955 PRINT "PICK YOUR BET NUMBER. (0 TO 44)";
970 GOTO 1000
985 PRINT "WHATS YOUR NUMBER";
1000 INPUT B
1015 IF B>44 GOTO 925
1030 IF B<0 GOTO 925
1045 IF G>5 GOTO 1090
1060 PRINT "HOW MUCH MONEY DO YOU WANT TO BET THIS TIME";
1075 GOTO 1105
1090 PRINT " AMOUNT !";
1105 INPUT C
1120 IF A5=C GOTO 1195
1135 IF A5>C GOTO 1195
1150 PRINT "YOU DON'T HAVE THAT MUCH MONEY!"
1165 PRINT "THE MOST YOU CAN BET IS "A5" DOLLARS."
1180 GOTO 1060
1195 N=INT(RND(-1)*100)
1210 IF N>37 GOTO 1195
1225 IF B>37 GOTO 1390
1240 IF B=N GOTO 1330
1255 A5=A5-C
1270 IF A5>0 GOTO 1300
1285 GOTO 1600
1300 PRINT N" YOU LOST BUT YOU STILL HAVE "A5" DOLLARS LEFT."
1315 GOTO 925
1330 D=35*C
1345 A5=A5+D
1360 PRINT N" YOU  ** WON **  !!  NOW YOU HAVE "A5" DOLLARS."
1375 GOTO 925
1390 IF B>39 GOTO 1720
1405 IF B=38 GOTO 1555
1420 IF N>18 GOTO 1450
1435 GOTO 1465
1450 IF N<37 GOTO 1525
1465 A5=A5-C
```

```
1480 IF A5>0 GOTO 1510
1495 GOTO 1600
1510 GOTO 1300
1525 A5=A5+C
1540 GOTO 1360
1555 IF N>18 GOTO 1465
1570 IF N>36 GOTO 1465
1585 GOTO 1525
1600 PRINT N" YOU LOST AND ARE OUT OF MONEY..."
1615 PRINT
1630 PRINT
1645 PRINT "WOULD YOU LIKE TO PLAY IT AGAIN. (YES OR NO)";
1660 INPUT Z$
1675 IF Z$="YES" GOTO 460
1690 IF Z$="Y" GOTO 460
1705 GOTO 2080
1720 IF B>41 GOTO 1855
1735 Y=(N/2)-INT(N/2)
1750 IF B=41 GOTO 1795
1765 IF Y>.01 GOTO 1465
1780 GOTO 1525
1795 IF N=37 GOTO 1465
1810 IF N=0 GOTO 1465
1825 IF Y>.01 GOTO 1525
1840 GOTO 1465
1855 IF B=42 GOTO 2005
1870 IF B=43 GOTO 1945
1885 IF N>24 GOTO 1915
1900 GOTO 1465
1915 IF N=37 GOTO 1465
1930 GOTO 2050
1945 IF N>12 GOTO 1975
1960 GOTO 1465
1975 IF N>24 GOTO 1465
1990 GOTO 2050
2005 IF N>0 GOTO 2035
2020 GOTO 1465
2035 IF N>12 GOTO 1465
2050 A5=C*2+A5
2065 GOTO 1360
2080 END
```

SKY DIVER:

DESCRIPTION

Sky Diver is a simulated parachute jump on any planet. The object of the game is to free fall as long as possible before opening your chute. In order to make it interesting your chute is operated by a timer, which must be set Before you jump.

INSTRUCTIONS

List the game for detailed instructions. This game is self prompting and will ask for all required entries.

LIMITATIONS

There should be no problem running this program, providing it is on a Basic speaking computer with 5K Bytes of available program memory.

SKY DIVER

```
010 PRINT "WELCOME TO 'SKY DIVER'-- THE GAME THAT SIMULATES A PARACHUTE"
020 PRINT "JUMP. TRY TO OPEN YOUR CHUTE AT THE LAST POSSIBLE"
030 PRINT "MOMENT WITHOUT GOING SPLAT.  YOU'LL WIN IF YOU DON'T"
040 PRINT "OPEN YOUR SHOOT UNTIL YOU'RE WITHIN 1000 FEET."
050 PRINT
060 PRINT
070 D1=INT(9001*RND(-1)+1000)
080 V = 0
090 A = 0
100 M = 0
110 M = 0
120 PRINT "SELECT YOUR OWN TERMINAL VELOCITY (YES OR NO)";
130 INPUT A1$
140 IF A1$ = "NO" THEN 230
150 IF A1$ = "YES" THEN 180
160 PRINT "'YES' OR 'NO' PLEASE";
170 GOTO 130
180 PRINT "WHAT TERMINAL VELOCITY (MI/HR)";
190 INPUT V1
200 V1 = V1*(5280/3600)
210 V = V1+((V1*RND(0))/20)-((V1*RND(0))/20)
220 GOTO 270
230 V1 = INT(1000*RND(0))
240 PRINT "OK,TERMINAL VELOCITY ="V1"MI/HR"
250 V1 = V1*(5280/3600)
260 V = V1+((V1*RND(0))/20)-((V1*RND(0))/20)
270 PRINT "WANT TO SELECT ACCELERATION DUE TO GRAVITY (YES OR NO)";
280 INPUT B1$
290 IF B1$ = "NO" THEN 370
300 IF B1$ = "YES" THEN 330
310 PRINT "'YES' OR 'NO' PLEASE!"
320 GOTO 280
330 PRINT "WHAT ACCELERATION (FT/SEC/SEC)";
340 INPUT A2
350 A = A2+((A2*RND(0))/20)-((A2*RND(0))/20)
360 GOTO 780
370 ON INT(1+(10*RND(0))) GOTO 380,400,420,440,460,480,500,520,540,560
380 PRINT "FINE,YOU'RE ON MERCURY. ACCELERATION = 12.2 FT/SEC/SEC"
390 GOTO 580
400 PRINT "ALRIGHT, YOU'RE ON VENUS. ACCELERATION = 28.3 FT/SEC/SEC"
410 GOTO 600
```

```
420 PRINT "THEN,YOU'RE ON EARTH. ACCELERATION = 32.16 FT/SEC/SEC"
430 GOTO 620
440 PRINT "FINE, THEN YOU'RE ON THE MOON. ACCELERATION = 5.15 FT/SEC/SEC"
450 GOTO 640
460 PRINT "OKAY, YOU'RE ON MARS. ACCELERATION = 12.5 FT/SEC/SEC"
470 GOTO 660
480 PRINT"I'LL PUT YOU ON JUPITER. ACCELERATION = 85.2 FT/SEC/SEC"
490 GOTO 680
500 PRINT "FINE, YOU'RE ON SATURN. ACCELERATION = 37.6"
510 GOTO 700
520 PRINT "GREAT, YOU'RE ON URANUS! ACCELERATION = 33.8"
530 GOTO 720
540 PRINT "ALRIGHT, YOU'RE ON NEPTUNE. ACCELERATION = 39.6"
550 GOTO 740
560 PRINT "I'LL PUT YOU ON THE SUN, WISE GUY! ACCELERATION = 896 FT/SEC/SEC"
570 GOTO 760
580 A2 = 12.2
590 GOTO 350
600 A2=28.3
610 GOTO 350
620 A2 = 32.16
630 GOTO 350
640 A2 = 5.15
650 GOTO 350
660 A2 = 12.5
670 GOTO 350
680 A2 = 85.2
690 GOTO 350
700 A2 = 37.6
710 GOTO 350
720 A2 = 33.8
730 GOTO 350
740 A2 = 39.6
750 GOTO 350
760 A2 = 896
770 GOTO 350
780 PRINT
790 PRINT "      ALTITUDE              ="D1"FT"
800 PRINT "      TERM. VELOCITY        ="V1"FT/SEC +-5%"
810 PRINT "      ACCELERATION          ="A2"FT/SEC/SEC +-5%"
820 PRINT "SET THE TIMER FOR YOUR FREE FALL."
830 PRINT "HOW MANY SECONDS";
840 INPUT T
850 PRINT "HERE WE GO"
860 PRINT
870 PRINT "TIME(SEC)","DIST TO FALL(FT)"
880 PRINT "==========","================"
890 FOR I = 0 TO T
900 IF I > V/A GOTO 970
910 D = D1-((A/2)*I↑2)
920 IF D<=0 GOTO 1100
```

```
930 PRINT I,D
940 LET I = I+T/8-1
950 NEXT I
960 GOTO 1040
970 PRINT "TERMINAL VELOCITY REACHED AT T PLUS"V/A"SECONDS."
980 FOR I = I TO T
990 D = D1-((V↑2/(2*A))+(V*(I-(V/A))))
1000 IF D<=0 GOTO 1130
1010 PRINT I,D
1020 LET I = I+T/8-1
1030 NEXT I
1040 PRINT "CHUTE OPEN"
1050 IF D<=1000 GO TO 1080
1060 PRINT "CONGRATULATIONS, BUT YOU CHICKENED OUT TOO SOON!"
1070 GO TO 1160
1080 PRINT"CONGRADULATIONS.  YOU WAITED TO THE LAST MOMENT."
1090 GO TO 1160
1100 PRINT SQR(2*D1/A),"SPLAT"
1110 PRINT "TOO BAD..."
1120 GOTO 1150
1130 PRINT (V/A)+((D1-(V↑2/(2*A)))/V),"SPLAT"
1140 GOTO 1110
1150 PRINT "I'LL GIVE YOU ANOTHER CHANCE."
1160 PRINT "DO YOU WANT TO PLAY AGAIN";
1170 INPUT Z$
1180 IF Z$ = "YES" GOTO 50
1190 IF Z$ = "NO" GOTO 1220
1200 PRINT "'YES' OR 'NO'"
1210 GOTO 1170
1220 PRINT "THANK YOU FOR PLAYING."
1230 END
```

TANK:

DESCRIPTION

Tank is a little war game played between you and the computer. The computer is the enemy tank and will try to blow you and your tank up. The object of the game is to destroy the enemy tank before it gets your tank.

INSTRUCTIONS

Game instructions will be given during program execution. Additional program information can be obtained by listing the game.

LIMITATIONS

The source code for Tank requires 3K Bytes for storage. An additional 1K Bytes of memory will be required for program execution. A typical game run is presented at the end of this program's source listing.

TANK

```
50 REM THIS IS TANK
75 PRINT "THIS IS A LITTLE WAR GAME"
100 PRINT "IT IS BETWEEN TWO TANKS - YOURS AND THE ENEMY'S"
125 PRINT "THE ENEMY TANK MOVES AFTER EACH SHOT"
150 PRINT
175 PRINT "GOOD LUCK!"
200 PRINT
225 M=N=E1=D1=R=L=0
250 PRINT
275 A4=20
300 REM A4 IS THE HIT RADIUS
325 A3=A4
350 PRINT
375 PRINT "AN ENEMY TANK HAS BEEN SPOTTED - TAKE BATTLE POSITIONS!"
400 PRINT
425 PRINT "ENTER YOUR DEFENSE NUMBER (1-100)"
450 PRINT
475 INPUT X4
500 X2=(-1)**X4
525 X4=X2*X4
550 GOTO 625
575 PRINT
600 PRINT "ENEMY MANEUVERING"
625 X=(RND(X4)+2)*30
650 M=M+1
675 A=(RND(-1)+2)*30
700 C=(RND(-2)+2)*30
725 PRINT
750 Y=X*A
775 X1=(INT(Y/100)*100+INT(X))
800 IF M<40 GOTO 850
825 A3=2*A4
850 IF L=1 GOTO 1150
875 PRINT "ENEMY VECTOR RANGE IS";X1;"YARDS"
900 PRINT "ENTER YOUR FIRING RANGE"
925 INPUT B
950 PRINT
975 Y1=INT(Y)
1000 IF ABS (B-Y1)<A3 GOTO 1300
1025 R=ABS(B-Y1)
1050 IF (B-Y1)>0 GOTO 1125
```

```
1075 PRINT "MISSED - SHOT SHORT BY";R;"YARDS"
1100 GOTO 1150
1125 PRINT "MISSED - SHOT LONG BY";R;"YARDS"
1150 PRINT
1175 L=0
1200 PRINT "ENEMY FIRING"
1225 IF ABS(A-C)<A3 GOTO 1650
1250 PRINT "MISSED - ENEMY MANEUVERING"
1275 GOTO 625
1300 IF ABS(B-Y1)<(A3/2) GOTO 1500
1325 D1=D1+1
1350 IF D1>4 GOTO 1450
1375 PRINT "HIT"
1400 PRINT "MINOR DAMAGE ONLY"
1425 GOTO 575
1450 PRINT "ENEMY DESTROYED"
1475 GOTO 2050
1500 IF ABS(B-Y1)<(A3/6) GOTO 1450
1525 IF D1>4 GOTO 1450
1550 PRINT "DIRECT HIT"
1575 PRINT "MAJOR DAMAGE TO TANK"
1600 D1=D1+3
1625 GOTO 575
1650 IF ABS(A-C)<(A3/3) GOTO 1850
1675 E1=E1+1
1700 IF E1>4 GOTO 1800
1725 PRINT "YOU'VE BEEN HIT!"
1750 GOTO 1400
1775 PRINT
1800 PRINT "BANG!!!! YOU'RE DEAD!"
1825 GOTO 2150
1850 IF ABS(A-C)<(A3/9) GOTO 1775
1875 IF E1>4 GOTO 1900
1900 PRINT "DIRECT HIT"
1925 PRINT "MAJOR DAMAGE; TWO MEN DEAD."
1950 L=1
1975 REM IF L=1 YOU LOOSE YOUR TURN AFTER A DIRECT HIT
2000 E1=E1+4
2025 GOTO 625
2050 PRINT
2075 IF A3=(2*A4) GOTO 2150
2100 PRINT "MESSAGE RECEIVED FROM HEADQUARTERS"
2125 PRINT "NICE GOING YOU GUYS!"
2150 PRINT
2175 PRINT
2200 PRINT
2225 PRINT "WOULD YOU LIKE ANOTHER BATTLE"
2250 INPUT Z$
2275 PRINT
2300 PRINT
2325 PRINT
2350 IF Z$="Y" GOTO 225
2375 IF Z$="YES" GOTO 225
2400 END
```

```
EXECUTED RUN OF THE GAME TANK



THIS IS A LITTLE WAR GAME
IT IS BETWEEN TWO TANKS - YOURS AND THE ENEMY'S
THE ENEMY TANK MOVES AFTER EACH SHOT

GOOD LUCK!


AN ENEMY TANK HAS BEEN SPOTTED - TAKE BATTLE POSITIONS!

ENTER YOUR DEFENSE NUMBER (1-100)

?67

ENEMY VECTOR RANGE IS          6067 YARDS
ENTER YOUR FIRING RANGE
?60000

HIT
MINOR DAMAGE ONLY

ENEMY MANEUVERING

ENEMY VECTOR RANGE IS          6276 YARDS
ENTER YOUR FIRING RANGE
?63000

MISSED - SHOT LONG BY            37 YARDS

ENEMY FIRING
DIRECT HIT
MAJOR DAMAGE; TWO MEN DEAD.


ENEMY FIRING
MISSED - ENEMY MANEUVERING

ENEMY VECTOR RANGE IS          5671 YARDS
ENTER YOUR FIRING RANGE
?55000

MISSED - SHOT SHORT BY          199 YARDS

ENEMY FIRING
BANG!!!! YOU'RE DEAD!


WOULD YOU LIKE ANOTHER BATTLE
?YES
```

```
AN ENEMY TANK HAS BEEN SPOTTED - TAKE BATTLE POSITIONS!

ENTER YOUR DEFENSE NUMBER (1-100)

?35

ENEMY VECTOR RANGE IS          5178 YARDS
ENTER YOUR FIRING RANGE
?5150

MISSED - SHOT LONG BY            46 YARDS

ENEMY FIRING
MISSED - ENEMY MANEUVERING

ENEMY VECTOR RANGE IS          4773 YARDS
ENTER YOUR FIRING RANGE
?4720

HIT
MINOR DAMAGE ONLY

ENEMY MANEUVERING

ENEMY VECTOR RANGE IS          5166 YARDS
ENTER YOUR FIRING RANGE
?5100

MISSED - SHOT SHORT BY           26 YARDS

ENEMY FIRING
YOU'VE BEEN HIT!
MINOR DAMAGE ONLY

ENEMY MANEUVERING

ENEMY VECTOR RANGE IS          4564 YARDS
ENTER YOUR FIRING RANGE
?4505

MISSED - SHOT SHORT BY           65 YARDS

ENEMY FIRING
DIRECT HIT
MAJOR DAMAGE; TWO MEN DEAD.


ENEMY FIRING
BANG!!!! YOU'RE DEAD!


WOULD YOU LIKE ANOTHER BATTLE
?NO
```

TEACH ME:

DESCRIPTION

This game is one of the two cybernetic programs included in this volume, the other one is Animals Four. Of the two this one is the most comprehensive and compact of the cybernetic programs. The program is designed to teach the computer how to learn about animals. When the program starts the computer only knows two animals. Each answer given by you increases the computer's knowledge about things. Each item is catagorized and the computer's responses are selective. The acuteness of the responses is uncanny, almost human. The learning curve of this program is similar to that of a five year old child.

INSTRUCTIONS

All inputs are prompted for by the computer. For detailed program instructions list the program. This game was adapted from the game "Animal" written by: N. Teichholty.

LIMITATIONS

Line 350 contains a STR$( ) statement. Line 725 uses the LEN( ) statement. Starting in line 800 the SST( ) statement is used; this statement is used extensively throughout this program. Program storage will require 4K Bytes of memory. Execution length is a function of the DIM statement in line # 325. With the DIM set to A$(500) the program will require about 16K Bytes of memory to run.

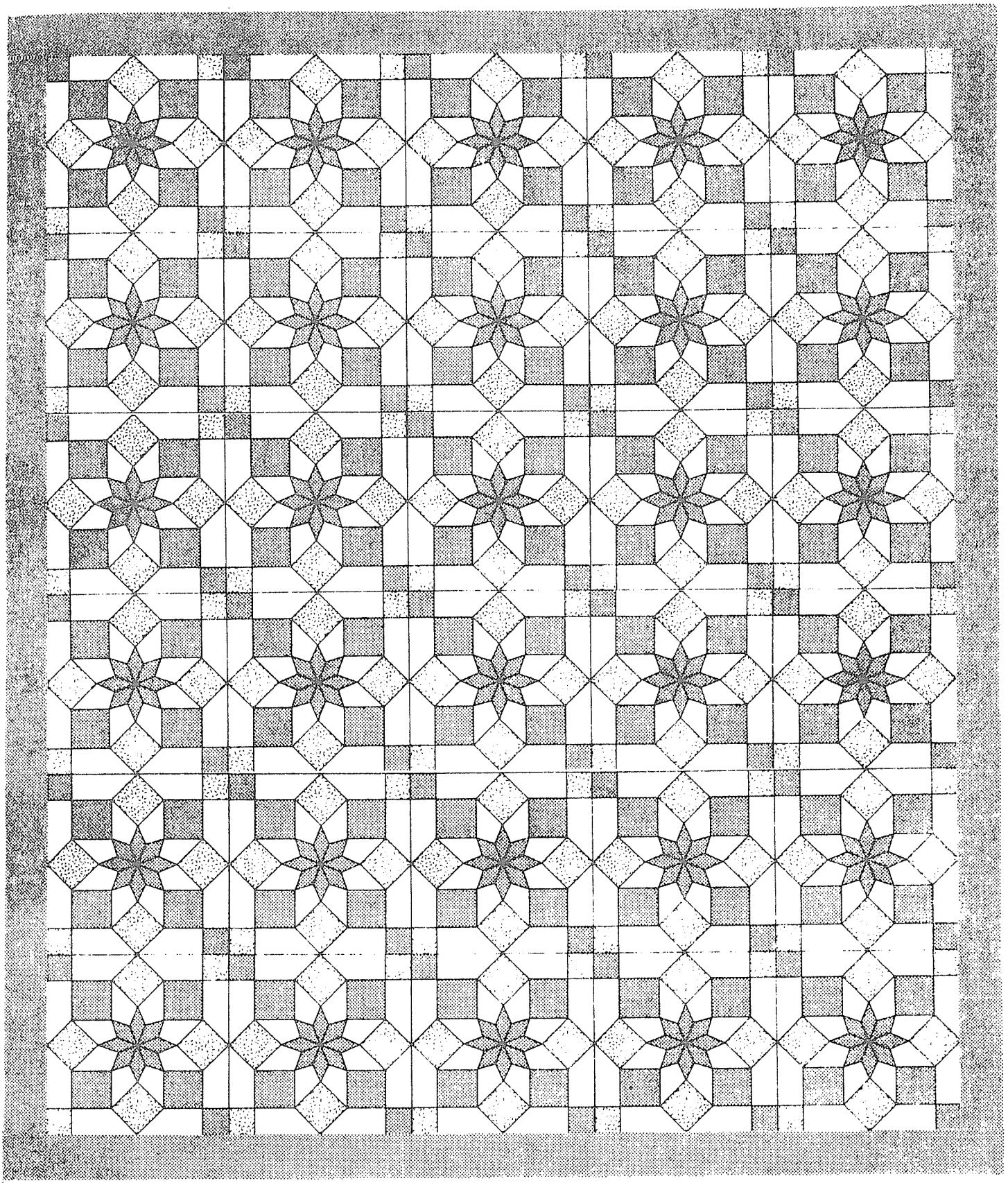
TEACH ME

```
100 V7=0
125 PRINT "WELCOME TO TEACH THE COMPUTER THE ANIMALS"
150 PRINT "WHEN YOU ARE READY TO LEAVE TYPE - STOP"
175 PRINT "IF YOU WOULD LIKE A LISTING OF ALL THE "
200 PRINT "ANIMALS YOU HAVE TAUGHT ME TYPE - LIST"
225 PRINT "WHEN ASKED - ARE YOU THINKING OF AN ANIMAL."
250 PRINT
275 PRINT "THINK OF AN ANIMAL AND I WILL TRY TO GUESS IT...."
300 N=3
325 DIM A$(500),B$(25),O(80)
350 A$(0)=STR$(4)
375 FOR I=1 TO 3
400 READ A$(I)
425 NEXT I
450 DATA "/QDOES IT SWIM/Y2/N3/","/AFISH","/ABIRD"
475 PRINT
500 PRINT
525 PRINT "ARE YOU THINKING OF AN ANIMAL";
550 INPUT Z9$
575 GOTO 3075
600 K=1
625 IF V7=0 THEN 675
650 GOTO 700
675 GOSUB 2050
700 GOSUB 2900
725 IF LEN(A$(K))=0 THEN 775
750 GOTO 800
775 GOSUB 2050
800 B$(2)=SST(A$(K),1,2)
825 IF B$(2)="/Q" GOTO 625
850 E$=A$(K)
875 F2=LEN(A$(K))-2
900 I9=3
925 GOSUB 4575
950 PRINT "IS IT A ";K$;
975 B$(3)=K$
1000 INPUT Z7$
1025 Z7$=SST(Z7$,1,1)
1050 IF Z7$="Y" GOTO 1100
1075 GOTO 1175
1100 PRINT
1125 PRINT " ** I'AM VERY PROUD OF MYSELF. ** "
1150 GOTO 475
```

```
1175 PRINT "THE ANIMAL YOU WERE THINKING OF WAS A ";
1200 INPUT Z9$
1225 PRINT "PLEASE TYPE IN A SIMPLE QUESTION THAT WOULD "
1250 PRINT "DISTINGUISH A "Z9$" FROM A "B$(3)
1275 N=N+2
1300 INPUT Z8$
1325 PRINT "THIS WOULD BE A VALID QUESTION FOR A "Z9$;
1350 INPUT Z7$
1375 Z7$=SST(Z7$,1,1)
1400 IF Z7$="Y" GOTO 1500
1425 IF Z7$="N" GOTO 1550
1450 PRINT " PLEASE ANSWER 'YES' OR 'NO' "
1475 GOTO 1325
1500 Z6$="N"
1525 GOTO 1625
1550 PRINT "  NO!  O.K.  ..... .."
1575 Z6$="Y"
1600 GOTO 1625
1625 Z1=VAL(A$(0))
1650 A$(0)=STR$(Z1+2)
1675 A$(Z1)=A$(K)
1700 A$(Z1+1)="/A" & Z9$
1725 H$(1)="/Q" & Z8$
1750 H$(2)=H$(1) & "/"
1775 H$(1)=H$(2) & Z7$
1800 H$(3)=STR$(Z1+1)
1825 H$(2)=H$(1) & H$(3)
1850 H$(1)=H$(2) & "/"
1875 H$(2)=H$(1) & Z6$
1900 H$(4)=STR$(Z1)
1925 H$(1)=H$(2) & H$(4)
1950 A$(K)=H$(1) & "/"
1975 GOTO 500
2000 REM
2025 REM
2050 DEF FNA(K)
2075 F$="/"
2100 E$=A$(K)
2125 F1=3
2150 GOSUB 4075
2175 F2=E9-3
2200 I9=3
2225 GOSUB 4575
2250 B$(4)=K$
2275 PRINT B$(4);
2300 INPUT Z9$
2325 Z9$=SST(Z9$,1,1)
2350 IF Z9$<>"Y" GOTO 2400
2375 GOTO 2425
2400 Z9$="N"
2425 F$="/" & Z9$
```

```
2450 E$=A$(K)
2475 F1=3
2500 GOSUB 4075
2525 Z1=E9+2
2550 F1=Z1
2575 F$="/"
2600 E$=A$(K)
2625 GOSUB 4075
2650 Z2=E9
2675 F2=Z2-Z1
2700 I9=Z1
2725 GOSUB 4575
2750 B$(K)=K$
2775 FNA=VAL(B$(K))
2800 FNEND
2825 U7=1
2850 RETURN
2875 REM
2900 K=FNA(K)
2925 RETURN
2950 REM
2975 REM
3000 REM
3025 REM
3050 REM THIS SUB CHECKS FOR A VALID ANSWER
3075 B$=SST(Z9$,1,1)
3100 IF B$="Y" GOTO 600
3125 IF B$="L" GOTO 3350
3150 IF B$="N" GOTO 500
3175 IF B$="S" THEN 4950
3200 PRINT "PLEASE ANSWER YES OR NO!..."
3225 GOTO 500
3250 REM
3275 REM
3300 REM
3325 REM
3350 REM THIS IS THE LIST SUB
3375 PRINT
3400 PRINT
3425 PRINT "THE ANIMALS THAT I ALREADY KNOW ARE:"
3450 PRINT
3475 FOR I=1 TO N
3500 E$=A$(I)
3525 F$="/A"
3550 F1=1
3575 F2=LEN(E$)
3600 I9=3
3625 GOSUB 4075
3650 IF E9=0 GOTO 3900
3675 S$=E$
3700 CHANGE S$ TO O
```

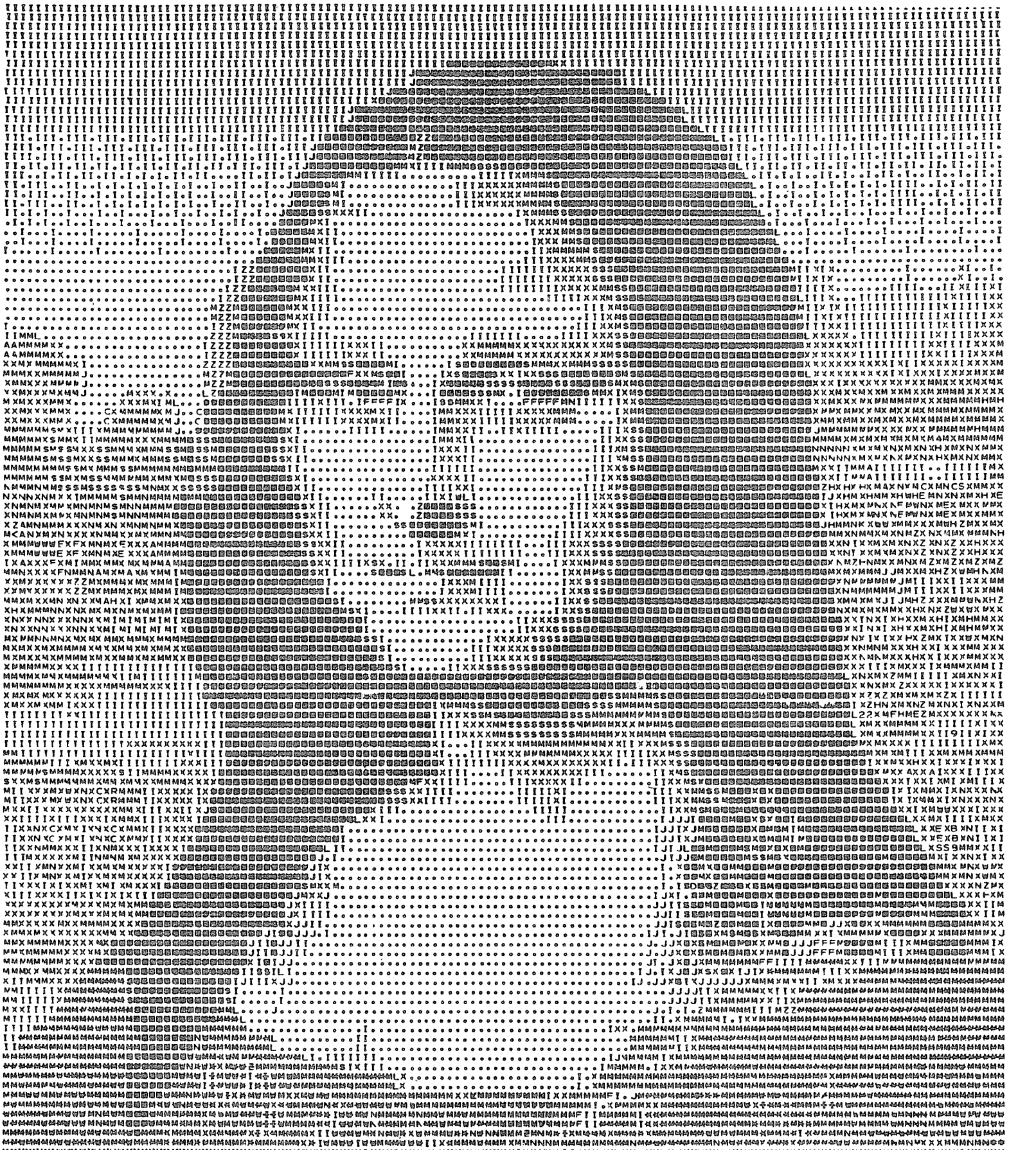
```
3725 F3=LEN(E$)
3750 FOR I2=3 TO F3
3775 O(I2-2)=O(I2)
3800 NEXT I2
3825 O(0)=(F3-2)
3850 CHANGE O TO J$
3875 PRINT J$,
3900 NEXT I
3925 PRINT
3950 GOTO 475
3975 REM
4000 REM
4025 REM
4050 REM
4075 REM THIS IS THE INSTR(F1,E$,F$) SUB.
4100 REM F$ IS THE TO BE MATCHED STRING "SE"
4125 REM F1 IS THE STARTING POSITION IN THE E$ STRING
4150 REM THIS SUB RETURNS E9  =0 IF NOT FOUND, ELSE POSITION #
4175 F2=LEN(F$)
4200 F3=LEN(E$)
4225 F4=F3-F2+1
4250 FOR I9=F1 TO F4
4275 GOSUB 4575
4300 F$(1)=K$
4325 IF F$(1)=F$ GOTO 4425
4350 NEXT I9
4375 E9=0
4400 GOTO 4450
4425 E9=I9
4450 RETURN
4475 REM
4500 REM
4525 REM
4550 REM
4575 REM THIS SUB SETS THE CHAR LENGTH
4600 REM K$=SST(E$,I9,F2)
4625 REM F2 IS # OF CHAR. TO BE SELECTED. I9 IS THE STARTING POSITION
4650 REM THIS SUB RETURNS K$ AS OUTPUT.
4675 CHANGE E$ TO O
4700 F3=LEN(E$)
4725 FOR I6=I9 TO F3
4750 O(I6+1-I9)=O(I6)
4775 NEXT I6
4800 O(0)=F2
4825 CHANGE O TO U$
4850 K$=U$
4875 RETURN
4900 REM
4925 REM
4950 PRINT
4975 PRINT
5000 PRINT "THANK YOU COME AGAIN ."
5025 PRINT
5050 END
```

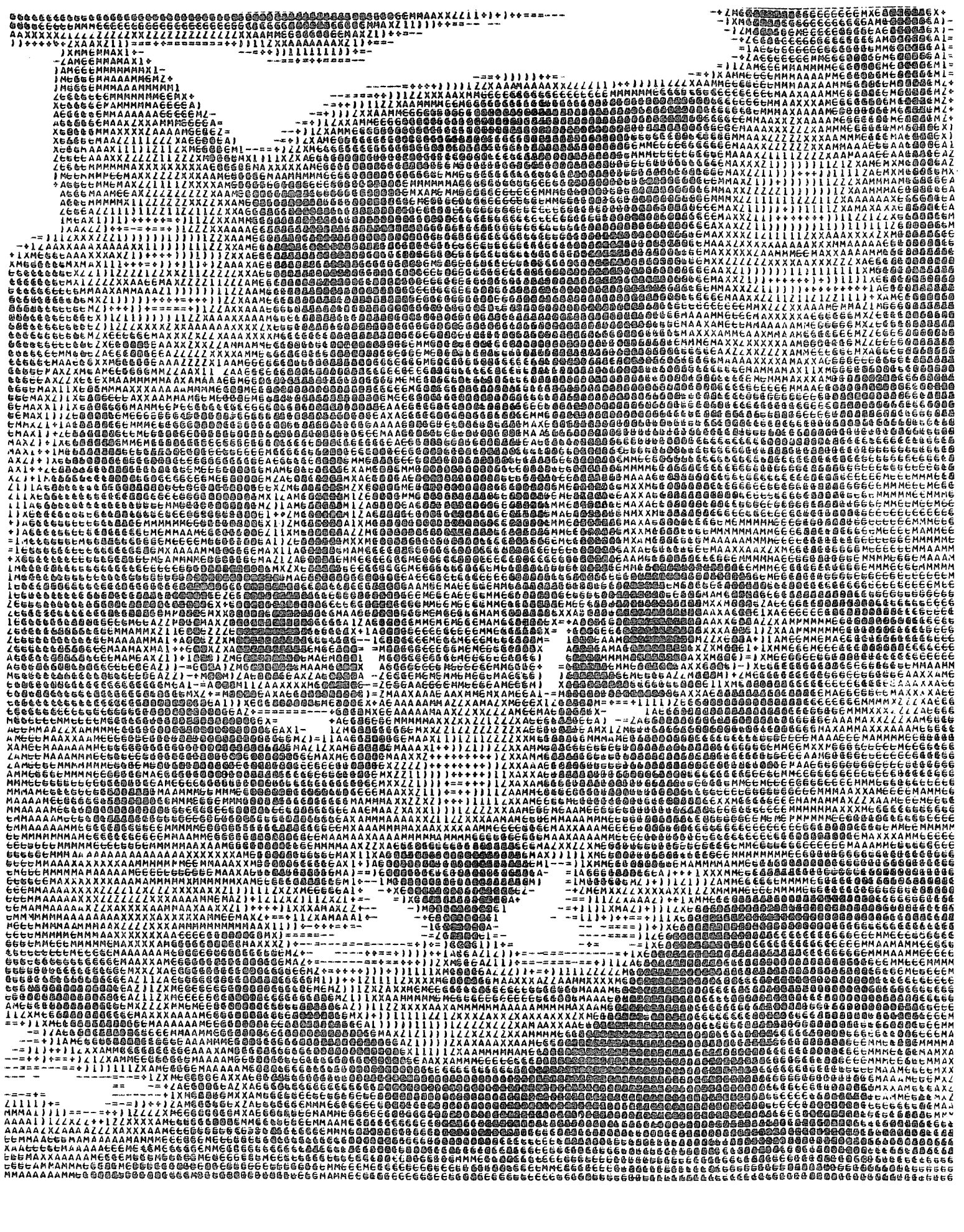


PART 2 - PICTURES

INTRODUCTION

Computer art like all forms of art appears on many levels. The picture programs presented here represent a single dimension and intensity. All of the picture programs in this volume use standard Basic instructions and will execute on any standard terminal or teletype. By way of comparison the first two pages in this section illustrate the difference achieved when using a high quality line (256 column) printer. The two pictures were reduced in size from their original size of 14" x 18" to increase the resolution and contrast. Overprinting techniques have not been used on any of the picture programs appearing in this section, therefore their overall quality or resolution appears lessened when compared with the first two illustrations. All of these pictures should be observed at arms length or further as the resolution produced by single type character terminals and teletypes appears rather poor when viewed close-up. The following pictures are very descriptive and extremely detailed for single type character terminal reproduction, they are in order of their inclusion: Ms. Santa, Nixon, Noel Noel, Nude, and Virgin. These programs were produced using a standard 80 column teletype and without using overprinting techniques, however the reader should be aware they are extremely tedious to enter into a computer due to the large number of descriptive characters used. The reader wishing to duplicate the the picture programs in this volume would be well advised to start with the simpler ones first before attempting to reproduce the more detailed and descriptive programs.





A. NEWMAN

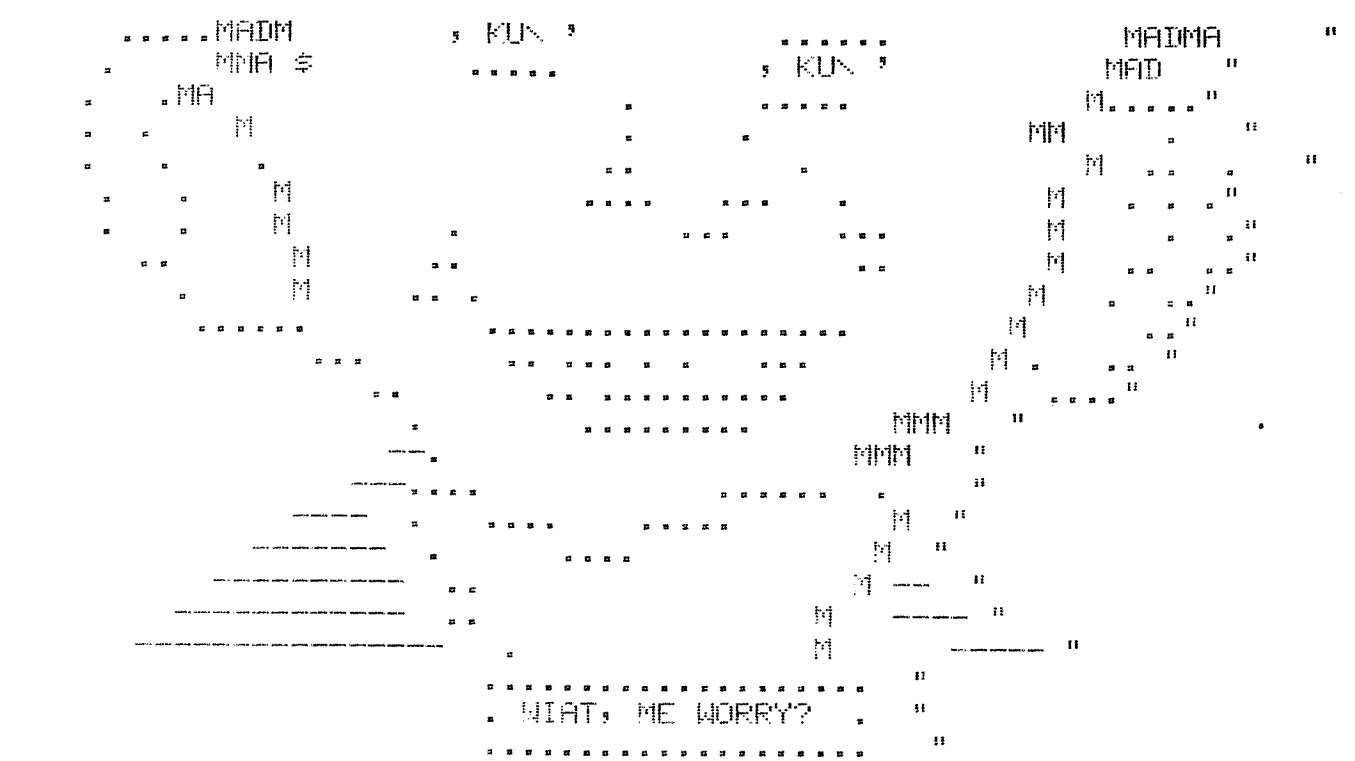
Description

From that famous or infamous magazine the original "What Me Worry?" character is portrayed. The source code for this program requires 3K Bytes of memory for both storage and execution. To use, simply load the program into memory and type RUN.

A. NEWMAN

```
001 PRINT
002PRINT
003PRINT
004PRINT
005PRINT
006PRINT
007PRINT
008PRINT
009PRINT
010PRINT
11PRINT"                                    MADMADMAD     "
12PRINT"                                 MADMADMADMADMADMADMAD "
13PRINT"                              MADMADMADMADMADMADMADMADMADM   "
14PRINT"                           MADMADMADMADMADMADMADMADMADMADMAD   "
15PRINT"                        MADMADMADMADMADMADMADMADMADMADMADMADM   "
16PRINT"                     MADMADMADMADMADMADMADMADMADMADMADMADMADMAD "
17PRINT"                  MADMADMADMADMADMADMADMADMADMADMADMADMADMADMAD"
18PRINT"                  MADMADMADMA   DMADMADMADMADMADMADMADMADMADMAD "
19PRINT"               MADMADM M M            MADMADMADMADMADMADMADMADMA   "
20PRINT"            MADMADMA                                      MADMADMAD "
21PRINT"            MADMADMA                                           MADMA "
22PRINT"            MADMADM                                            MADMA   "
23PRINT"            MADMA       MMMMMMMM                               MADMA    "
24PRINT"            MADMA      .         .                             MADMA"
25PRINT"            MADMA        .....           MMMMMMM               MADMA"
```

```
26PRINT"
27PRINT"
28PRINT"
29PRINT"
30PRINT"
31PRINT"
32PRINT"
33PRINT"
34PRINT"
35PRINT"
36PRINT"
37PRINT"
38PRINT"
39PRINT"
40PRINT"
41PRINT"
42PPINT"
43PRINT"
44PRINT"
45PRINT"
46PRINT"
47PRINT"
48PRINT"
49PRINT
50PRINT
51PRINT
52PRINT
53PRINT
54PRINT
55 END
```



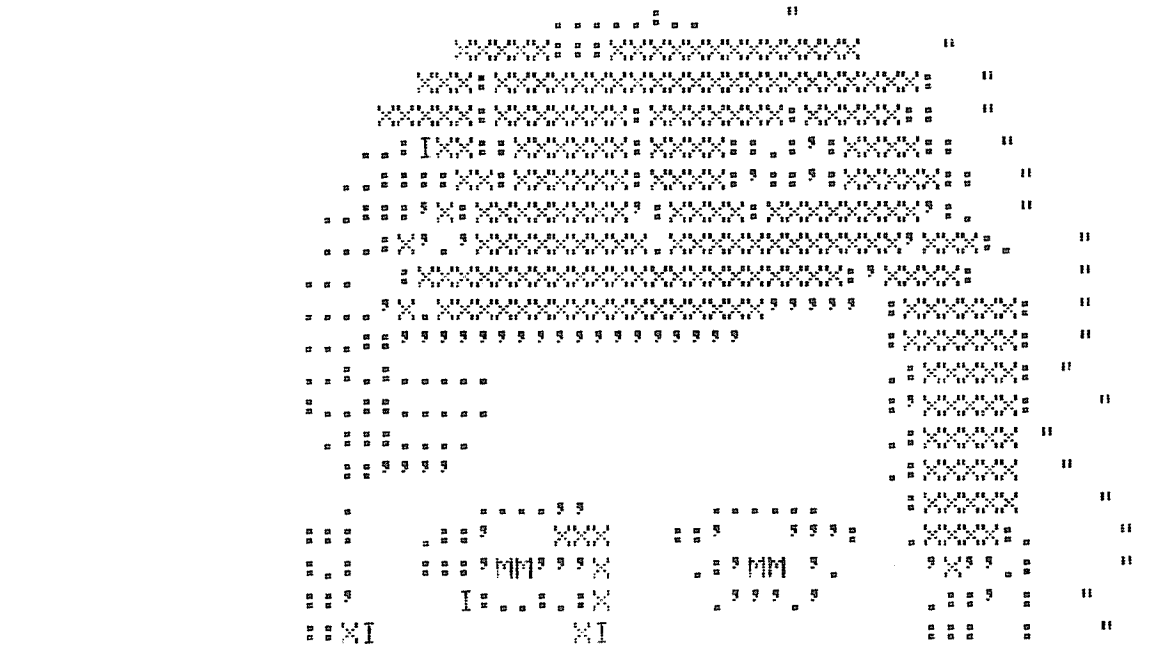
J.F.K.

Description

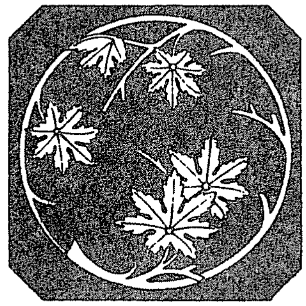
While it won't actually sit on a pedestal this bust of our 35th. President is an easily recognizable likeness of him. This program can be stored and executed in only 3K Bytes of memory.

J.F.K.

```
002PRINT
003PRINT
004PRINT
005PRINT
006PRINT
007PRINT
008PRINT"
009PRINT"
010PRINT"
011PRINT"
012PRINT"
013PRINT"
014PRINT"
015PRINT"
016PRINT"
017PRINT"
018PRINT"
019PRINT"
020PRINT"
021PRINT"
022PRINT"
023PRINT"
024PRINT"
025PRINT"
026PRINT"
027PRINT"
```



```
028PRINT"                  :XX         XI                ."::'':     "
029PRINT"                  :X' .:.     /X.              .:::    .   "
030PRINT"                  '''....    /XXX.'XX.         ...: .    "
031PRINT"                   ':....   '''''              ...:.  "
032PRINT"                             ..                          "
033PRINT"                    ':...                     ...:      "
034PRINT"                     :....  :..:II:II:..:     ...:       "
035PRINT"                     ':.... ::.               ..::       "
036PRINT"                      ':...  '''''''          .:::        "
037PRINT"                        .:...               .  ..::::'   "
038PRINT"                        ':....            :  ..:'.XXI:...  "
039PRINT"                  ....:::X:...        .:::::'   XXXXXXI:X:."
040PRINT"          .....:::XXXXXXXX:::::.....:::::'    .XXXXXXIMMM::.  "
041PRINT"     .::XXXXXXXXXXXXXXXXXXXX::::::::::::::::'     .XXXXXXXXXMMMMMMM:.  "
042PRINT"   .XXXXXXXXXXXXXXXXXXXXXXX':::::::::::::'    .'.::XXXXXXXX:MMMMMMMMMMM"
043PRINT"  .XXXXXXXXXXXXXXXXXXXXXXX ':::::::::::'   .'  .XXXXXXXXXX:MMMMMMMMMMM "
044PRINT" XXXXXXXXXXXXXXXXXXXXXXXX   '::::::::' .'    .XXXXXXXXXXX:MMMMMMMMMMM"
045PRINT".XXXXXXXXXXXXXXXXXXXXXXXXX    ':::::'.'     .XXXXXXXXXXXX:MMMMMMMMMMM "
046PRINT"XXXXXXXXXXXXXXXXXXXXXXXXXX    .'WWWW.     .XXXXXXXXXXXXXX'MMMMMMMMMM  "
047PRINT"XXXXXXXXXXXXXXXXXXXXXXXXXX.   .'WWWWWW    .XXXXXXXXXXXXXXX:MMMMMMMMMM"
048PRINT"XXXXXXXXXXXXXXXXXXXXXXXXXX.   .  .:WWWW' '    .XXXXXXXXXXXXXXX:     "
049 PRINT
050 PRINT
051 PRINT
052 PRINT
053 PRINT
054 PRINT
055 END
```



LINUS

Description

This program generates a picture of Linus making a speech. Whats that in his left hand? Hm m m m m m m. Execute the program to find out. The program will load and execute in 4K Bytes of memory.

LINUS

```
001PRINT
002PRINT"                                  ********"
003PRINT"                              ****     ********    "
004PRINT"                            * **********       *     "
005PRINT"                   **********        ********     "
006PRINT"                 **    ****     *****      "
007PRINT"          *     *    **  *         **************     "
008PRINT"         **         *   *                     *  *    "
009PRINT"         **            *       **     ****      *      "
010PRINT"         **            *                        *     "
011PRINT"     *** **            *                        *    "
012PRINT"    ** ****            *  *     ***     *       *     "
013PRINT"   *  *** **           * *  II *     II   *    ***     "
014PRINT" *       * *         **  *     *         *        *      "
015PRINT"  *        *         **   *     ***     *         *       "
016PRINT"   *       *         **                           *         "
017PRINT"   *        *        *                         ***  "
018PRINT"    *        *       *       ***********       *     "
019PRINT"     *        *       *     *************     *    "
020PRINT"      *        *      *                      *      "
021PRINT"                *      *                   **  "
022PRINT"       *         *      *               ***   "
023PRINT"        *          *      **************    "
024PRINT"         *          *      *         *       "
025PRINT"          *          *************************   "
026PRINT"           *         *   *                   **  "
```

```
027PRINT"             *       *   *                     *    "
028PRINT"              *    *    *                       *   "
029PRINT"                *     *                  *       *     "
030PRINT"                 *  *                    *        *   "
031PRINT"                  *                       *       *  "
032PRINT"                    *                      *   *****     "
033PRINT"                    *                       ****   *   "
034PRINT"                    *                         *     *****  "
035PRINT"                    *                         **      * **** "
036PRINT"                   **                       *****   *  *    *  "
037PRINT"                  *                         *   **   **     *  "
038PRINT"                  *                         *   *****       *   "
039PRINT"                  *                         *   *          *   "
040PRINT"                  *                          *             *    "
041PRINT"                  *                          *            * *** "
042PRINT"                  *****************************           * * *"
043PRINT"                  *                            *            *  * "
044PRINT"                  *                             *          **  ** "
045PRINT"                  *                             **         **   *   "
046PRINT"                  *                             **               * "
047PRINT"                  *                             *  *             *  "
048PRINT"                  *******************************  *              * "
049PRINT"                       *           *************    *             *  "
050PRINT"                       *************           *    *              *"
051PRINT"               **********************************   *               *"
052PRINT"            *             *                   *    *           *  "
053PRINT"            ***********************************     ************  "
054PRINT
055PRINT
056PRINT"          NO PROBLEM IS TOO BIG OR TOO COMPLICATED    "
057PRINT"                 TO BE RUN AWAY FROM...    "
058PRINT"                                       LINUS   "
059PRINT
060 PRINT
061 PRINT
062 PRINT
063 PRINT
064 PRINT" NOW TEAR YOUR DRAWING FROM THE ROLL, TYPE IN THE WORD 'OKAY', "
065 PRINT" AND PRESS THE 'RETURN' KEY...        "
066 INPUT A$
067 IF A$="OKAY" THEN 070
068 PRINT
069 GOTO 060
070 END
```

MS. SANTA

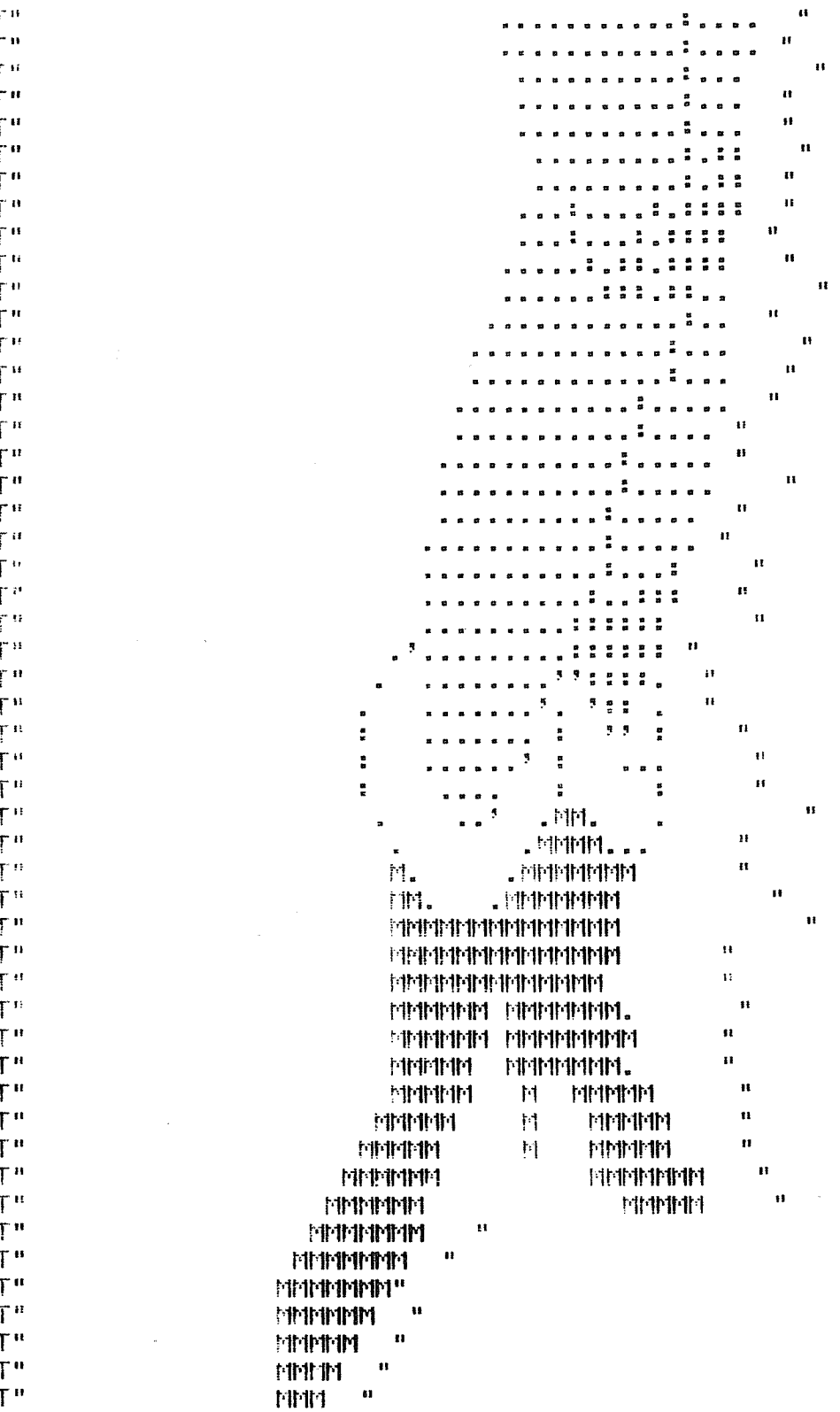
Description

This is a picture of Santa's best friend. When you run this program you will see why Santa only leaves home once a year. Seven K Bytes of memory are required for storage and execution of this program.

```
MS. SANTA




001 PRINT
002 PRINT
003 PRINT
004 PRINT
005 PRINT
006PRINT"                  MMMMMM.    "
007PRINT"                MMMMMMMMMMM::'':.  "
008PRINT"               MMMMMMMMMMM''   :.   "
009PRINT"              MMMMMMMMMM'       :    "
010PRINT"             MMMMMMM:          .:   "
011PRINT"            MMMMMMM.         .:..   "
012PRINT"           MMMMMMMM.       .:.....   "
013PRINT"           MMMMMMMM     ..:........   "
014PRINT"           MMMMMMM.::.......:......  "
015PRINT"           UMMMMMV............/....  "
016PRINT"            MMMMV.... '---'',,,  ..... "
017PRINT"            UMMV.....WA,  ,AWW,V ....."
018PRINT"             VV.....      ;     ......"
019PRINT"            .......     . ;     .../..     "
020PRINT"           .......;    'X-X'   ......."
021PRINT"           ........::  ''...'' .......  "
022PRINT"          ........;:;    :..  .........  "
023PRINT"          ........:::;.      .:........     "
024PRINT"          ........:..:''-,,-':.........  "
025PRINT"        AM       .......     ..........   "
026PRINT"       AMMA       ........   ........  "
027PRINT"      AMMV         ......... .......  "
028PRINT"     AMMM           ........ ...... .-''.   "
```

```
029PRINT"     MMM                 ...... ........:...:   "
030PRINT"     MMM    AIIIA   .......... .........  .    "
031PRINT"     MMMA AIIIIIIIA ..........  ;......;   .    "
032PRINT"     MMMMVIIIIIIIIIA..........          ;.  .   "
033PRINT"     MMMV IIIIIIIIIIA .........          ;  .    "
034PRINT"     ;M;  IIIIIIIIIIIA .....   ;.    .  .;  :    "
035PRINT"      M   IIIIIIIIIIIIA.       ;;;;.!.;     :    "
036PRINT".:::: M   IIIIIIIIIIIIIII                  :      "
037PRINT":    :/   IIIIIIIIIIIIIIII.               ./     "
038PRINT": M/;:    IIIIIIIIMIIIIIIIII.    .:.  ; .M      "
039PRINT":     :   IIIIIIIIMIIIIIIIIIIIIIIIII-;  7M     "
040PRINT";:   :;   IIIIIIIIMIIIIIIIIIIIIIIIII:   :     "
041PRINT";;;;      IIIIIIIIMIIIIIIIIIIIIIIIII   :   "
042PRINT"          IIIIIIIIMIIIIIIIIIIIIIIIIII:.:;    "
043PRINT"          IIIIIIIIMIIIIIIIIIIIIIIIIIIII    "
044PRINT"          IIIIIIIII IIIIIIIIIIIIIIIIIIII.   "
045PRINT"          IIIIIIIII  7IIIIIIIIIIIIIII;   :    "
046PRINT"           IIIIIIII   7IIIIIIIIIIIII:     :   "
047PRINT"           IIIIIIII    7IIIIIIIIIIII:     ;    "
048PRINT"           IIIIIIII     7IIIIIIIIIIII-.-I;       "
049PRINT"           IIIIIIII      IIIIIIIIIIIIIIIIIIIL    "
050PRINT"           IIIIIIIIII:: IIIIIIIIIIIIIIIIIIIIIIIL   "
051PRINT"            IIIIIIIIII..IIIIIIIIIIIIIIIII;    ;;II "
052PRINT"            .IIIIIIIII:IIIIIIIIIIIIIIIII       III  "
053PRINT"            :IIIIIIIIIIIIIIIIIIIIIIIIIIIII.  .IIIIL  "
054PRINT"            :   ;;;; IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII    "
055PRINT"            :        MMMMMMMMMMMMMMMMMMMMMMMM     MMMM    "
056PRINT"             :.       MMMMMMMMMMMMMMMMMMMMMMMM MMM MMMM       "
057PRINT"             ;::::::;MMMMMMMMMMMMMMMMMMMMMMMM MMM MMMMM;:.      "
058PRINT"                     MMMMMMMMMMMMMMMMMMMMMMMM     MM;;    :.      "
059PRINT"                   ..:;             ;;;;;;;;;;;;;       :  "
060PRINT"                ..:;                                ...:;   "
061PRINT"                :                               ....::::;;"
062PRINT"                :    .......;;;;;;;;;;;;;;;;;;;;;;;   "
063PRINT"                 ::;;..............:::::::::::::::::    "
064PRINT"                     ...............::::::::::::::"
065PRINT"                     ................:::::::::::    "
066PRINT"                     .................::::::::::   "
067PRINT"                      .................::::::::::   "
068PRINT"                      .................::::::::::    "
069PRINT"                      .................:::::::::   "
070PRINT"                       ................::::::::::    "
071PRINT"                       ................::::::::;   "
072PRINT"                        ...............:::::..:   "
073PRINT"                        ...............:::......    "
074PRINT"                         ..............:......    "
075PRINT"                         ..............:......    "
076PRINT"                          .............:.....    "
077PRINT"                          .............:.....    "
078PRINT"                           ............:.....  "
079PRINT"                           ............:....   "
```

```
080PRINT"
081PRINT"
082PRINT"
083PRINT"
084PRINT"
085PRINT"
086PRINT"
087PRINT"
088PRINT"
089PRINT"
090PRINT"
091PRINT"
092PRINT"
093PRINT"
094PRINT"
095PRINT"
096PRINT"
097PRINT"
098PRINT"
099PRINT"
100PRINT"
101PRINT"
102PRINT"
103PRINT"
104PRINT"
105PRINT"
106PRINT"
107PRINT"
108PRINT"
109PRINT"
110PRINT"
111PRINT"
112PRINT"
113PRINT"
114PRINT"
115PRINT"
116PRINT"
117PRINT"
118PRINT"
119PRINT"
120PRINT"
121PRINT"
122PRINT"
123PRINT"
124PRINT"
125PRINT"
126PRINT"
127PRINT"
128PRINT"
129PRINT"
130PRINT"
131 PRINT
132 PRINT
133 PRINT
134 PRINT
135 PRINT
136 PRINT
137 PRINT
138 PRINT
139 PRINT
140 END
```



NIXON

<u>Description</u>

The face of a former President of the United States of America is reproduced in outstanding detail. Once loaded into memory it will execute in 5K Bytes.

NIXON

```
001 FOR I=1 TO 10
002 PRINT
003 NEXT I
10 REM
11PRINT"                           MMMMMMMMMZZZZZZZ    "
12PRINT"                       MMMMMMMMMMMMMZZZZZZZZ  "
13PRINT"                 ZZZZZZZZZMMMMMMMMMMMMMMMMZZZZZZZ  "
14PRINT"             MMMMZMMMMMMMMMMMMMMMMMMMMMMMMMMMMZZZZZZZ  "
15PRINT"           MMMMMMMMMMMMMMMMMMMMMMMMZZMMMMMMMMZZMZZZZZZ "
16PRINT"          MMMMMMMMMMMMMMMMMMMMMMMMMZZMMMMMMMMZMMMZZZZZZ   "
17PRINT"        MMMMMMMMMMMM++++++++++MMMMMZZMMMMMMMMMMMZZZZZZZZ  "
18PRINT"      MMMMMMMMMMM+++++++++++++MMMMMMMMMZZMMMMMMMMMMMZZZZZZZ"
19PRINT"    MMMMMMMMMM++++++++++++++++MMMMMMMMMZZMMMMMMMMMMMZZZZZZZ   "
20PRINT"   MMMMMMMMMM+++++++++++++++++MMMMMMMMMZMMMMMMMMMMMMMMMZZZZZZZZZ"
21PRINT"  MMMMMMMMMM+++++++++++++++++++MMMMMMMMMMMMMMMMMMMMMMMMMZZZZZZMMZ"
22PRINT" MMMMMMMMM+++++++........++++++MMMMMMMMMMMMMMMMMMMMMMMMMMMMMZZZMMZZZ"
23PRINT" MMMMMMMM++++............++++++MMMMMMMMMMMMMMMMMMMMMMMMMMMMMZZZMMMMZZ"
24PRINT"MMMMM++++++...............++++MMMMMMMMMMMMMMMMMMMMMMMMMMMMMZZZMMMMMZZ"
25PRINT" MM+++++++................+++++MMMMMMMMMMMMMMMMMMMMMMMMMMMMMZZZMMMMMMZ"
26PRINT" M+++++++.................++++++MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMZZMMMMM"
27PRINT" +++++++...................++++++MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMZZMMMZ"
28PRINT" ++++++....................+++++++MMMMMMMMMMMMMMMMMMMMMMMMM1111MMZZMMZ"
29PRINT" ++++++.....................++++++++++MMMMMMMMMMMMMMMMMM111+++111MZZZ"
30PRINT" ++++++++.....................++++++++++++MMMMMMMMMMMMMM11+11111+11MMZ"
31PRINT" +++++++.................++++++++++++++++++MMMMMMMMMMMM11+11+++11+11MMM"
32PRINT" +++++++..........++++++++ZZZZZ+++++++++++++MMMMMMMMM11+1+++++1+1MMMM"
33PRINT" ++++++++....+++++ZZZZZZZZZZZZZ+++++++++++++MMMMMMMMM11+1+++++1+1MMMM"
34PRINT" +++++++++++++++ZZZZZ1111ZZZZZZZ1+++++++++++MMMMMMMMMM11++1++++1+1MMMM"
35PRINT" +++++++++++++ZZZZZ11ZZZZZ1ZZ1+++++++++++++++++++++++..+++++++1+1MMMM"
36PRINT" +++++++++++ZMMMMMMMMMZ1+................+++++++++++++..++++++1+11MMMM"
```

```
37PRINT"  ++++++++++1MMMMMMMMM...++................+++++++++++..+++..+1+MMMMMM"
38PRINT" ++++++++++...111111..++++..................+++++++++++++......1++1MMMMM"
39PRINT" +++ZZZZ+....+++++1++++....................+++++++++++++.......+1MMMMMM"
40PRINT" ++ZZMMMM....++++..........................++++++++++++1.....11MMMMMMM"
41PRINT" +ZZMMMMM....+++............................+++++++++++++1...1MMMMMMMMM"
42PRINT"  +ZMMMM.....++..............................++++++++++++11MMMMMMMMMMZ"
43PRINT"   ZM...++...++++.............................++++++++++..ZMZ1+......."
44PRINT"    +..++....+++..............................+++++++++....+++......."
45PRINT"     +++.....+++..1ZZ1........+...............++++++.........++......."
46PRINT"     ++.....++++.ZZZZ1...........+..............++++++.......+++++....."
47PRINT"      +....++++ZZZZZ1........++++++.............++++++......+++++++..."
48PRINT"      +...++++ZZZZZ1.........!!!!!!!............+++++++....++++++++++++"
49PRINT"      +1+++++ZZZZ++.....++ZZZZ  11+.............+++++++ &&&&&&&&&&&+++"
50PRINT"      +....+..ZZ+++..ZZZZ       1++............++++++++..+++++++++++"
51PRINT"       +...+....+++ZZZ       ZZ1+++............++++++++1++++++++++   :"
52PRINT"       +...+...+ZZZZ      ZZZ11+++.............+1+++++++++++++++++   :"
53PRINT"        +...+..+ZZ     ZZZZ11++...............+..+++++++++++++++   :"
54PRINT"          +..+..+ZZ  ZZZ111+++................+...+++++++++++++   :"
55PRINT"           +..+... ZZ1111++...................+1++++++++++++++   :"
56PRINT"            +.......+++++......................++++++++++++   :"
57PRINT"             +.................................++++++++++++++   :"
58PRINT"              +..............................+++++++++++++++   :   "
59PRINT"               ++.......................++++++++++++++++++++++  :"
60PRINT"                 ++....................++++++++++++++++++++  :"
61PRINT"                  ++...................+++++++++++++++++++  :"
62PRINT"                    ++................+++++++++++++++++++  :  "
63PRINT"                      ++.........++++++++++++++++++++  :   "
64PRINT"                          11111++++++++++++++++++++  :"
65PRINT"                            1111+++++++++++++++   :      :"
66PRINT"                                              :     :  :     :  "
67PRINT"                                              :    :    :    :   "
68PRINT"                                              :   :      :   :  "
69PRINT"                                              :  :        :  :   "
70PRINT"                                              : :          : :   "
71PRINT"                                               :    "
72 FOR I=1 TO 5
73 PRINT
74 NEXT I
75 END
```

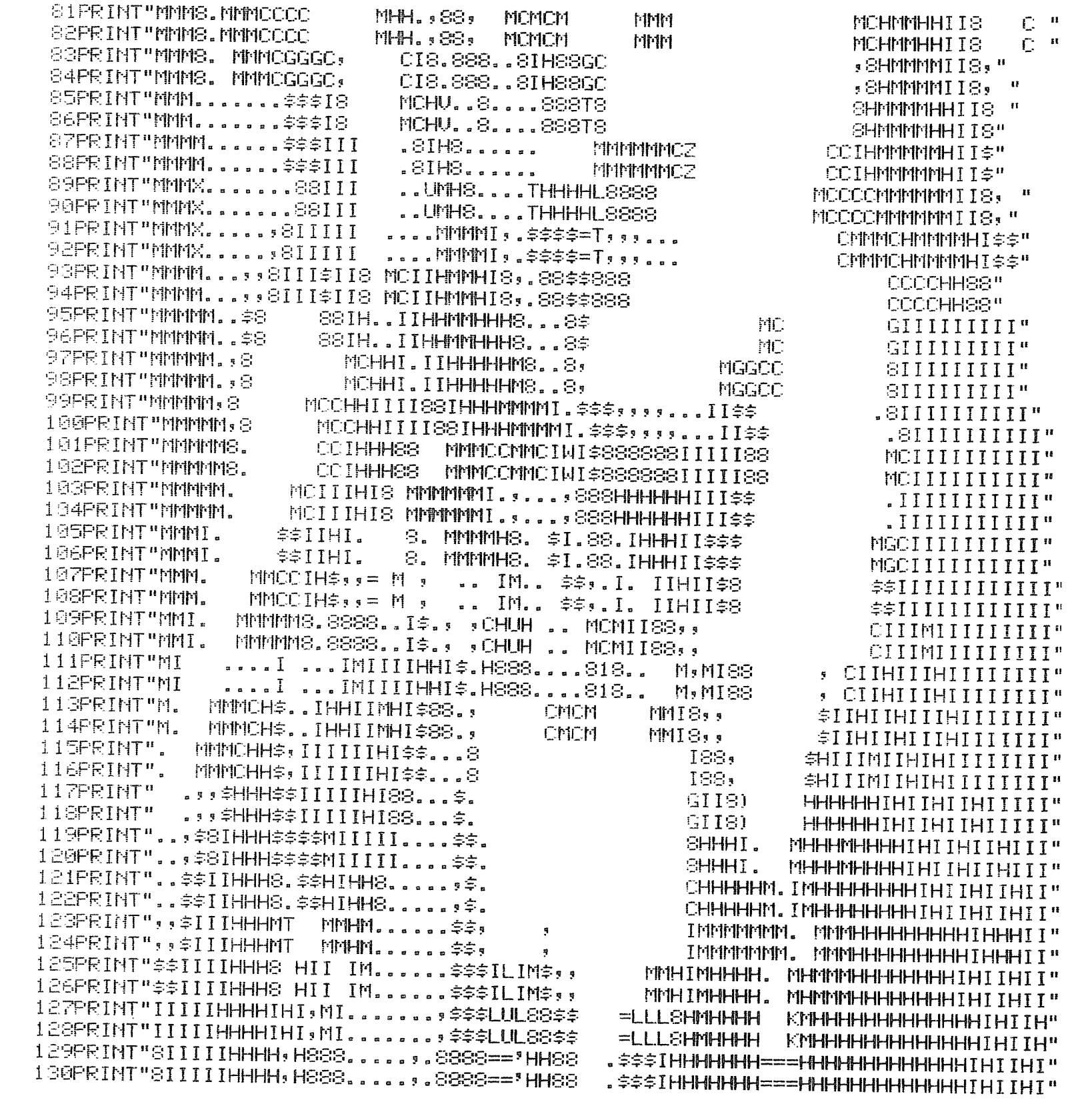
NOEL NOEL

Description

This is the most comprehensive picture program included in this volume. When completely executed the picture drawn is of the Madonna and Child. Due to the magnification factor of this picture it should not be viewed at distances of closer then six feet. This is a very beautiful picture and is sure to catch the eye of all who see it. The source code is 13K Bytes long and the program will store and execute in this space.

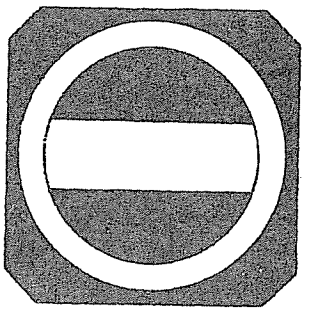
```
NOEL NOEL




001 FOR I=1 TO 10
002 PRINT
003 NEXT I
10 REM
11PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
12PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
13PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
14PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM "
15PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
16PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
17PRINT"MMMMMMMMMMMMMMMMMMMMMHHHH88.8HII88..            CCCCCIMMMMMMMMMMMMMMMMMMMMM"
18PRINT"MMMMMMMMMMMMMMMMMMMMMHHHH88.8HII88..            CCCCCIMMMMMMMMMMMMMMMMMMMMM"
19PRINT"MMMMMMMMMMMMMMMMMMMMHH88.IHHHHIIII88                CCCHMMMMMMMMMMMMMMMMMM"
20PRINT"MMMMMMMMMMMMMMMMMMMMHH88.IHHHHIIII88                CCCHMMMMMMMMMMMMMMMMM "
21PRINT"MMMMMMMMMMMMMMMMMMM''88..HIIII''IIIHH''.              .'''IMMMMMMMMMMMMMM"
22PRINT"MMMMMMMMMMMMMMMMMMM''88..HIIII''IIIHH''.              .'''IMMMMMMMMMMMMMM"
23PRINT"MMMMMMMMMMMMMMMMMM=88...III8888IIIHH''.                88888HMMMMMMMMMMMM"
24PRINT"MMMMMMMMMMMMMMMMMM=88...III8888IIIHH''.                88888HMMMMMMMMMMMM"
25PRINT"MMMMMMMMMMMMMMMHHH8...III''IHHIHHI..'''HH''..             =CCCC==MMMMMM"
26PRINT"MMMMMMMMMMMMMMMHHH8...III''IHHIHHI..'''HH''..             =CCCC==MMMMMM"
27PRINT"MMMMMMMMMMMMMMMM='...IHHIIHHHI''''H.HHHIIHH...              .8888HHMMMM"
28PRINT"MMMMMMMMMMMMMMMM='...IHHIIHHHI''''H.HHHIIHH...              .8888HHMMMM"
29PRINT"MMMMMMMMMMMM==MH'..'HHHH'II=IHMMMI.'I=='IIIH88             CCCC=MMMMMM"
```

```
30PRINT"MMMMMMMMMMM==MH'..'HHHH'II=IHMMMI.'I==''IIIH88                CCCC=MMMMMM"
31PRINT"MMMMMMMMMMMMM=...HIIIIII ''II  I '''''IIIMMII'              '''.===MMMMMM"
32PRINT"MMMMMMMMMMMMM=...HIIIIII ''II  I '''''IIIMMII'              '''.===MMMMMM"
33PRINT"MMMMMMMMMMH88..HHHIIII .' CMIHMMM8  .' MMMMHM88             '''.888IMMMMM"
34PRINT"MMMMMMMMMMH88..HHHIIII .' CMIHMMM8  .' MMMMHM88             '''.888IMMMMM"
35PRINT"MMMMMMMMMMH=.IHHHH''   I  .IIHMI' CCMMMMHHHMMMH''.          .''..  CIMMMM"
36PRINT"MMMMMMMMMMH=.IHHHH''   I  .IIHMI' CCMMMMHHHMMMH''.          .''..  CIMMMM"
37PRINT"MMMMMMMMM='.IHHHH  IIHIMIIHHMMIIMMMIIHHHHHH==''..)        ===     ''====="
38PRINT"MMMMMMMMM='.IHHHH  IIHIMIIHHMMIIMMMIIHHHHHH==''..)        ===     ''====="
39PRINT"MMMMMMMMM='.HII==IHIIMIHHHMMHIHMMMHHHHI''''M=HI''          M       ''MMM"
40PRINT"MMMMMMMMM='.HII==IHIIMIHHHMMHIHMMMHHHHI''''M=HI''          M       ''MMM"
41PRINT"MMMMMMMM='' IIH88 HHIMMMHHM==IIIIJCCCCC      '=MMH'               '8HMM"
42PRINT"MMMMMMMM='' IIH88 HHIMMMHHM==IIIIJCCCCC      '=MMH'               '8HMM"
43PRINT"MMMMMMMM='. CHH..III. CIIII'''''              ''=MI'               'IMMM"
44PRINT"MMMMMMMM='. CHH..III. CIIII'''''              ''=MI'               'IMMM"
45PRINT"MMMMMMMM='  '===....                           8==I'.             MCCHMM "
46PRINT"MMMMMMMM='  '===....                           8==I'.             MCCHMM"
47PRINT"MMMMMMMMH8  CHMH....                           .'MMI88             MCIMM"
48PRINT"MMMMMMMMH8  CHMH....                           .'MMI88             MCIMM"
49PRINT"MMMMMMMMH' CCHMH..8.                           8MMMI88             MMCIH "
50PRINT"MMMMMMMMH' CCHMH..8.                           8MMMI88             MMCIH"
51PRINT"MMMMMMMH' .88HMI..8.                            MMMI88.       ....8IH "
52PRINT"MMMMMMMH' .88HMI..8.                            MMMI88.       ....8IH"
53PRINT"MMMMMMMHHH .88HHI..8.                           88MMMI88I      88  CI"
54PRINT"MMMMMMMHHH .88HHI..8.                           88MMMI88I      88  CI"
55PRINT"MMMMMMHH8. MIHM8.88                              8MMMI888      .8. MM"
56PRINT"MMMMMMHH8. MIHM8.88                              8MMMI888      .8. MM"
57PRINT"MMMMMMH88.  CMM8..8.                    '    ''    8IMMM88      .I."
58PRINT"MMMMMMH88.  CMM8..8.                    '    ''    8IMMM88      .I."
59PRINT"MMMMMH8...  MMM8..88                 ..8LHHH88. U    IMMI8.      CC  "
60PRINT"MMMMMH8...  MMM8..88                 ..8LHHH88. U    IMMI8.      CC  "
61PRINT"MMMMMH8.8   .MM8.88.. '           .8HHHTT            IMH I8,      I8"
62PRINT"MMMMMH8.8   .MM8.88.. '           .8HHHTT            IMH I8,      I8"
63PRINT"MMMMMH..8   8MMI8IIHHH8.          .888.88HHL.'.       I H 88      MM"
64PRINT"MMMMMH..8   8MMI8IIHHH8.          .888.88HHL.'.       I H 88      MM"
65PRINT"MMMMM....   IMMH.8,8LHHHHH.'        .88H===8T8        8H  I '     .8I"
66PRINT"MMMMM....   IMMH.8,8LHHHHH.'        .88H===8T8        8H  I '     .8I"
67PRINT"MMMMM..8.   HMMH..8HT8M'='H8..      CHL8LT8           8   MH8     MCM"
68PRINT"MMMMM..8.   HMMH..8HT8M'='H8..      CHL8LT8           8   MH8     MCM"
69PRINT"MMMMI..88  CHMMM8.8IT8T8TI8HI.                          KIH8      C "
70PRINT"MMMMI..88  CHMMM8.8IT8T8TI8HI.                          KIH8      C  "
71PRINT"MMMM8..88 MCIMMMI. CC       MC                          .HMI8 C,"
72PRINT"MMMM8..88 MCIMMMI. CC       MC                          .HMI8 C,"
73PRINT"MMMM...88. CHIHHH,8        MMM                         8IMHHH8  8"
74PRINT"MMMM...88. CHIHHH,8        MMM                         8IMHHH8  8"
75PRINT"MMM....88.  CIMMM8.8.      MMM                          HMMHI8,   .. "
76PRINT"MMM....88.  CIMMM8.8.      MMM                          HMMHI8,   .."
77PRINT"MMM8...8888.   CMMH.8..    MMM                          .IHHHII8  C"
78PRINT"MMM8...8888.   CMMH.8..    MMM                          .IHHHII8  C "
79PRINT"MMM88 MMCCC     CHHI.8.,   MCM       M                 MHHHHII8.  CC "
80PRINT"MMM88 MMCCC     CHHI.8.,   MCM       M                 MHHHHII8.  CC"
```



```
81PRINT"MMM8.MMMCCCC      MHH.,88,  MCMCM      MMM                    MCHMMHHII8   C "
82PRINT"MMM8.MMMCCCC      MHH.,88,  MCMCM      MMM                    MCHMMHHII8   C "
83PRINT"MMM8. MMMCGGGC,     CI8.888..8IH88GC                          ,8HMMMMII8,"
84PRINT"MMM8. MMMCGGGC,     CI8.888..8IH88GC                          ,8HMMMMII8,  "
85PRINT"MMM.......$$$I8     MCHV..8....888T8                          8HMMMMHHII8  "
86PRINT"MMM.......$$$I8     MCHV..8....888T8                          8HMMMMHHII8"
87PRINT"MMMM......$$$III    .8IH8......      MMMMMMCZ               CCIHMMMMMHII$"
88PRINT"MMMM......$$$III    .8IH8......      MMMMMMCZ               CCIHMMMMMHII$"
89PRINT"MMMX.......88III    ..UMH8....THHHHL8888                   MCCCCMMMMMMII8,  "
90PRINT"MMMX.......88III    ..UMH8....THHHHL8888                   MCCCCMMMMMMII8,"
91PRINT"MMMX.....,8IIIII   ....MMMMI,.$$$$=T,,,...                  CMMMCHMMMMHI$$"
92PRINT"MMMX.....,8IIIII   ....MMMMI,.$$$$=T,,,...                  CMMMCHMMMMHI$$"
93PRINT"MMMM...,,,8III$II8 MCIIHMMHI8,.88$$888                         CCCCHH88"
94PRINT"MMMM...,,,8III$II8 MCIIHMMHI8,.88$$888                         CCCCHH88"
95PRINT"MMMMM..$8     88IH..IIHHMMHHH8...8$              MC            GIIIIIIIII"
96PRINT"MMMMM..$8     88IH..IIHHMMHHH8...8$              MC            GIIIIIIIII"
97PRINT"MMMMM.,8        MCHHI.IIHHHHHM8..8,           MGGCC            8IIIIIIIII"
98PRINT"MMMMM.,8        MCHHI.IIHHHHHM8..8,           MGGCC            8IIIIIIIII"
99PRINT"MMMMM,8      MCCHHIIIII88IHHHMMMMI.$$$,,,,,...II$$              .8IIIIIIIII"
100PRINT"MMMMM,8      MCCHHIIIII88IHHHMMMMI.$$$,,,,,...II$$              .8IIIIIIIII"
101PRINT"MMMM8.       CCIHHH88  MMMCCMMCIWI$888888IIIII88               MCIIIIIIIII"
102PRINT"MMMM8.       CCIHHH88  MMMCCMMCIWI$888888IIIII88               MCIIIIIIIII"
103PRINT"MMMM.     MCIIIHI8 MMMMMMI.,...,888HHHHHHIII$$                 .IIIIIIIII"
104PRINT"MMMM.     MCIIIHI8 MMMMMMI.,...,888HHHHHHIII$$                 .IIIIIIIII"
105PRINT"MMI.     $$IIHI.    8. MMMMH8. $I.88.IHHHII$$$               MGCIIIIIIII"
106PRINT"MMI.     $$IIHI.    8. MMMMH8. $I.88.IHHHII$$$               MGCIIIIIIII"
107PRINT"MM.    MMCCIH$,,= M ,  .. IM.. $$,.I. IIHII$8                $$IIIIIIIII"
108PRINT"MM.    MMCCIH$,,= M ,  .. IM.. $$,.I. IIHII$8                $$IIIIIIIII"
109PRINT"MI.   MMMMM8.8888..I$.,  ,CHUH .. MCMII88,,                 CIIIMIIIIII"
110PRINT"MI.   MMMMM8.8888..I$.,  ,CHUH .. MCMII88,,                 CIIIMIIIIII"
111PRINT"MI    ....I ...IMIIIIHHI$.H888....818..  M,MI88          , CIIHIIIHIIIII"
112PRINT"MI    ....I ...IMIIIIHHI$.H888....818..  M,MI88          , CIIHIIIHIIIII"
113PRINT"M.   MMMCH$..IHHIIMHI$88.,      CMCM    MMI8,,           $IIHIIHIIIHIII"
114PRINT"M.   MMMCH$..IHHIIMHI$88.,      CMCM    MMI8,,           $IIHIIHIIIHIII"
115PRINT".   MMMCHH$,IIIIIIHI$$...8                  I88,        $HIIIMIIHIHIIII"
116PRINT".   MMMCHH$,IIIIIIHI$$...8                  I88,        $HIIIMIIHIHIIII"
117PRINT"   .,,$HHH$$IIIIIHI88...$.                  GII8)      HHHHHHIHIIHIIHIII"
118PRINT"   .,,$HHH$$IIIIIHI88...$.                  GII8)      HHHHHHIHIIHIIHIII"
119PRINT"..,$8IHHH$$$$MIIIII....$$.                  8HHHI.   MHHHMHHHHIHIIHIIHIII"
120PRINT"..,$8IHHH$$$$MIIIII....$$.                  8HHHI.   MHHHMHHHHIHIIHIIHIII"
121PRINT"..$$IHHH8.$$HIHH8.....,$.                   CHHHHHM.IMHHHHHHHHIHIIHIIHII"
122PRINT"..$$IHHH8.$$HIHH8.....,$.                   CHHHHHM.IMHHHHHHHHIHIIHIIHII"
123PRINT",,$IIIHHHMT  MMHM.....$$,    ,              IMMMMMMM. MMMHHHHHHHHHIHHHII"
124PRINT",,$IIIHHHMT  MMHM.....$$,    ,              IMMMMMMM. MMMHHHHHHHHHIHHHII"
125PRINT"$$IIIIHHH8 HII IM.....$$$ILIM$,,          MMHIMHHHH. MHMMMHHHHHHHIHIIHII"
126PRINT"$$IIIIHHH8 HII IM.....$$$ILIM$,,          MMHIMHHHH. MHMMMHHHHHHHIHIIHII"
127PRINT"IIIIIHHHHIHI,MI.....,$$$LUL88$$        =LLL8HMHHHH  KMHHHHHHHHHHHHHIHIIH"
128PRINT"IIIIIHHHHIHI,MI.....,$$$LUL88$$        =LLL8HMHHHH  KMHHHHHHHHHHHHHIHIIH"
129PRINT"8IIIIIHHHH,H888.....,.8888=='HH88      .$$$IHHHHHHH===HHHHHHHHHHHHHIHIIHI"
130PRINT"8IIIIIHHHH,H888.....,.8888=='HH88      .$$$IHHHHHHH===HHHHHHHHHHHHHIHIIHI"
```

```
181PRINT"......$IIIIIHIIHIIHHHHHHHJ   II  IIII  RAX  II$I    I$$$$$8  $$$$$$$$$"
182PRINT"......$IIIIIHIIHIIHHHHHHHJ   II  IIII  RAX  II$I    I$$$$$8  $$$$$$$$$"
183PRINT"....,$J$$$JIIIIIIHIIHHHHI    I.I IIHH  $X$  G$$I  JJJ$$$$.J$  $$$$$$$$$"
184PRINT"....,$J$$$JIIIIIIHIIHHHHI    I.I IIHH  $X$  G$$I  JJJ$$$$.J$  $$$$$$$$$"
185PRINT"....,$$$$$IIIIIIIIIHHIIHH  HI   HHIH.  $  .$$$I  $$$$$$$$$  $$$$$$$$$"
186PRINT"....,$$$$$IIIIIIIIIHHIIHH  HI   HHIH.  $  .$$$I  $$$$$$$$$  $$$$$$$$$"
187PRINT"....$$I$$$$$IIIIIMIMIIIMM  IH.  IIHHI.   MJ,,,I      $$$I      $$$$$"
188PRINT"....$$I$$$$$IIIIIMIMIIIMM  IH.  IIHHI.   MJ,,,I      $$$I      $$$$$"
189PRINT"....$I$$$$$$$$$IIIIIIIHIHIIHHIIIIINIIIIJ$$$$J$$$$$$$$$IIIIIIIII$$"
190PRINT"....$I$$$$$$$$$IIIIIIIHIHIIHHIIIIINIIIIJ$$$$J$$$$$$$$$IIIIIIIII$$"
191PRINT"....$I$$$$$$$$IIIIIIIIHIHIIHIIHHIIIIIII$$$$$$$$$$$$$$$$$$$$$$$$$"
192PRINT"....$I$$$$$$$$IIIIIIIIHIHIIHIIHHIIIIIII$$$$$$$$$$$$$$$$$$$$$$$$$"
193PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
194PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
195PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
196PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
197PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM"
198 FOR I=1 TO 10
199 PRINT
200 NEXT I
201 END
```



NUDE

Description

This is a playboy original that should be rated R, line 60 should do it. This picture is extremely detailed and is almost three feet long. It will execute in 9K Bytes of memory, as many times as you like.

NUDE

```
001 PRINT
002 PRINT
003 PRINT

005PRINT"          .:IHHMHHI:..,"
006PRINT".::IHHI..IIHHMMMHIHHH:.."
007PRINT"::HMHHMHHMMMMMMMMHMMHHI::, "
008PRINT"IHHHMHMHMHHHMMMMMMMMMH:::.:"
009PRINT"MMMMMMMMMHMMMMMMMHMMMMMMMMI: "
010PRINT"MMMMMMMMMMMMMHMMHMMMMMMMMM,:"
011PRINT"MMMMMMMMMMMMMMMMMMMMMMMMMM, "
012PRINT"MHMHMMMMMMMMMMHMMMMHHMMMMM::.. "
013PRINT"HMMMMMMHMMMMMMMHHMMMMMMMMMMM"
014PRINT"MMMMMMMMMMHMMHHHI'   ':::I HMMMMMI"
015PRINT"MMMHMMMMMMMMMMMHI, '    HIHMMMMMM."
016PRINT"MMMMMMMMMMMMMMIII,      '':IHMMMM"
017PRINT"MMMMMMMMMMHMMMMMH:        ... HMM:"
018PRINT"MMMMMMMMMMMMMMMHHH          IMM MH, "
019PRINT"MMMMMMMMMMMMMMMMMI,    ...IMMMMM  "
020PRINT"MMMMMMHMMMMMMMMMMM       :MIMMI.,   "
021PRINT"MMMMMMMHHMMMMMMMM IMMI..   IMMIHH:."
022PRINT"MMMMMMMHHHHHMMMMIMMH:::... 'IHI,..."
023PRINT"MMMMMMMMMMMMMMM'H:MHIII:...:  ':.:. "
024PRINT"MMMMHHMMHHMHI ,,MMMII:':::I:I.  :I::   "
025PRINT"MMMMMMMMHH....:'''':::.::I,.: MII:"
026PRINT"MMMMMMMM::.::''''   '':::IH:IM::  IM. "
027PRINT"MMMMMMMMMII:'' '     '':::I::  :MMMM."
```

```
028PRINT"MMMMMMMMMMII:.        ':I:.;MMMMM':   "
029PRINT"MMMMMMMMMMHHHII:.     .::I:IIMMM':::   "
030PRINT"MMMMMMMMMMMMMMII::.. .:II: '::ii:''.;:''''::..'   "
031PRINT"MMMMMMMMMMMMMMMI:::.:I::.. .. ..:'' ;.:'''::;    ':;"
032PRINT"MMMMMMMMMMMMHII::'II::....' .:'                   ::.;   "
033PRINT"IHIMMMMMMMMMMMMMMHI::....::::: :'         ::         '."
034PRINT" '':HMMMMMMMMMMMHHHHHI:..::::II::' .::::::III:;;          ';  "
042PRINT"       ;MHMMMMMMHH:.''     ...        ..   ...::H:;  'I::.     .:"
043PRINT"       .IMHMMMHI:''     ..:. I      ..    ..   ...::II;  'II....    :"
044PRINT"       IMHIMMI:''        . :                    ....::H:  I:: .    "
045PRINT"       MMHIMMI:.''     ..:    ...:        ...    ....II;'I:...."
046PRINT"      'MMHIMM:'':.    .         .. .    .. ;:         ;.IIHI:::."
047PRINT"      IMIHMMI::::''          .      ;             .;;  ..::IHIII.."
048PRINT"      IMIHMMM.......              .                      ..::HH:."
049PRINT"      HMIHMMMH:.       .                                ....:::IIHH"
050PRINT"      IHIMMM::...                                          ''';::::"
051PRINT"      :MMHMM:..  .    ...    I II..... .                    '''"
052PRINT"      'MIHMMI:...      :::..    .   I. :::::.. ...::....  ..    "
053PRINT"       MMHMMM:...  ..        .:......:.III:::.........::::.........  "
054PRINT"       HMIMMI:...         ..:::::::::III:H:IIHII:::::...::::..........."
055PRINT"       IMHIMM:.....        ....::::::III:IIIHHHHHHH'III:....:........."
056PRINT"       'MHHMM:...          ....::::::IIIIHMI:':::IHHMHIII:::::........"
057PRINT"        IMIMM:::...            ...:::::III' :....::::IHHMHIIII.::.:.."
058PRINT"        'MMIMM:...             ....::I:.'  '       '''';::IIIHMH;':::::"
059PRINT"         IMHMMI:::....     ;      ..:::::::..    .. ...   ..::IHMM:;  '"
060PRINT"          HMMMMH......:   .       ..:::::::..          ..::::MMMM)  "
061PRINT"          IMIMMHH:...:...     ..  ...:::::...   ..  ...   ..:;::MMMI"
062PRINT"           HMHMMHI:... ..:.      ....::::::::..:.      ....::::IMM'"
063PRINT"           'MMHHHHI:..::...     ....::::II::.::....  ..: ...::IHM'"
064PRINT"            IMMHHI:.:::... .      ......::III:..::.:::::..IIHHM'   "
065PRINT"            'MMMHI:::..::.       ......:IIIHIHII::IHHHHHHHHHI'''"
066PRINT"             MIMHHHII::..:.    ..  ..:::I::.:HHHHIHMMMHMHHIH'"
067PRINT"             'MMHHHHII::. ...         ..:.::HHHHHHHMHHMMHI'   "
068PRINT"              IMMHHIII:::...        .....IHHIIHHIIIHHHHMH   "
069PRINT"              'MMHHHIII:..:..   ..   ...:HI:...:::IIHHHMH  "
070PRINT"               IMHHHII:::::...      ..IHI..  ..:HHHIHMHH  "
071PRINT"               'MHHII:::....        ...III:...  .IHHHHMMH   "
072PRINT"                IMHHHIII::...    ..  ..IHH..  ..:::IHHMH   "
073PRINT"                'MHHHIIIII:... .     ....II:....:::IHMMHI   "
074PRINT"                 MHHIIII:::::.         ...:::..:::.HHHHH'   "
075PRINT"                 'MMHI::::.......        ..:::::.IHHHIHH    "
076PRINT"                  MMIII::::.......     ....:::::::HIIHHH'   "
077PRINT"                  'MHHHHHII::...          ...:::::MHHHH   "
078PRINT"                   MHHHHHHIIH::.     .      .::::HIMMH'   "
079PRINT"                   HMHHHHHHHHHH::..        ....:::HHHHI   "
080PRINT"                    IMMHHHHHIIII:.     ..    ..::::IHHM'  "
081PRINT"                    IMMHHHHHHHHHHI::.     ..   ..::HMHHH  "
082PRINT"                    IMHHHHHHHIII::....    ......::HHHI"
083PRINT"                    HMHHHHHHHIII::''' '    ''''::MHHM'  "
084PRINT"                   IMMHHHIII::'''              '::HMMM  "
085PRINT"                  ;HMHHHII::''''         '''':MMMHM    "
```


086PRINT"
087PRINT"
088PRINT"
089PRINT"
090PRINT"
091PRINT"
092PRINT"
093PRINT"
094PRINT"
095PRINT"
096PRINT"
097PRINT"
098PRINT"
099PRINT"
100PRINT"
101PRINT"
102PRINT"IMIHHHHHMMHHII
103PRINT"HMIHHMMMHHHHH
104PRINT"MMHHHHHHHHII
105PRINT"HMHHHHHHHHHI
106PRINT"IMMHHHHHHHHH
107PRINT"
108PRINT" IMMIHHHHHHHHHII
109PRINT"
110PRINT"
111PRINT"
112PRINT"
113PRINT"
114PRINT"
115PRINT"
116PRINT"
117PRINT"
118PRINT"
119PRINT"
120PRINT"
121PRINT"
122PRINT"
123PRINT"
124PRINT"
125PRINT"
126PRINT"
127PRINT"
128PRINT"
129PRINT"
130PRINT"
131PRINT"
132PRINT"
133PRINT"
134PRINT"
135PRINT"

```
136PRINT"MMMMMMMMMMHHH::..   ..::HHMMM   ,:IIIHIIII:IIIHHMMMMMMMMMHHH::.. ."
137PRINT"MMMMMMHHHHHIII::.   .:HMMMMM:IIIIH:'''':'':'':::IHMMMMHHHH::........"
138PRINT"MMMMMMMHHIII::''IHHHIIIIIHHHI:''                 '':::.IHMMMMMHHHH::....."
139PRINT"HHHHMMHIIHIIHHHIII::::''''''                       '':::IHMMMMHHMHHI:::.."
140PRINT"IHII''HHHHIII:'::...    ..                          ....  .HHHMMHMMMMHHI::"
141PRINT"HHHHIII:'''''':...       .           .....    ::::  .IIHMHHHHHMHHHIMMH"
142PRINT"II:'':::..          .          ....:::::::  ,::::::IIHHIIIHMHHIIIHHHMMMH"
143PRINT"..     .           .           .......::::::::'' IIHHHMHHHHHHHMMMMHHHMMMM"
144PRINT"       .....       .........::::::::::III::IIHHHHHHMHHHHHHHMMMMMMMMMMMMM"
145PRINT".....       ..:   ..:    ......:::::IIHHHHHHHIIIIIHHMMMMMMMMMHHMMMMMMMHII"
146PRINT"::.      .........::::::::::IIIHHHHHHMMMMMMMMMMMMHHHHHMMMMMMMMMMMMHHMII:''''"
147PRINT"::::::::IIIHHHHHHHHHHMMMMMMMMMMMMMMMMMMMMMMMMMMHHHHHHIIII::'''''''     "
148PRINT"IHIHIIHHHHMMMMMMHHIII::::::::::::::'''''''''''    "
149PRINT"HHHHHHHHHHHHHHHHHHHH'''''' "
150PRINT"HHHIIIIIII              "
151 PRINT
152 PRINT
153 PRINT
154 END
```

PEACE

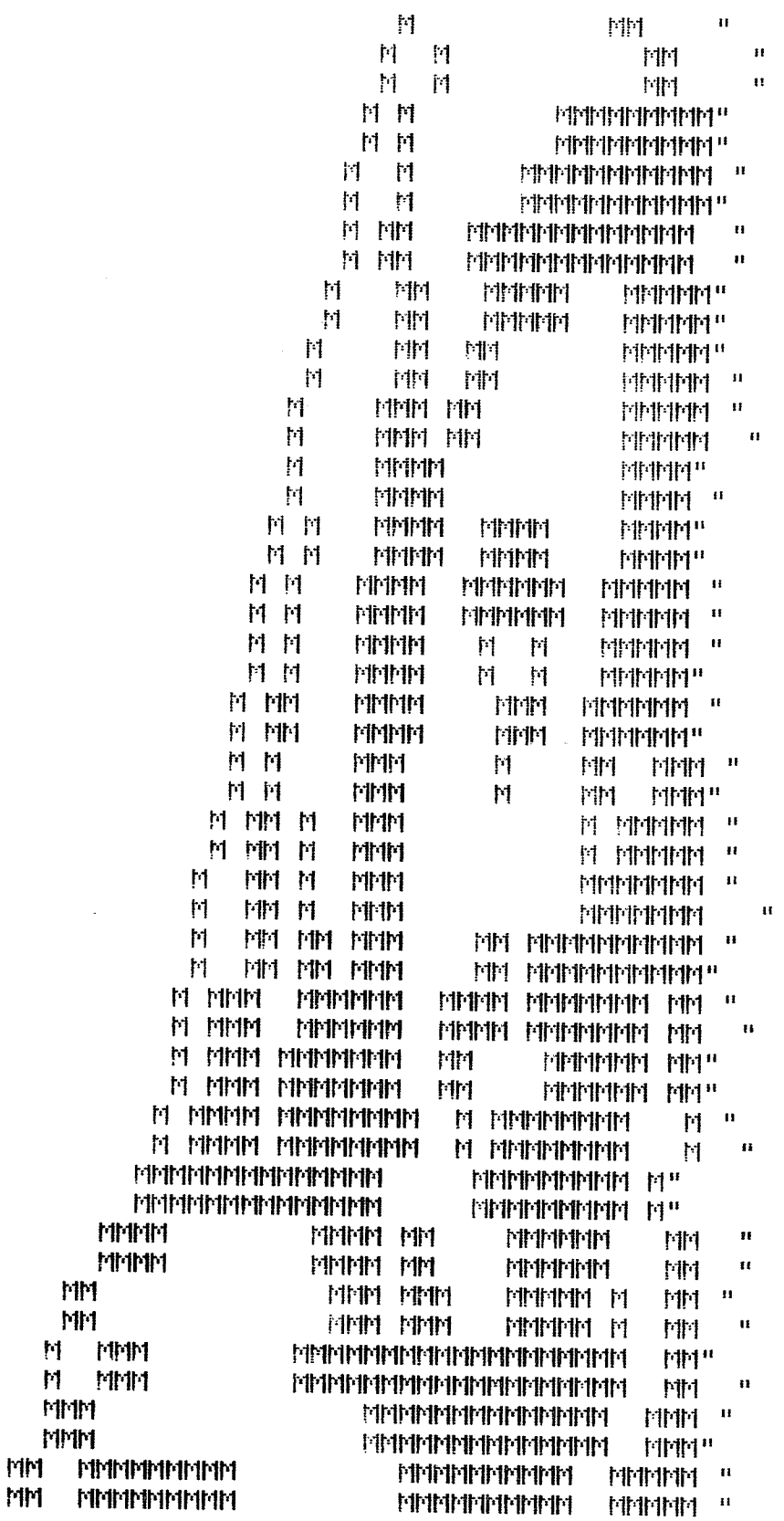
Description

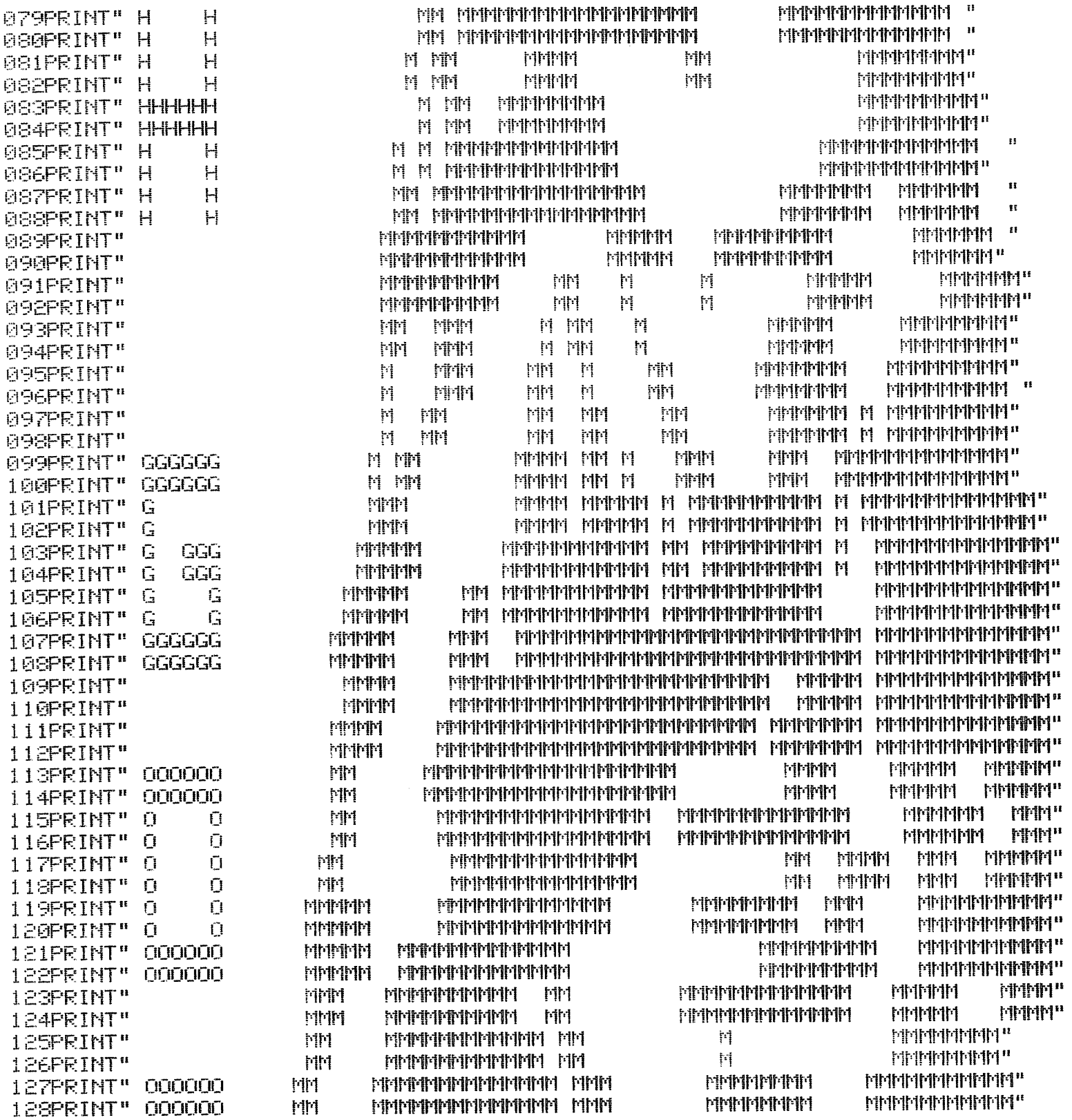
This picture carries a message to all people of the world. Like NOEL NOEL this picture should be observed no closer then six feet. Can you tell what she is doing with her hands? Execution of this program is accomplished in 12K Bytes of memory.

PEACE

```
001 PRINT
002 PRINT
003 PRINT
004 PRINT
005 PRINT
006PRINT
007PRINT
008PRINT
009PRINT
010PRINT
011PRINT"   PPPPPP  EEEEEE      A      CCCCCC  EEEEEE      OOOOOO  N     N"
012PRINT"   PPPPPP  EEEEEE      A      CCCCCC  EEEEEE      OOOOOO  N     N"
013PRINT"   P    P  E          A A     C       E           O    O  NN    N"
014PRINT"   P    P  E          A A     C       E           O    O  NN    N"
015PRINT"   PPPPPP  EEE       A   A    C       EEE         O    O  N N   N"
016PRINT"   PPPPPP  EEE       A   A    C       EEE         O    O  N N   N"
017PRINT"   P       E        AAAAAAA   C       E           O    O  N  N N "
018PRINT"   P       E        AAAAAAA   C       E           O    O  N  N N"
019PRINT"   P       EEEEEE  A       A  CCCCCC  EEEEEE      OOOOOO  N   NN"
020PRINT"   P       EEEEEE  A       A  CCCCCC  EEEEEE      OOOOOO  N   NN"
021PRINT
022PRINT
023PRINT" EEEEEE                                          MMMMMMMM    "
024PRINT" EEEEEE                                          MMMMMMMM   "
025PRINT" E                                             MM        M   "
026PRINT" E                                             MM        M   "
027PRINT" EEE                                          M            MM    "
```

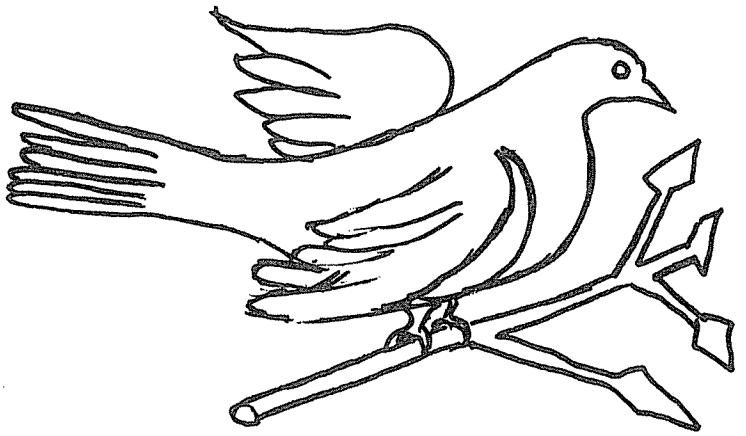
```
028PRINT" EEE
029PRINT" E
030PRINT" E
031PRINT" EEEEEE
032PRINT" EEEEEE
033PRINT"
034PRINT"
035PRINT"
036PRINT"
037PRINT"    A
038PRINT"    A
039PRINT"   A A
040PRINT"   A A
041PRINT"  A   A
042PRINT"  A   A
043PRINT" AAAAAAA
044PRINT" AAAAAAA
045PRINT"A       A
046PRINT"A       A
047PRINT"
048PRINT"
049PRINT"
050PRINT"
051PRINT" RRRRRR
052PRINT" RRRRRR
053PRINT" R    R
054PRINT" R    R
055PRINT" RRRRR
056PRINT" RRRRR
057PRINT" R   R
058PRINT" R   R
059PRINT" R    R
060PRINT" R    R
061PRINT"
062PRINT"
063PRINT"
064PRINT"
065PRINT"TTTTTTT
066PRINT"TTTTTTT
067PRINT"   T
068PRINT"   T
069PRINT"   T
070PRINT"   T
071PRINT"   T
072PRINT"   T
073PRINT"   T
074PRINT"   T
075PRINT"
076PRINT"
077PRINT"
078PRINT"
```





```
129PRINT" O    O      MM    MMMMMMMMMMMMMMMMM MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM   MM"
130PRINT" O    O      MM    MMMMMMMMMMMMMMMMM MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM   MM"
131PRINT" O    O      MM    MMMM MMM MMMMMMMM MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM    MMMM MMM "
132PRINT" O    O      MM    MMMM MMM MMMMMMMM MMMMMMMMMMMMMMMMMMMMMMMMMMMMMMMM    MMMM MMM"
133PRINT" O    O       M     MM    MM  M MMMM  MMMMMMMMM      MMMMMMMMM    MM  MMM  M"
134PRINT" O    O       M     MM    MM  M MMMM  MMMMMMMMM      MMMMMMMMM    MM  MMM  M"
135PRINT" OOOOOO      MM MMMM MMMM MM MMMMMMMMMMMMMM MMMMMMMM         MMM  MMMM MMMM"
136PRINT" OOOOOO      MM MMMM MMMM MM MMMMMMMMMMMMMM MMMMMMMM         MMM  MMMM MMMM"
137PRINT"              M  M M  MMM      MM MM MMMM    MMMM             M   MMM    M"
138PRINT"              M  M M  MMM      MM MM MMMM    MMMM             M   MMM    M"
139PRINT"              M MM    MM       MM  M MMM     MMMMM            M   MMM   MM"
140PRINT"              M MM    MM       MM  M MMM     MMMMM            M   MMM   MM"
141PRINT" DDDDDD        MMMM    MM       MM  M MMM   MM  MM         MMMM   MMMM  "
142PRINT" DDDDDD        MMMM    MM       MM  M MMM   MM  MM         MMMM   MMMM  "
143PRINT" D    D       MMMMMM  MMM      MMMMMMMMMM MMMMMMM       MMMMMM  MMMM   MM"
144PRINT" D    D       MMMMMM  MMM      MMMMMMMMMM MMMMMMM       MMMMMM  MMMM   MM"
145PRINT" D    D          MMM   MM       MMM M MMMMMMMMMM       MMMMMM   MMM   "
146PRINT" D    D          MMM   MM       MMM M MMMMMMMMMM       MMMMMM   MMM  "
147PRINT" D    D        MMM  MM       MMMM  MMMMMM       M    MMMMMMMM   MMM  "
148PRINT" D    D        MMM  MM       MMMM  MMMMMM       M    MMMMMMMM   MMM"
149PRINT" DDDDDD          MM  M         MM    MMMMMMMMMMM    MMMMMMMMM    MM "
150PRINT" DDDDDD          MM  M         MM    MMMMMMMMMMM    MMMMMMMMM    MM"
151PRINT"                  M  M         MM    MMMMMMMMMM    MMMMMMMMMM    M "
152PRINT"                  M  M         MM    MMMMMMMMMM    MMMMMMMMMM    M"
153PRINT"                  M M          MM    MMMMMMMMM     M MMMMM MM    M  "
154PRINT"                  M M          MM    MMMMMMMMM     M MMMMM MM    M"
155PRINT"                  M            MM  MMMMMMMMM  MM  M MMM  M M   M  "
156PRINT"                  M            MM  MMMMMMMMM  MM  M MMM  M M   M "
157PRINT"                  M            MM  MMMMMMMMM MM  M MMM   M M  "
158PRINT"                  M            MM  MMMMMMMMM MM  M MMM   M M  "
159PRINT"                 MM            MM  MMMMMMMMM  MM MMM     MM  "
160PRINT"                 MM            MM  MMMMMMMMM  MM MMM     MM"
161PRINT"                  MM            M  MMMMMMMMM M   MM       M   "
162PRINT"                  MM            M  MMMMMMMMM M   MM       M   "
163PRINT"                   MMMM         M  MM MMM MM     M        M"
164PRINT"                   MMMM         M  MM MMM MM     M        M "
165PRINT"                    MMMM        M  MM MM   M                "
166PRINT"                    MMMM        M  MM MM   M                  "
167PRINT"                     MMMM       M  M  MM   M"
168PRINT"                     MMMM       M  M  MM   M"
169PRINT"                       MMMM        M  M  "
170PRINT"                       MMMM        M  M  "
171PRINT
172PRINT"W      W  III  L        L       TTTTT  OOOOO     M     M  EEEEE  N     N"
173PRINT"W      W  III  L        L       TTTTT  OOOOO     M     M  EEEEE  N     N"
174PRINT"W  W   W   I   L        L         T    O   O     MM   MM  E      NN    N"
175PRINT"W  W   W   I   L        L         T    O   O     MM   MM  E      NN    N"
176PRINT"W W W W   I   L        L         T    O   O     M M M M  EEE    N N   N"
177PRINT"W W W W   I   L        L         T    O   O     M M M M  EEE    N N   N"
178PRINT"WW   WW   I   L        L         T    O   O     M  M  M  E      N  N  N"
179PRINT"WW   WW   I   L        L         T    O   O     M  M  M  E      N  N  N"
```

```
180PRINT"W     W  III  LLLLLL  LLLLLL    T    OOOOO     M     M  EEEEE  N    NN"
181PRINT"W     W  III  LLLLLL  LLLLLL    T    OOOOO     M     M  EEEEE  N    NN"
182PRINT
183PRINT"              MERRY  CHRISTMAS  AND  A  HAPPY  NEW  YEAR"
184PRINT
185PRINT
186PRINT
187PRINT
188PRINT
189PRINT
190 END
```



POLICEMAN

Description

The name gives this picture away as our first line of defense against crime is pictured here. This picture is relatively easy to implement on a very small computer system as it can be executed in only 3K Bytes of memory.

POLICEMAN

```
001 FOR I=1 TO 10
002 PRINT
003 NEXT I
10 REM
11PRINT"                    XXXXXX "
12PRINT"                  XXXXXXXXXXXXXXXX  "
13PRINT"                 XXXXXXXXXXXXXXXXXX  "
14PRINT"                XXXXXXXXXXXXXXXXXXXX "
15PRINT"               XXXXXXXXXXXXXXXXXXXXXX   "
16PRINT"              XXXXXXXXXXXXXXXXXXXXXXXX  "
17PRINT"            XXXXXX  XXXX XXXXXXXXXXXXXX  "
18PRINT"          XXXXXXXX XXX XXXXXXXXXXXXXXXX  "
19PRINT"          XXXXXXXX XXXX XXXXXXXXXXXXXXXX"
20PRINT"          XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX   "
21PRINT"          XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX  "
22PRINT"          XXXXXXXXXXXXXXXXXXXXXXXXXXXXXX "
23PRINT"          XXXXXXXXX       XXXXXXXXX/XXXX"
24PRINT"          XXXXXX/  //XXXXXXXXXXXXXX/XXXX  "
25PRINT"          XXXXX/  //XXXXXXXXXXXXX/XXXX   "
26PRINT"           XXXX /XXXXXXXXX-------/XXXXX   "
27PRINT"             XX XXXXXX-//XXXXXXXXXXXXX  "
28PRINT"              XXX-----/XXXXXXXXXXXXXXX  "
29PRINT"              X XXXXXXXXXXXXXXXXXXXX X  "
30PRINT"              XX XXXXXXXXXXXXXXXXXX/XX  "
31PRINT"                XXXXXX XX  XXXXXXX//XX    "
32PRINT"                X  -XXX XX  XXXXXXX/  X   "
```

```
33PRINT"                    X /-XXX XXXX     XXXXX X    "
34PRINT"                    X   /X  XXXXX    XXXXX X    "
35PRINT"                    X       XX       XXXXXXX   "
36PRINT"                    X         XX     XXXXXXX    "
37PRINT"                     X    XXXXXX    XXXXXXXX     "
38PRINT"                     X       XXXX   XXXXXXX     "
39PRINT"                     X      X XXXXXXXXXXX   "
40PRINT"                      X     --XXXXXXXXXXXX "
41PRINT"                      X     --XXX XXXXXXXX"
42PRINT"                      X     XXXXX XXXXXXX"
43PRINT"                       X    XXXXXXXXXXXXX   "
44PRINT"                       X      XXXXXXXXXXX   "
45PRINT"                        X       / XXXXXXXX "
46PRINT"                          X       XXXXXXX/XX "
47PRINT"                          X   ---XXXXXXX/MMMX"
48PRINT"                           X     XXXXX/MMMMX   "
49PRINT"                           X ---  XXXX/MMMM/"
50PRINT"                           X     XXX/MMMMM/ "
51PRINT"                           X     XX/MMMMMM   "
52PRINT"                           X     X/MMMMMM/     "
53PRINT"                           XXX   /MMMMMM/"
54PRINT"                           XXXX/MMMMMMMM   "
55 FOR I=1 TO 5
56 PRINT
57 NEXT I
58 END
```

SANTA'S SLEIGH

Description

This is one of the most decorative banner type pictures presented in this volume. The finished picture is seven feet long and depicts the lighter side of the Xmas season. Once your friends see this one they will all want one. This is the largest program contained in these volumes, requiring 27K Bytes of memory for storage and execution. The extreme length of this program may make it restrictive for systems with less then 32K Bytes of on line memory.

```
SANTA'S SLEIGH


001 PRINT
002 PRINT
003 PRINT
004 PRINT
005 PRINT
006 PRINT
007 PRINT
008 PRINT
009 PRINT
010 PRINT
011 PRINT
012 PRINT
013 PRINT
014 PRINT
015 PRINT
021PRINT"                    DD  "
022PRINT"                  D  D    "
023PRINT"                  D    DO"
024PRINT"                  D   D  D    "
025PRINT"                   D @    DD     "
026PRINT"                   00       D    0000     "
```

```
027PRINT"                                D       9  0  00    0    "
028PRINT"          MMM                  D       9 D0000      0     "
029PRINT"        MMMMM         00MMM D          D000          "
030PRINT"       MM   MM      M00               D   00          0"
031PRINT"      MM      MM    M 00              D      000        60 "
032PRINT"     MM       MMM M  00           D         000     00  "
033PRINT"    MM         MMM   00           D           00000   "
034PRINT"       MMMMMMMMM      00          D                    "
035PRINT"     MMMMMMMMMM       00         D"
036PRINT"    MMM          D     00       D     "
037PRINT"    MM          D      00      D    "
038PRINT"    MM          D      00      D     "
039PRINT"    MM         000000000000000000    "
040PRINT"     MM        00000000000000000      "
041PRINT"               D       00    0D          "
042PRINT"               D       00 0  D       "
043PRINT"M              D       000   D        "
044PRINT"MM             D       000   D        "
045PRINT" MM            D       00      D       "
046PRINT"  MMMM          D      00      D       "
047PRINT"M  MMMM       MMMMM   00       D     "
048PRINT"MM    MMMMM            00       D   "
049PRINT" MM      MM           000       D    "
050PRINT"  MMMMMMM             000      D     "
051PRINT"   MMMMMMMMM       0 00      D   "
052PRINT"              MMD 0    00    DD        "
053PRINT"                 D0    00DD DD        "
054PRINT"                   DD 00     DDD         "
055PRINT"                      00                  "
056PRINT"                      00                        "
057PRINT"                      00                                MMMMMMMMMMMMMMMMMMMMMM"
058PRINT"                      00                                MMMMMMMMMMMMMMMMMMMMMM"
059PRINT"                      00                                MMMMMMMMMMMMMMMMMMMM  "
060PRINT"                      00                                          MMMM"
061PRINT"                      00                                        MMMM "
062PRINT"                      00                                         MMM  "
063PRINT"                      00                                           MMM"
064PRINT"                      00                                MMMMMMMMMMMMMMMMMMMM  "
065PRINT"                      00     DD                         MMMMMMMMMMMMMMMMMMMMM"
066PRINT"                      00    D  D                        MMMMMMMMMMMMMMMMMMMMMM"
067PRINT"                      00   D    DO       "
068PRINT"                      00    D   D  D          "
069PRINT"                      00     D 0    DD                 EEEEEEEEEEEEEEEEEEEE"
070PRINT"                      00     00       D    0000       EEEEEEEEEEEEEEEEEEEE"
071PRINT"                      00     D       9  0  00   0      EEEEEEEEEEEEEEEEEEEE"
072PRINT"          MMM         00    D        9 D0000     0     EEEE     EEEE   EEEE"
073PRINT"        MMMMM         00MMM D          D000            EEEE     EEEE   EEEE"
074PRINT"       MM   MM      M00               D   00         0EEEE     EEEE   EEEE"
075PRINT"      MM      MM    M 00              D      000      60EEEE     EEEE   EEEE"
076PRINT"     MM       MMM M  00           D         000    00 EEEE            EEEE"
077PRINT"    MM         MMM   00           D           00000   EEEE     "
```

```
078PRINT"       MMMMMMMM      @@          D      "
079PRINT"     MMMMMMMMMM      @@        D          "
080PRINT"    MMM          D    @@       D                                  RRRRRRRRRRRRRRRRRRR"
081PRINT"    MM          D     @@      D                                   RRRRRRRRRRRRRRRRRRR"
082PRINT"    MM          D     @@      D                                   RRRRRRRRRRRRRRRRRRR"
083PRINT"    MM        @@@@@@@@@@@@@@@@                                        RRRR      RRRR"
084PRINT"     MM       @@@@@@@@@@@@@@@@                                        RRRR      RRRR"
085PRINT"              D       @@   @D                                      RRRRRR      RRRR"
086PRINT"              D       @@ @  D                                    RRRRRRRRR    RRRRR"
087PRINT"M             D       @@@   D                                   RRRRRRRRRRRRRRRRRR"
088PRINT"MM            D       @@@   D                                   RRRR       RRRRRRRR "
089PRINT" MM           D       @@     D    "
090PRINT"  MMMM        D       @@     D    "
091PRINT"M  MMMM      MMMMM    @@       D                                RRRRRRRRRRRRRRRRRRR"
092PRINT"MM    MMMMM          @@       D                                 RRRRRRRRRRRRRRRRRR"
093PRINT" MM      MM          @@@      D                                 RRRRRRRRRRRRRRRRRR"
094PRINT"  MMMMMMM           @@@      D                                      RRRR      RRRR"
095PRINT"   MMMMMMMMM      @ @@      D                                      RRRR      RRRR"
096PRINT"             MMD @   @@   DD                                     RRRRRR      RRRR"
097PRINT"                DD   @@DD DD                                    RRRRRRRRR    RRRRR"
098PRINT"                  DD @@    DDD                                 RRRRRRRRRRRRRRRRRR"
099PRINT"                     @@                                        RRRR       RRRRRRRR "
100PRINT"                     @@ "
101PRINT"                     @@   "
102PRINT"                     @@                                                      YYY"
103PRINT"                     @@                                                    YYYYY"
104PRINT"                     @@                                                  YYYYY"
105PRINT"                     @@                                        YYYYYYYYYYYYYYYY  "
106PRINT"                     @@                                        YYYYYYYYYYYYY  "
107PRINT"                     @@                                        YYYYYYYYYYYYYYYY"
108PRINT"                     @@                                                  YYYYY  "
109PRINT"                     @@                                                   YYYYY"
110PRINT"                     @@     DD                                              YYY"
111PRINT"                     @@   D  D      "
112PRINT"                     @@  D    DO     "
113PRINT"                     @@   D   D  D  "
114PRINT"                     @@    D @    DD    "
115PRINT"                     @@    @@       D    @@@@  "
116PRINT"                     @@    D       9  @  @@   @"
117PRINT"        MMM          @@   D       9 D@@@@     @   "
118PRINT"       MMMMM         @@MMM D        D@@@                "
119PRINT"      MM   MM      M@@             D   @@          @ "
120PRINT"     MM     MM   M @@            D     @@@       @@"
121PRINT"    MM       MMM M  @@          D        @@@    @@"
122PRINT"   MM         MMM   @@          D           @@@@     CCCCCCCCCCCCCCCC"
123PRINT"      MMMMMMMM      @@         D                    CCCCCCCCCCCCCCCCCC"
124PRINT"    MMMMMMMMMM      @@        D                   CCCCCCCCCCCCCCCCCCCC"
125PRINT"   MMM         D    @@       D                   CCCCC           CCCCC"
126PRINT"   MM         D     @@      D                    CCCC             CCCC"
127PRINT"   MM         D     @@      D                    CCCC             CCCC"
128PRINT"   MM       @@@@@@@@@@@@@@@@                     CCCC             CCCC"
```

```
129PRINT"     MM        0000000000000000                                  CCCC            CCCC"
130PRINT"               D       00    0D                                  CCCC          CCCC"
131PRINT"               D       00 0  D      "
132PRINT"M              D       000    D     "
133PRINT"MM             D       000    D                                HHHHHHHHHHHHHHHHHHHH"
134PRINT" MM            D       00      D                               HHHHHHHHHHHHHHHHHHHH"
135PRINT"   MMMM         D      00      D                               HHHHHHHHHHHHHHHHHHHH"
136PRINT"M  MMMM       MMMMM   00       D                                      HHHH"
137PRINT"MM     MMMMM           00       D                                     HHHH"
138PRINT" MM      MM          000       D                                     HHHH"
139PRINT"  MMMMMMM            000      D                                HHHHHHHHHHHHHHHHHHHH"
140PRINT"    MMMMMMMMM      0 00      D                                 HHHHHHHHHHHHHHHHHHHH"
141PRINT"              MMD 0    00    DD                                HHHHHHHHHHHHHHHHHHHH"
142PRINT"                 D0    00DD DD    "
143PRINT"                   DD 00     DDD                 "
144PRINT"                      00                                      RRRRRRRRRRRRRRRRRRRR"
145PRINT"                      00                                      RRRRRRRRRRRRRRRRRRRR"
146PRINT"                      00                                      RRRRRRRRRRRRRRRRRRRR"
147PRINT"                      00                                            RRRR      RRRR"
148PRINT"                      00                                            RRRR      RRRR"
149PRINT"                      00                                          RRRRRR      RRRR"
150PRINT"                      00                                       RRRRRRRRR    RRRRR"
151PRINT"                      00                                      RRRRRRRRRRRRRRRRRR"
152PRINT"                      00                                      RRRR       RRRRRRRR "
153PRINT"                      00                  "
154PRINT"                      00                  "
155PRINT"                      00     DD                               II                  II"
156PRINT"                      00    D  D                              IIIIIIIIIIIIIIIIIII"
157PRINT"                      00   D    DO                           IIIIIIIIIIIIIIIIIII"
158PRINT"                      00    D   D  D                          IIIIIIIIIIIIIIIIIII"
159PRINT"                      00     D 0    DD                        II                  II"
160PRINT"                      00     00       D    0000       "
161PRINT"                      00     D       9  0  00    0 "
162PRINT"          MMM         00    D        9 D0000      0       SSSS       SSSSSS"
163PRINT"        MMMMM         00MMM D          D000              SSSS      SSSSSSSS"
164PRINT"       MM   MM       M00              D   00           0SSSS      SSSSSSSSS"
165PRINT"      MM     MM    M 00               D     000       60SSSS     SSSS  SSSSS"
166PRINT"     MM      MMM M  00                 D       000     00 SSSS    SSSS    SSSS"
167PRINT"    MM        MMM   00                 D          00000   SSSS   SSSS     SSSS"
168PRINT"       MMMMMMMM     00                D                  SSSSS SSSS      SSSS"
169PRINT"     MMMMMMMMMM     00               D                    SSSSSSS       SSSS"
170PRINT"    MMM         D    00              D                     SSSSSS  "
171PRINT"    MM         D     00             D       "
172PRINT"    MM         D     00             D       "
173PRINT"    MM        0000000000000000                                                TTTT"
174PRINT"     MM       0000000000000000                                                TTTT"
175PRINT"              D       00    0D                                               TTTT"
176PRINT"              D       00 0  D                                 TTTTTTTTTTTTTTTTTTTT"
177PRINT"M             D       000    D                                TTTTTTTTTTTTTTTTTTTT"
178PRINT"MM            D       000    D                                TTTTTTTTTTTTTTTTTTTT"
179PRINT" MM           D       00      D                                              TTTT"
```

```
180PRINT"  MMMM         D      00      D                                                    TTTT"
181PRINT"M  MMMM      MMMMM  00       D                                                    TTTT"
182PRINT"MM    MMMMM          00       D      "
183PRINT" MM      MM          000       D      "
184PRINT"  MMMMMMM            900      D                                  MMMMMMMMMMMMMMMMMMMM"
185PRINT"   MMMMMMMMM      0 00      D                                   MMMMMMMMMMMMMMMMMMMM"
186PRINT"             MMD 0    00    DD                                  MMMMMMMMMMMMMMMMMMM"
187PRINT"                D0    00DD DD                                          MMMM"
188PRINT"                  DD 00     DDD                                      MMMM"
189PRINT"                     00                                           MMMM"
190PRINT"                     00                                            MMMM"
191PRINT"                     00                                             MMMM  "
192PRINT"                     00                                  MMMMMMMMMMMMMMMMMM "
193PRINT"                     00                                  MMMMMMMMMMMMMMMMMM"
194PRINT"                     00                                  MMMMMMMMMMMMMMMMMM"
195PRINT"                     00       "
196PRINT"                     00          "
197PRINT"                     00                                  AAAAAAAAAAAAAAAAAAA"
198PRINT"                     00                                  AAAAAAAAAAAAAAAAAAA"
199PRINT"                     00                                  AAAAAAAAAAAAAAAAAAA"
200PRINT"                     00     DD                                 AAAA        AAAA"
201PRINT"                     00    D  0                                AAAA        AAAA"
202PRINT"                     00   D    DO                             AAAA        AAAA"
203PRINT"                     00    D   D  D                           AAAAAAAAAAAAAAAAAAA"
204PRINT"                     00     D 0    DD                         AAAAAAAAAAAAAAAAAAA"
205PRINT"                     00     00       D    0000               AAAAAAAAAAAAAAAAAA"
206PRINT"                     00     D       9  0  00   0"
207PRINT"         MMM         00    D       9 D0000     0    "
208PRINT"        MMMMM        00MMM D         D000            SSSS      SSSSSS"
209PRINT"       MM   MM      M00              D   00          9 SSSS     SSSSSSS"
210PRINT"      MM      MM   M 00             D     000       60SSSS     SSSSSSSSS"
211PRINT"     MM       MMM M  00           D        900    00 SSSS     SSSS  SSSSS"
212PRINT"    MM         MMM   00           D          00000   SSSS    SSSS    SSSS"
213PRINT"       MMMMMMM      00          D                    SSSS   SSSS     SSSS"
214PRINT"     MMMMMMMMM      00         D                     SSSS SSSS       SSSS"
215PRINT"    MMM          D   00       D                      SSSSSSS       SSSS"
216PRINT"    MM          D    00      D                       SSSSS    "
217PRINT"    MM          D    90      D "
218PRINT"    MM        000000000000000000  "
219PRINT"     MM       00000000000000000"
220PRINT"              D       00   0D    "
221PRINT"              D       00 0  D    "
222PRINT"M             D       000   D    "
223PRINT"MM            D       000   D    "
224PRINT" MM           D       00      D    "
225PRINT"  MMMM         D      00      D    "
226PRINT"M  MMMM      MMMMM  00       D  "
227PRINT"MM    MMMMM          90       D  "
228PRINT" MM      MM          000       D                                  AAAAAAAAAAAAAAAAAAA"
229PRINT"  MMMMMMM            000      D                                   AAAAAAAAAAAAAAAAAAA"
230PRINT"   MMMMMMMMM      0 00      D                                    AAAAAAAAAAAAAAAAAAA"
```

```
231PRINT"              MMD 0    00    DD                                    AAAA          AAAA"
232PRINT"                 D0    00DD  DD                                    AAAA          AAAA"
233PRINT"                   DD  00     DDD                                  AAAA          AAAA"
234PRINT"                       00                                       AAAAAAAAAAAAAAAAAAAAA"
235PRINT"                       00                                       AAAAAAAAAAAAAAAAAAAAA"
236PRINT"                       00                                       AAAAAAAAAAAAAAAAAAAA"
237PRINT"                       00          "
238PRINT"                       00          "
239PRINT"                       00                                       NNNNNNNNNNNNNNNNNNNNN"
240PRINT"                       00                                       NNNNNNNNNNNNNNNNNNNNN"
241PRINT"                       00                                       NNNNNNNNNNNNNNNNNNNNN"
242PRINT"                       00                                            NNNN  "
243PRINT"                       00                                          NNNN  "
244PRINT"                       00                                        NNNN    "
245PRINT"                       00     DD                                NNNNNNNNNNNNNNNNNNNNN"
246PRINT"                       00    D  D                               NNNNNNNNNNNNNNNNNNNNN"
247PRINT"                       00   D    DO                             NNNNNNNNNNNNNNNNNNNNN"
248PRINT"                       00    D    D  D    "
249PRINT"                       00     D 0    DD   "
250PRINT"                       00     00       D     0000              DDDDDDDDDDDDDDDDDDDD"
251PRINT"                       00     D       9  0  00    0             DDDDDDDDDDDDDDDDDDDD"
252PRINT"         MMM           00    D        9 D0000      0            DDDDDDDDDDDDDDDDDDDD"
253PRINT"        MMMMM          00MMM D          D000                    DDDD                DDDD"
254PRINT"       MM   MM       M00                D   00                0DDDD                DDDD"
255PRINT"      MM      MM    M 00                D      000          60DDDD                DDDD"
256PRINT"     MM       MMM M  00                  D         000     00 DDDDD              7DDDD"
257PRINT"    MM         MMM   00                  D            00000     DDDDDDDDDDDDDDDDDDD"
258PRINT"       MMMMMMMM      00                 D                       DDDDDDDDDDDDDDDDD  "
259PRINT"     MMMMMMMMMM      00                D    "
260PRINT"    MMM          D   00               D    "
261PRINT"    MM          D    00              D  "
262PRINT"    MM         00000000000000000000"
263PRINT"     MM        0000000000000000"
264PRINT"               D       00    0D   "
265PRINT"               D       00 0  D   "
266PRINT"M              D       000   D   "
267PRINT"MM             D       000   D  "
268PRINT" MM            D       00      D  "
269PRINT"  MMMM         D       00      D                                HHHHHHHHHHHHHHHHHHHHH"
270PRINT"M  MMMM      MMMMM     00       D                               HHHHHHHHHHHHHHHHHHHHH"
271PRINT"MM    MMMMM           00       D                               HHHHHHHHHHHHHHHHHHHHH"
272PRINT" MM      MM          000       D                                    HHHH  "
273PRINT"  MMMMMMM           000      D                                     HHHH  "
274PRINT"   MMMMMMMMM      0 00      D                                      HHHH"
275PRINT"              MMD 0    00    DD                                   HHHHHHHHHHHHHHHHHHHHH"
276PRINT"                 D0    00DD  DD                                   HHHHHHHHHHHHHHHHHHHHH"
277PRINT"                   DD  00     DDD                                 HHHHHHHHHHHHHHHHHHHHH"
278PRINT"                       00                  "
279PRINT"                       00                    "
280PRINT"                       00                                       AAAAAAAAAAAAAAAAAAAA"
281PRINT"                       00                                       AAAAAAAAAAAAAAAAAAAA"
```

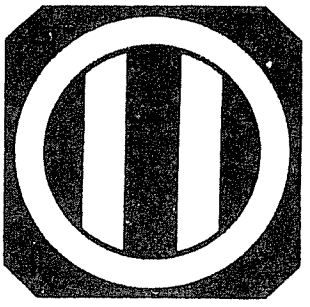
```
282PRINT"                    00                                  AAAAAAAAAAAAAAAAAAAA"
283PRINT"                    00                                       AAAA        AAAA"
284PRINT"                    00                                       AAAA        AAAA"
285PRINT"                    00                                       AAAA        AAAA"
286PRINT"                    00                                  AAAAAAAAAAAAAAAAAAAA"
287PRINT"                    00                                  AAAAAAAAAAAAAAAAAAAA"
288PRINT"                    00                                  AAAAAAAAAAAAAAAAAAAA"
289PRINT"                    00     DD            "
290PRINT"                    00    D  D           "
291PRINT"                    00   D     DO                      PPPPPPPPPPPPPPPPPPPP"
292PRINT"                    00    D    D  D                    PPPPPPPPPPPPPPPPPPPP"
293PRINT"                    00     D 0     DD                  PPPPPPPPPPPPPPPPPPPP"
294PRINT"                    00     00        D     0000              PPPP      PPPP"
295PRINT"                    00     D        9  0  00   0              PPPP      PPPP"
296PRINT"          MMM       00    D        9 00000      0             PPPP      PPPP"
297PRINT"        MMMMM       00MMM D          D000                     PPPPP   PPPPP"
298PRINT"       MM   MM      M00               D   00          0         PPPPPPPPPP"
299PRINT"      MM      MM   M 00      .        D     000       50         PPPPPPPP"
300PRINT"     MM       MMM M  00           D         000    00   "
301PRINT"    MM         MMM   00           D           00000  "
302PRINT"       MMMMMMMM      00          D                          PPPPPPPPPPPPPPPPPPPP"
303PRINT"     MMMMMMMMM      00         D                           PPPPPPPPPPPPPPPPPPPP"
304PRINT"    MMM          D   00        D                           PPPPPPPPPPPPPPPPPPPP"
305PRINT"    MM          D    00       D                                 PPPP      PPPP"
306PRINT"    MM          D    00       D                                 PPPP      PPPP"
307PRINT"    MM        000000000000000000                               PPPP      PPPP"
308PRINT"     MM       000000000000000000                               PPPPP   PPPPP"
309PRINT"              D       00   0M                                   PPPPPPPPPP"
310PRINT"              D       00 0  D                                    PPPPPPPP"
311PRINT"M             D       000   D       "
312PRINT"MM            D       000   D       "
313PRINT" MM           D       00     D                                        YYY"
314PRINT"  MMMM        D       00     D                                      YYYYY"
315PRINT"M  MMMM      MMMMM   00      D                                    YYYY "
316PRINT"MM    MMMMM          00      D                          YYYYYYYYYYYYYYY"
317PRINT" MM      MM          000     D                          YYYYYYYYYYYYY"
318PRINT"  MMMMMMM            000     D                          YYYYYYYYYYYYYY  "
319PRINT"   MMMMMMMMM       0 00     D                                YYYYY"
320PRINT"             MMD 0    00    DD                                 YYYYY"
321PRINT"                D0    00DD  DD                                   YYY"
322PRINT"                  DD 00     DDD    "
323PRINT"                     00       "
324PRINT"                     00       "
325PRINT"                     00       "
326PRINT"                     00      "
327PRINT"                     00      "
328PRINT"                     00        "
329PRINT"                     00        "
330PRINT"                     00       "
331PRINT"                     00     "
332PRINT"                     00       "
```

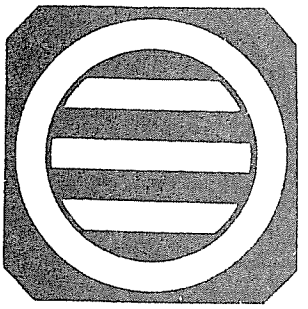
```
333PRINT"                    00                             NNNNNNNNNNNNNNNNNNNN"
334PRINT"                    00    DD                       NNNNNNNNNNNNNNNNNNNN"
335PRINT"                    00   D  D                      NNNNNNNNNNNNNNNNNNNN"
336PRINT"                    00  D    DO                              NNNN "
337PRINT"                    00   D   D  D                          NNNN  "
338PRINT"                    00    D 0    DD                      NNNN   "
339PRINT"                    00    00       D     0000      NNNNNNNNNNNNNNNNNNNN"
340PRINT"                    00    D      9  0  00    0     NNNNNNNNNNNNNNNNNNNN"
341PRINT"         MMM        00   D       9 D0000      0    NNNNNNNNNNNNNNNNNNNN"
342PRINT"        MMMMM       00MMM D        D000     "
343PRINT"       MM   MM     M00            D   00          0      "
344PRINT"      MM     MM   M 00           D     000       60EEEEEEEEEEEEEEEEEEEE"
345PRINT"     MM      MMM M  00         D        000     00 EEEEEEEEEEEEEEEEEEEE"
346PRINT"    MM        MMM   00         D           00000   EEEEEEEEEEEEEEEEEEEE"
347PRINT"       MMMMMMMM     00        D                    EEEE     EEEE   EEEE"
348PRINT"     MMMMMMMMMM     00       D                     EEEE     EEEE   EEEE"
349PRINT"    MMM        D    00      D                      EEEE     EEEE   EEEE"
350PRINT"    MM        D     00     D                       EEEE     EEEE   EEEE"
351PRINT"    MM        D     00     D                       EEEE            EEEE"
352PRINT"    MM       0000000000000000                      EEEE  "
353PRINT"     MM      000000000000000   "
354PRINT"             D      00   0D      "
355PRINT"             D      00 0  D                                 WWWWWWWWWWWW"
356PRINT"M            D      000   D                              WWWWWWWWWWWWWWW"
357PRINT"MM           D      000   D                           WWWWWWWWWWWWWWWWWW"
358PRINT" MM          D      00     D                       WWWWW   "
359PRINT"  MMMM        D     00     D                         WWWWW   "
360PRINT"M  MMMM      MMMMM  00      D                          WWWWW   "
361PRINT"MM     MMMMM        00      D                        WWWWW"
362PRINT" MM      MM        000      D                      WWWWW   "
363PRINT"  MMMMMMM          000     D                          WWWWWWWWWWWWWWWWWW"
364PRINT"   MMMMMMMMM      0 00     D                             WWWWWWWWWWWWWWW"
365PRINT"            MMD 0   00   DD                                 WWWWWWWWWWWW"
366PRINT"               D0   00DD DD          "
367PRINT"                 DD 00    DDD        "
368PRINT"                    00             "
369PRINT"                    00                "
370PRINT"                    00               "
371PRINT"                    00              "
372PRINT"                    00                "
373PRINT"                    00                 "
374PRINT"                    00                 "
375PRINT"                    00                "
376PRINT"                    00                "
377PRINT"                    00                                               YYY"
378PRINT"                    00                                             YYYYY"
379PRINT"                    00    DD                                     YYYYY"
380PRINT"                    00   D  D                      YYYYYYYYYYYYYYYY    "
381PRINT"                    00  D    DO                    YYYYYYYYYYYYYYY"
382PRINT"                    00   D    D  D                 YYYYYYYYYYYYYYYYY"
383PRINT"                    00    D 0    DD                              YYYYY"
```

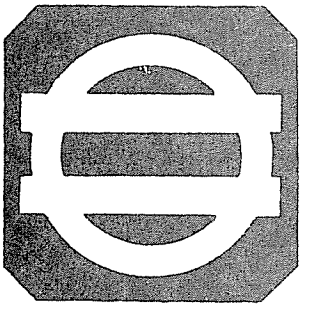
```
384PRINT"                        00     00        D     0000                              YYYYY"
385PRINT"                        00     D       9  0  00    0                             YYY"
386PRINT"          MMM           00    D        9 D0000      0 "
387PRINT"        MMMMM           00MMM D          D000         "
388PRINT"       MM    MM       M00                D    09           0EEEEEEEEEEEEEEEEEEEEE"
389PRINT"      MM      MM    M 00                 D      000       60EEEEEEEEEEEEEEEEEEEEE"
390PRINT"     MM       MMM M  00                    D         000     00 EEEEEEEEEEEEEEEEEEEE"
391PRINT"    MM         MMM   00                    D            00000    EEEE      EEEE    EEEE"
392PRINT"       MMMMMMMM      00                  D                       EEEE      EEEE    EEEE"
393PRINT"     MMMMMMMMMM      00                D                         EEEE      EEEE    EEEE"
394PRINT"    MMM          D    00              D                          EEEE      EEEE    EEEE"
395PRINT"    MM          D     00            D                           EEEE                EEEE"
396PRINT"    MM          D     00            D                           EEEE    "
397PRINT"    MM         0000000000000000000   "
398PRINT"     MM        000000000000000000      "
399PRINT"               D       00   0D                                  AAAAAAAAAAAAAAAAAAAA"
400PRINT"               D       00 0  D                                  AAAAAAAAAAAAAAAAAAAA"
401PRINT"M              D       000   D                                  AAAAAAAAAAAAAAAAAAAA"
402PRINT"MM             D       000   D                                        AAAA        AAAA"
403PRINT" MM            D       00     D                                     AAAA        AAAA"
404PRINT"  MMMM         D      00      D                                     AAAA        AAAA"
405PRINT"M  MMM        MMMMM  00       D                                  AAAAAAAAAAAAAAAAAAAA"
406PRINT"MM     MMMMM          00       D                                 AAAAAAAAAAAAAAAAAAAA"
407PRINT" MM      MM          900       D                                 AAAAAAAAAAAAAAAAAAAA"
408PRINT"  MMMMMMM            000      D          "
409PRINT"    MMMMMMMM      0 00      D             "
410PRINT"              MMD 0   00    DD                                   RRRRRRRRRRRRRRRRRRRR"
411PRINT"                 D0   00DD DD                                    RRRRRRRRRRRRRRRRRRRR"
412PRINT"                   DD 00     DDD                                 RRRRRRRRRRRRRRRRRRRR"
413PRINT"                      00                                              PRRR      RRRR"
414PRINT"                      00                                              RRRR      RRRR"
415PRINT"                      00                                           RRRRRR       RRRR"
416PRINT"                      00                                        RRRRRRRRR     RRRRR"
417PRINT"                      00                                      RRRRRRRRRRRRRRRRRRRR"
418PRINT"                      00                                      RRRR       RRRRRRRR"
419PRINT"                      00    "
420PRINT"                      00    "
421PRINT"          NNNNNNM    OO   "
422PRINT"        NN         NNNOO    "
423PRINT"      NN             NN   "
424PRINT"     N N               NN    "
425PRINT"   NM  M                 NNX  "
426PRINT" N    M                   N X  X  "
427PRINT"M    M                     N  X  X "
428PRINT"M    M                       N   X X "
429PRINT"M    M                ZZZZ     N     X X"
430PRINT"N    M              ZZ     Z    Z       XX    "
431PRINT"M    M            Z         Z   Z       XXX  "
432PRINT"M    M          Z           Z   Z        X  X    "
433PRINT"M    M          Z      ZZZZ     Z      XX  X    "
434PRINT"M    M          Z     Z    Z   Z      XXXXXX     "
```

```
435PRINT"M   M          Z    Z     Z XXX  X    XX      "
436PRINT"M   M           Z     ZZZZZXX    XX     XX       "
437PRINT"M   M            Z    X  X  X     X     XX     "
438PRINT"M   M             Z   X  X  X     X     XXX    "
439PRINT"M   M              Z  X  X  X     XX      X   "
440PRINT"M   M               ZX  X  X       XXX    X X X XX  X "
441PRINT"M   M               ZX  X               X  X X  XX              "
442PRINT"M   M                ZZ     XX            X XXXXXXXXX       "
443PRINT"M   M                  Z      XXXXX      XXXXX              "
444PRINT"M   M                   Z                XXX   X       X     "
445PRINT"M   M                   Z  000 XXXXX             XXXXX        "
446PRINT"M   M                   Z     0000               XXX         "
447PRINT"M   M                    Z         00            0          "
448PRINT"M   M                    Z           000                     "
449PRINT"M   M                     Z             00                    "
450PRINT"M   M                    Z                000       //       "
451PRINT"M   M                   Z                    00    /         "
452PRINT"M   M                  Z                       0 /           "
453PRINT"M   M                  Z                       0/            "
454PRINT"M   M                 Z                       /     /        "
455PRINT"M   M                 Z                      //             "
456PRINT"M   M                ZZ                   //////       /      "
457PRINT"M   M                ZZ                     /          /      "
458PRINT"M   M               Z                       /          /        "
459PRINT"M   M               Z                       /          /       "
460PRINT"M   M               Z                        ///               "
461PRINT"M   M              Z                           //      "
462PRINT"M   M              Z                             //     "
463PRINT"M   M               Z                             0/   "
464PRINT"M   M               Z                            00 /    "
465PRINT"M   M                Z                           0   /   "
466PRINT"M   M                Z                         0   "
467PRINT"M   M ZZ               Z                      00    "
468PRINT"M   M  ZZZZ            ZZ                   00   "
469PRINT"M   M  M    ZZ           Z                 00    "
470PRINT"M   M  M      ZZZ      ZZZ              000"
471PRINT"M   M  M         ZZ       Z          0000  "
472PRINT"M   M  M           Z      Z      0000"
473PRINT"M   M  M            Z       Z 000  "
474PRINT"M   M  M              Z      Z "
475PRINT"M  M  M               Z      ZZ    "
476PRINT"M MM M                  ZZ    Z  "
477PRINT"MM MM                     ZZZ  "
478PRINT
479PRINT
480PRINT
481PRINT
482PRINT
483PRINT
484PRINT
485PRINT
```

```
486PRINT
487PRINT
488PRINT
489PRINT
490PRINT
491PRINT
492PRINT
493PRINT
494PRINT
495PRINT
496PRINT
497PRINT
498PRINT
499PRINT
500 END
```







SNOOPY

Description

That famous dog even plays football and this picture catches him in full action. This banner style picture is three feet long. All the kids will love it. The program is 8K Bytes long and will also execute in this space.

SNOOPY

```
001PRINT
002PRINT"                                       ************   "
003PRINT"                                    ***************  *  "
004PRINT"                                 ****************       *  "
005PRINT"                               ****************          *
006PRINT"                             ****************             *     "
007PRINT"                           ****************                *     "
008PRINT"                          ***************                   *   "
009PRINT"                        ***************                     *   "
010PRINT"                       **************                       *     "
011PRINT"                       ************                        *      "
012PRINT"                        ********          ***             ****   "
013PRINT"                         ****            *   *           *    *   "
014PRINT"                                *       *     *      ****         "
015PRINT"                                *       *     *     *   *    "
016PRINT"                       *       *       *      *         *   "
017PRINT"                      *  *    *        *      *         *  "
018PRINT"                      *   ***         *       *         *  "
019PRINT"                      *    *          *       *         *"
020PRINT"                  ****      *    ***  *      *           *  "
021PRINT"               *       *    *   *  *   *    *             *    "
022PRINT"             *         *     *  *   * *     *              *  "
023PRINT"            *         *      *  *    ***    *               *    "
024PRINT"  ***      *       ****      *  *           *               *   "
025PRINT" *   *   *         ****     *   *            *              *     "
026PRINT" *    *            ****    *    *             *            *  "
027PRINT" *    *             ******     *               *          *  "
028PRINT" ***                           *                   ****** "
029PRINT" *                             *                  ******  "
```

```
030PRINT" ***                          *                   *** **  "
031PRINT" *     **                     *                    ****   "
032PRINT" ***  *  *                   *                "
033PRINT"  *  *     *               *     "
034PRINT"    *         *          *      "
035PRINT"                *     *   "
036PRINT"                 *    *    "
037PRINT"               *        *    * *    "
038PRINT"               *        ****    *    "
039PRINT"                *               *  "
040PRINT"                 *             *    "
041PRINT"                   ***********       "
042PRINT"                                               *   "
043PRINT"                                              *   *   "
044PRINT"                                             *      *  "
045PRINT"                                            *         * "
046PRINT"                                            *           *    "
047PRINT"                                           *             *   "
048PRINT"                                          *               *  "
049PRINT"                                          *                *   "
050PRINT"                                          *                *   "
051PRINT"                                         *                  *   "
052PRINT"                                         *                  * "
053PRINT"                                          *                 * "
054PRINT"                                          *                 *"
055PRINT"                                          *                 * "
056PRINT"                                           *                * "
057PRINT"                                           *                *  "
058PRINT"                                            *              * "
059PRINT"                                             *             * "
060PRINT"                                               *          *   "
061PRINT"                                                *        * "
062PRINT"                                                  *     *  "
063PRINT"                                                    *  *   "
064PRINT
065PRINT
066PRINT
067PRINT
068PRINT
069PRINT
070PRINT
071PRINT
072PRINT
073PRINT
074PRINT"********************************************************   "
075PRINT"********************************************************  "
076PRINT"                          *****                    ***** "
077PRINT"                          *****                    *****    "
078PRINT"                          *****                    *****   "
079PRINT"                          *****                    *****   "
080PRINT"                          *****                    *****    "
```


081PRINT"
082PRINT"
083PRINT"
084PRINT"
085PRINT"
086PRINT"
087PRINT"
088PRINT"
089PRINT"
090PRINT"
091PRINT
092PRINT
093PRINT
094PRINT
095PRINT
096PRINT"
097PRINT"
098PRINT"
099PRINT"
100PRINT"
101PRINT"
102PRINT"
103PRINT"
104PRINT"
105PRINT"
106PRINT"
107PRINT"
108PRINT"
109PRINT"
110PRINT"
111PRINT
112PRINT
113PRINT
114PRINT
115PRINT
116PRINT"
117PRINT"
118PRINT"
119PRINT"
120PRINT"
121PRINT"
122PRINT"
123PRINT"
124PRINT"
125PRINT"
126PRINT"
127PRINT"
128PRINT"
129PRINT"
130PRINT"
131PRINT"

```
132PRINT"************************************************************ "
133PRINT"************************************************************  "
134PRINT
135PRINT
136PRINT
137PRINT
138PRINT
139PRINT"                                                       ***** "
140PRINT"                                                       *****  "
141PRINT"                                                       ***** "
142PRINT"                                                       *****  "
143PRINT"                                                       ***** "
144PRINT"                                                       *****   "
145PRINT"                                                       ***** "
146PRINT"************************************************************  "
147PRINT"************************************************************   "
148PRINT"                                                       ***** "
149PRINT"                                                       *****  "
150PRINT"                                                       *****  "
151PRINT"                                                       *****   "
152PRINT"                                                       *****    "
153PRINT"                                                       *****  "
154PRINT"                                                       *****  "
155PRINT
156PRINT
157PRINT
158PRINT
159PRINT
160PRINT
161 END
```

VIRGIN

Description

This is the most beautiful picture included in this volume and will most certainly grace anyplace it is hung. Pictured are the Virgin Mary and the Christ Child, using words from the bible to form their heads and faces. Starting in the upper left corner and reading from left to right - top to bottom, the words of the scriptures give added meaning to this picture as it is read. This picture stores and executes in 8K Bytes of memory.

VIRGIN

```
001 FOR I=1 TO 10
002 PRINT
003 NEXT I
10 REM
11PRINT"      PPPPPP  EEEEEE       A       CCCCCC  EEEEEE       OOOOOO  N     N"
12PRINT"      P    P  E           A A     C        E            O    O  NN    N"
13PRINT"      PPPPPP  EEE        A   A    C        EEE          O    O  N N   N"
14PRINT"      P       E         AAAAAAA   C        E            O    O  N  N  N"
15PRINT"      P       EEEEEE  A         A  CCCCCC  EEEEEE       OOOOOO  N   NN "
16PRINT
17PRINT"              EEEEEE       A       RRRRRR  TTTTTTT  H     H "
18PRINT"              E           A A      R    R     T     H     H"
19PRINT"              EEE        A   A     RRRRR      T     HHHHHHH"
20PRINT"              E         A AAA A    R   R      T     H     H"
21PRINT"              EEEEEE  A         A  R    R     T     H     H"
22PRINT
23PRINT"HAIL*MARY*FULL*OF*GRACE*THE*LORD*IS*WITH*THEE.*BLESSED*ART*THOU*AMONG"
24PRINT"*WOMEN*AND*BLESSED*IS*THE*FRUI T OF*THY*WOMB*JESUS.*HOLY*MARY*MOTHER*"
25PRINT"OF*GOD*PRAY*FOR*US*SINNERS*NOW*AND*AT*THE*HOUR*OF*OUR*DEATH.*AMEN.***"
26PRINT"HAIL*HOLY*QUEEN*MOTHER*OF*MERCY                HOLY*MARY*HOLY*MOTHER*OF*GO"
27PRINT"HAIL*OUR*LIFE*OUR*SWEETNESS*AND*OUR                 D*HOLY*VIRGIN*OFVIRGINS"
```

```
28PRINT"*HOPE.T0 *THEE*DO*WE*CRY*POOR*BANISH                    *MOTHER*OF*CHRIST*"
29PRINT"ED*CHILDREN*OF*EVE.*TO*THEE*DO*WE*SEND*                 MOTHER*OF*DEVINE*"
30PRINT"UP*OUR*SIGHS*MOURNING*AND*WEEPING*IN*                    GRACE*MOTHER*MOS "
31PRINT"THIS*VALE*OF*TEARS.*TURN*THEN*MOST*GRACIOUS*                T*PURE*MOTHER"
32PRINT"ADVOCATE THINE*EYES*OF*MERCY*TOWARD*US*AND*AF                 *MOST*CHAST"
33PRINT"TER*THIS*OUR*EXILE*SHOW*UNTO*US*THE*BLESSED*F                 E*MOTHER*IN"
34PRINT"RUIT*OF*THY*WOMB*JESUS.*O*MER C IFUL*O*LOVING               VIOLATE*MOTHE"
35PRINT"*O*SWEET*VIRGIN*MARY.* AM EN.***** **  **********          R*UNDEFILED*M"
36PRINT"ISAIAS*9*6*****FOR*A   *  CHILD*I S*BORN*TO*US*AND        OTHER  *MOST*"
37PRINT"*A*SON*IS*GIVEN*TO  *US*AND*THE*GOVERNMENT*IS*UPON*     AMI      ABLE***"
38PRINT"HIS*SHOULDERS*AND*HIS*NAME*SHALL*BE*CALLED*WONDERFU      *         MOTHE"
39PRINT"L*COUNSELOR* GOD*T HE*MIGHTY*THE*FATHER*       R*MOST             *AMI"
40PRINT"OF*THE*WORLD *TO*COME* THE*PRINCE              RABLE*             MOTHE"
41PRINT"*OF4PEACE.*  **********                          R*OF*G           OOT*CO"
42PRINT"LUKE*2*10**  11*******                          UNSEL*M            OTHER"
43PRINT"AS *THE*ANG EL*SAID*T                            *OF*OUR           *CREA"
44PRINT"O*THEM*DO* NOT*BE*AFR                             TOR*MOT      HER*OF**"
45PRINT"AID*FOR*BE HOLD*I*BRI                             OUR*SAVIOR    *U  IR"
46PRINT"NG*GOOD*NEWS*OF*GRE                               GIN*MOST     *PR UD "
47PRINT"AT*JOY*WHIC  H*SHALL*                  *    **     ENT*UIR     GIN  "
48PRINT"BE*TO*ALL*T  HE*PEOPL                GLORY*TO** *    *MOST*     VE"
49PRINT"E*FOR*TODA   Y*IN*THE* *           GOD*IN*              NEW ERA     BLE "
50PRINT"TOWN*OF*DA   VID*A*SAVIOR*H       THE*HIGHEST**          * V IR     GI"
51PRINT"AS*BEEN*   BORN*TO*YOU*WHO*      **PEACE*ON             N*  M O    ST*"
52PRINT"IS*CHRIST*   THE*LORD.**********     *EARTH*             R   END     WNE"
53PRINT"*HAIL*MARY* FULL*OF*GRACE*THE*                             D*VI      R"
54PRINT"LORD*IS*WI TH*THEE* **       **                          GIN*M OS  "
55PRINT"BLESSED*ART *THOU*AM        ***                          T*POWER  F "
56PRINT"ING*WOMEN*A  ND*BLESS       JMJ                           UL*VIRG  IN"
57PRINT"ED*IS*THE*FR   UIT*OF*T     ***                           *MOST*ME  R "
58PRINT"HY*WO MB***     JESUS*HO    ***       *                  CIFUL*VIR  GI"
59PRINT"LY*MARY*MOTHE    R*OF*GOD   *PRAY    ***                N*MOST*FAI   T"
60PRINT"*FOR* US*SINNER    S*NOW*AND*AT*THE                     HFUL*MIRROR "
61PRINT"*HOUR*OF*OUR*DE    ATH.*AMEN.******                     *OF*JUSTICE "
62PRINT"LUKE*2*15*20****   AT*THAT*TIM    E*THE*SH            *SEAT*OF*WISD "
63PRINT"EPHERDS*WERE*SAY   ING*TO*ONE*ANOTHER*L               OM*CAUSE*OF*OUR* "
64PRINT"ET*US*GO*OVER*T   O*BETHLEHEM*AND*SEE*THI              *JOY*SPIRITUAL  "
65PRINT"S*THING*THAT*HAS* COME*TO*PASS*WHICH*                    *VESSEL*  "
66PRINT"THE*LORD*    HAS*MADE*KNOWN*TO*US*                **      VESSEL*OF* "
67PRINT"SO*THEY*       WENT*WITH*HASTE*AND           *JMJ*       HONOR*SING  "
68PRINT"*THEY*F     OUND*MARY*AND*JOSEPH*AND*THE*BABE.*          ULAR*VESSEL*  "
69PRINT"LYING*I     N*THE*MA  NGER.*AND*WHEN*THEY*HAD*S           OF*DEVOTION "
70PRINT"EEN*TH    EY*UNDER STOOD*WHAT*HAD*BEEN*TOLD*TH           *MYSTICAL*RO "
71PRINT"EM*CO    NCERNIN  G*T HIS*CHI LD**AND*ALL*WHO           SE*TOWER*OF*D"
72PRINT"*HEA   RD*MARVELE D *  AT *THE *THING S*TOLD*           AVID*TOWER*OF*"
73PRINT"THEM  *BY*THE*SHEPHERDS *BUT* MA RY*KEPT**             IVORY*HOUSE*OF*"
74PRINT"IN    *MIND *ALL*THESE*THINGS*PONDERING  *THEM*       * GOLD*ARK*OF*THE*"
75PRINT"IN  *HER*HEART.*AND*THE*S     *****    *******       COVENANT*GATE*OF*H"
76PRINT"H  EPHERDS*RETURNED*GLORI                ****       EAVEN*MORNING*STAR*"
77PRINT"  FYING*AND*PRAISING*GOD*                *JMJ*      HEALTH*OF*THE*SICK*"
78PRINT"FOR*ALL*THAT*THEY*HAD*HEAR               *JMJ**   REFUGE*OF*SINNERS*CO"
```

```
79PRINT"D*AND*SEEN*EVEN*AS*IT*WAS*                    MFORTER*OF*THE*AFFLICTED*HEL"
80PRINT"SPOKEN*TO*T  HEM**********     *              P*OF*CHRI STIANS*QUEEN*OF*AN"
81PRINT"JOHN*1*1*1 4** **********IN*THE*       GELS*QUEEN*OF*PATRIARCHS*QUEEN*"
82PRINT"BEGINNING*WAS*THE*WORD*AND*THE*WO    *OF*PROPHET  S*QUEEN*OF*APOSTLES*"
83PRINT"RD*WAS*WITH*GOD*AND*THE*WORD*WAS*  QUEEN*OF*MARTYRS*QUEEN*OF*CONFESSO"
84PRINT"GOD**HE*WAS*  IN*THE*BE   **     *          RS*QUEEN*OF*VIRGINS*QUEEN*OF"
85PRINT"GINNING*WITH*  GOD*ALL*TH       *          *ALL*SAINTS*QUEEN*CONCEIVED*"
86PRINT"INGS*WERE*MADE*THROUGH*HI     MARY        WITHOUT*ORIGINAL*SIN*QUEEN*AS"
87PRINT"M*AND*WITHOUT*HIM*WAS*MADE   **BABY*      SUMED*INTO*HEAUEN*QUEEN*OF*T"
88PRINT"*NOTHING*THAT*HAS*BEEN*MAD    **        HE*MOST*HOLY*ROSARY*QUEEN*OF*P"
89PRINT"E**IN*HIM*WAS*LIFE*AND*THE*L  ********** EACE**PRAY*FOR *US********** "
90PRINT"IFE*WAS*THE*LIGHT*OF*MAN**AND*THE*L  **MERRY*CHRIS TMA S*JOY*TO*THE***"
91PRINT"IGHT*SHINES*IN*THE  *DARKNESS*AN   WORLD*MERR Y*C  HRI STMAS**LOVE*IS"
92PRINT"D*THE*DARKNESS*       BORN**O*LI  TTLE*TOWN* OF     * BETHLEHEM*COME** "
93PRINT"GRASPED*IT*NOT**        ALL*YE*FAITHFUL*COME      *  AND* ADORE*HIM*** "
94PRINT"MARYS*BABY**             BY*SHAMAS*O*SHEEL**      **     JOSEPH*MILD** "
95PRINT"AND*NOBLE*BENT **         ABOVE*THE*STRAW****         A *PALE*GIRL*A** "
96PRINT"FRAIL*GIRL*MARVELL          ING*HE*SAW*O*MY*LOVE      * MY*MARY*MY*BRID"
97PRINT"E*I*PITY*THEE.*NAY*          DEAR*SAID*          * MARY*ALL*IS*WELL*WIT "
98PRINT"H*ME.*BABY*MY*BAB              Y*O*MY*          BABE*SHE*SANG***SUDDEN"
99PRINT"LY*THE*GOLDEN*N      IGHT*AL   L**              WITH*MUSIC*RANG******** "
100PRINT"ANGELS*LEADING*SHEPHER  DS *SH   EP H   E       RDS*LEADING*SHEEP*THE*"
101PRINT"SILENCE*6F*WORSHIP*B ROKE*T     HE* MO  THERS*SLEEP*ALL*THE*MEEK*AND*"
102PRINT"LOWLY*OF*THE*WORLD*WERE*THE  RE  *SMILIN G*SHE*S HO WED*THEM*THAT*HER"
103PRINT"*CHILD*WAS*FAIR*BABY*MY*BABY*KISSI NG*HIM*SHE*SAID****SUDDENLY*A*FLAM"
104PRINT"ING*STAR*THROUGH*THE*HEAVENS*SPED******THREE*OLD*MEN*AND*WEARY*KNELT*"
105PRINT"THEM*SIDE*BY*SIDE*THE*WORLDS*WEALTH*FORSWEARING*MAJESTY*AND*PRIDE*WOR"
106PRINT"ILY*MIGHT*AND*WISDOM*BEFORE*THE*BABE*BENT*LOW*WEEPING*MAID*MARY*SAID*"
107PRINT"I*LOVE*HIM*SO.*BABY*MY*BABY*AND*THE*BABY*SLEPT***SUDDENLY*ON*CALVARY*"
108PRINT"                        ALL*THE*OLIVES*WEPT**    "
109PRINT
110PRINT"                    GGGGGG   OOOO    OOOO   DDDDDD  "
111PRINT"                    G       O    O  O    O  D    D  "
112PRINT"                    G  GGG  O    O  O    O  D    D   "
113PRINT"                    G    G  O    O  O    O  D    D   "
114PRINT"                    GGGGGG   OOOO    OOOO   DDDDDD  "
115PRINT
116PRINT" W      W  III  L        L        TTTTT  OOOOO    M      M  EEEEE  N     N"
117PRINT" W  W  W   I   L        L          T    O   O    MM    MM  E      NN    N"
118PRINT" W W W W   I   L        L          T    O   O    M M M M  EEE    N N   N"
119PRINT" WW   WW   I   L        L          T    O   O    M  M  M  E      N  N  N"
120PRINT" W      W  III  LLLLLL   LLLLLL     T    OOOOO    M      M  EEEEE  N   NN"
121 FOR I=1 TO 10
122 PRINT
123 NEXT I
124 END
```

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