HEWLETT-PACKARD

Real Estate

Business Software Solutions

SERIES 80

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SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Loan Amortization

File Name L O A N

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 1,613

Program Description: This program amortizes a loan using arbitrary monthly payments entered by the user. Monthly reports are generated indicating payments to interest and principal. Yearly reports are printed showing accumulated payments to interest and principal and the remaining balance. Final payment is computed when balance falls below user-set maximum monthly payment.

PROGRAM DESCRIPTION II

Sample Problem

Starting month : September (9)
Maximum Pmt./Mo: 75
Principal : 450
Interest rate : 10%
Payments : 75, 50, 60, 50, 70, 75, 55

SOLUTION:

```
LOAD "LOAN"
RUN

Enter input parameters as prompted.
    PRINCIPAL = 450
    INT. RATE = 10 %
    MAX. PMT. = 75


    MONTH  10
         PAYMENT  =  75
         INTEREST =  3.75
         CUM INT  =  3.75
         PRINCIPAL=  71.25
         CUM PRINC=  71.25
         BALANCE  =  378.75
    MONTH  11
         PAYMENT  =  50
         INTEREST =  3.16
         CUM INT  =  6.91
         PRINCIPAL=  46.84
         CUM PRINC=  118.09
         BALANCE  =  331.91
    MONTH  12
         PAYMENT  =  60
         INTEREST =  2.77
         CUM INT  =  9.67
         PRINCIPAL=  57.23
         CUM PRINC=  175.33
         BALANCE  =  274.67

    --------------------------------

    YEAR  1
      TOTAL PAY MADE = 185
      YEAR CUM INT   = 9.67
      YEAR PRINC PAY = 175.33
      BALANCE        = 274.67

    --------------------------------
```

PROGRAM DESCRIPTION II

```
MONTH  1
     PAYMENT  =  50
     INTEREST =  2.29
     CUM INT  =  11.96
     PRINCIPAL=  47.71
     CUM PRINC=  223.04
     BALANCE  =  226.96
MONTH  2
     PAYMENT  =  70
     INTEREST =  1.89
     CUM INT  =  13.85
     PRINCIPAL=  68.11
     CUM PRINC=  291.15
     BALANCE  =  158.85
MONTH  3
     PAYMENT  =  75
     INTEREST =  1.32
     CUM INT  =  15.18
     PRINCIPAL=  73.68
     CUM PRINC=  364.82
     BALANCE  =  85.18
MONTH  4
     PAYMENT  =  55
     INTEREST =  .71
     CUM INT  =  15.99
     PRINCIPAL=  54.29
     CUM PRINC=  419.11
     BALANCE  =  30.89
MONTH  5
     PAYMENT  =  31.14
     INTEREST =  .26
     CUM INT  =  16.14
     PRINCIPAL=  30.89
     CUM PRINC=  450
     BALANCE  =  0

--------------------------------

YEAR  2
  TOTAL PAY MADE = 281.14
  YEAR CUM INT   = 6.47
  YEAR PRINC PAY = 274.67
  BALANCE        = 0

--------------------------------

 8  PAYMENTS WERE MADE
```

PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
N1	Starting month		
M	Maximum allowable payment		
P	Principal		
R	Interest rate		
X	Payment		
I	Interest		
I1	Cumulative interest		
P2	Principal		
P3	Cumulative principal		
X6	Total payments		
I6	Yearly cumulative interest		
P6	Yearly cumulative principal		
Y	Year number		

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USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "LOAN" and press RUN.
2	Enter principal, interest rate, maximum monthly payment as prompted.
3	Enter each monthly payment as prompted.
4	Monthly and yearly reports will be printed as payments are entered.

PROGRAM LISTING

Listing **Comments**

```
 10 CLEAR
 20 DEF FNA(X) = INT((X*1000+5)/
    10)/100
 30 DISP "ENTER STARTING MONTH (
    FEB=2)";
 40 INPUT N1
 50 DISP @ DISP "ENTER MAXIMUM A
    LLOWABLE PAYMENT PER MONTH";
 60 INPUT M
 70 Y=1 @ Z=1 @ I1=0 @ N=0 @ P3=
    0
 80 DISP @ DISP "ENTER PRINCIPAL
    ";
 90 INPUT P
100 DISP @ DISP "ENTER INTEREST
    RATE";
110 INPUT R
120 PRINT "PRINCIPAL =";P
130 PRINT "INT. RATE =";R;"%"
140 PRINT "MAX. PMT. =";M
150 PRINT @ PRINT
160 R=R/100
170 P6=0 @ I6=0 @ X6=0
180 DISP @ DISP "ENTER PAYMENT";
190 INPUT X
200 IF X>=0 AND X<=M THEN 220
210 BEEP @ DISP "Invalid payment
    . Max = ";M @ DISP @ GOTO 18
    0
220 X6=X6+X
230 I=P*R/12
240 I6=I6+I
250 I1=I1+I
260 N1=N1+1
270 N=N+1
280 IF NOT Z OR X THEN 310
290 P2=0
300 GOTO 360
310 P2=X-I
320 IF P2>=0 THEN 360
330 P=P+ABS(P2)
340 P2=0
350 GOTO 290
360 P3=P3+P2
370 P6=P6+P2
380 IF X THEN 410
390 P=P+I
400 GOTO 420
410 P=P-P2
420 PRINT "MONTH ";N1
430 PRINT "     PAYMENT  = ";FNA(
    X)
440 PRINT "     INTEREST = ";FNA(
    I)
450 PRINT "     CUM INT  = ";FNA(
    I1)
460 PRINT "     PRINCIPAL= ";FNA(
    P2)
470 PRINT "     CUM PRINC= ";FNA(
    P3)
```

Data entry

Housekeeping

Enter payment

Total payments

Total interest

Print report

PROGRAM LISTING

Listing **Comments**

```
480 PRINT "    BALANCE   = ";FNA(
    P)
490 IF Z=0 THEN 550
500 IF N1=12 THEN 550                  Compute final payment
510 IF P>M THEN 180
520 X=P+P*R/12                         Print yearly forms
530 Z=0
540 GOTO 220
550 PRINT @ PRINT "-------------
    -------------------"
560 PRINT
570 PRINT "YEAR ";Y
580 PRINT "  TOTAL PAY MADE =";F
    NA(X6)
590 PRINT "  YEAR CUM INT   =";F
    NA(I6)
600 PRINT "  YEAR PRINC PAY =";F
    NA(P6)
610 PRINT "  BALANCE        =";F
    NA(P)
620 PRINT @ PRINT "-------------
    -------------------"
630 PRINT
640 Y=Y+1 @ N1=0
650 IF Z=0 THEN 670
660 GOTO 170
670 PRINT N;" PAYMENTS WERE MADE
    "
680 END
```

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Mortgage Analysis

File Name M O R G A G

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 3,357

Program Description: MORGAG will find the missing parameter of the following four, given the remaining three: interest rate, life (years), amount borrowed, and monthly payment. The program will then print a monthly or yearly summary indicating the amount of interest, amount of payment and outstanding balance for each period.

PROGRAM DESCRIPTION II

Sample Problem

```
Select unknown variable:  Pmt (Key #4)
Nominal annual rate    :    10.5
Mortgage life (yrs,mos):   6,0
Borrowed amount        :  10000
Settlement date (mo,yr):  1,1980
Table length (years)   :     6
Print annual summary   :     1
```

SOLUTION:

```
LOAD "MORGAG".
RUN
```

Enter input parameters as prompted.

```
            MORTGAGE TERMS

NOMINAL ANNUAL RATE = 10.5 %

MORTGAGE LIFE = 6 YRS 0 MONTHS

AMOUNT BORROWED = 10000

MONTHLY PAYMENT = 187.79

------------------------------

            MORTGAGE TABLE
```

	INTEREST	PRINCIPAL	ENDING BALANCE
1980	912.93	1152.76	8847.24
1981	863.32	1390.16	7457.09
1982	710.09	1543.39	5913.70
1983	540.01	1713.47	4200.23
1984	351.20	1902.28	2297.96
1985	141.56	2111.92	186.04

PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
R	Interest rate		
Y	Years of mortgage life		
M	Months of mortgage life		
A	Amount borrowed		
P	Monthly payment		
T1	Month of settlement		
T2	Year of settlement		
T3	Table length (years)		
Z1	Summary selection		
I1, S1	Monthly, Yearly interest PAID		
P1, S2	Monthly, Yearly principal PAID		
A1	Monthly starting balance		
A2	Unpaid principal		
T2	Current year for table		
M2	Current month for table		

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USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "MORGAG" and press RUN.
2	Select Special Function key corresponding to unknown variable.
3	Enter remaining three variables as prompted.
4	Enter settlement date, table length, and summary selections as prompted.
5	Tables will be printed.

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PROGRAM LISTING

Listing **Comments**

```
 10 DIM M$[36]
 20 CLEAR
 25 DEF FNA(X) = INT((X*1000+5)/
    10)/100
 30 M$="JANFEBMARAPRMAYJUNJULAUG
    SEPOCTNOVDEC"
 40 ON KEY# 1,"RATE" GOTO 110
 50 ON KEY# 2,"LIFE" GOTO 120
 60 ON KEY# 3,"AMOUNT" GOTO 130
 70 ON KEY# 4,"  PMT" GOTO 140
 80 KEY LABEL @ DISP
 90 DISP "SELECT UNKNOWN VARIABL
    E:"
100 GOTO 100
110 Z=1 @ GOTO 150
120 Z=2 @ GOTO 150
130 Z=3 @ GOTO 150
140 Z=4
150 CLEAR
160 !
170 !
180 IF Z=1 THEN 240
190 DISP "ENTER NOMINAL ANNUAL R
    ATE (%)";
200 INPUT R
210 R=R/100
220 DISP
230 IF Z=2 THEN 280
240 DISP "ENTER MORTGAGE LIFE (Y
    RS,MONTHS)";
250 INPUT Y,M
260 DISP
270 IF Z=3 THEN 320
280 DISP "ENTER AMOUNT TO BE BOR
    ROWED";
290 INPUT A
300 DISP
310 IF Z=4 THEN 350
320 DISP "ENTER MONTHLY PAYMENT"
    ;
330 INPUT P
340 DISP
350 DISP "ENTER SETTLEMENT DATE
    (MO,YEAR)";
360 INPUT T1,T2
370 DISP
380 DISP "ENTER TABLE LENGTH (YE
    ARS)";
390 INPUT T3
400 DISP @ DISP "PRINT ANNUAL (1
    ) OR MONTHLY (2) SUMMARY";
410 INPUT Z1
420 CLEAR
430 IF Z=2 THEN 460
440 N=12*Y+M
450 IF Z=1 THEN 620
460 R=R/12
470 IF Z=3 THEN 570
480 IF Z=4 THEN 600
490 IF A*R/P<1 THEN 520
```

Set up option selection

Wait for special function key

Data entry

Error trap

PROGRAM LISTING

Listing **Comments**

```
500 BEEP @ DISP "THE FIRST MONTH
    S PAYMENT WILL   NOT COVER I
    T'S INTEREST"
510 STOP
520 N=-LOG(1-A*R/P)/LOG(1+R)                    Compute life
530 N=INT(N)+1
540 Y=INT(N/12)
550 M=N-12*Y
560 GOTO 740
570 A=P*(1-1/(1+R)^N)/R                         Compute amount borrowed
580 A=INT((A*100+5)/10)/10
590 GOTO 740                                    Compute payment
600 P=A*R*(1+R)^N/((1+R)^N-1)
610 GOTO 740                                    Compute rate
620 R=(P*N/A-1)/12
630 R1=R
640 IF R>0 THEN 690
650 BEEP @ DISP "RATE IS NEGATIV
    E OR ZERO"
660 STOP
670 R=R-2*R1
680 R=R+R1
690 C=P*(1/(R/((1+R)^N-1)+R))
700 IF ABS(C-A)<.01 THEN 740
710 R1=R1/2
720 IF C-A<0 THEN 670
730 GOTO 680
740 IF 12*P>R*A*12+1 THEN 800                   Error trap
750 BEEP
760 DISP "YOUR FIRST YEARS PAYME
    NTS        ARE ";12*P
770 DISP @ DISP "THE FIRST YEAR'
    S INTEREST        IS ";R*A*12
780 DISP @ DISP "THEREFORE, THE
    LIFE OF THE       MORTGAGE IS
     UNDEFINED"
790 STOP
800 !
810 PRINT "           MORTGAGE TE   Print terms
    RMS"
820 PRINT
830 PRINT "NOMINAL ANNUAL RATE =
    ";FNA(R*1200);"%"
840 PRINT
850 PRINT "MORTGAGE LIFE =";Y;"Y
    RS";M;"MONTHS"
860 PRINT
870 PRINT "AMOUNT BORROWED =";A
880 PRINT
890 PRINT "MONTHLY PAYMENT =";FN
    A(P)
900 PRINT
910 IF Z#2 THEN 930
920 PRINT "MORTGAGE LIFE HAS BEE
    N ROUNDEDEDUP TO THE NEAREST
     MONTH" @ PRINT
930 PRINT "----------------------
    -----------"
940 PRINT
950 PRINT "          MORTGAGE TAB
    LE"
```

PROGRAM LISTING

Listing

Comments

```
960 PRINT
970 Z2=0 @ S1=0 @ S2=0
980 IF T1=12 THEN 1000
990 M2=T1 @ GOTO 1020
1000 T2=T2+1
1010 M2=0
1020 M3=M2+1
1030 IF Z1=2 THEN PRINT "  FOR T
     HE CALENDER YEAR ";T2 @ PRI
     NT
1040 IF Z1=1 THEN PRINT "
                        ENDING"
1050 IF Z1=2 THEN PRINT "
                      STARTING"
1060 PRINT "      INTEREST  PRINC
     IPAL BALANCE"
1070 FOR M1=M3 TO 12*T3
1080 I1=FNA(A*R)
1090 IF P<A+I1 THEN P1=P-I1 ELSE
      P1=A
1100 A1=A @ A=A1-P1
1110 S1=S1+I1 @ S2=S2+P1
1120 M2=M2+1
1130 IF Z1=1 THEN 1320
1140 IMAGE 4A,5D.DD,2(XX,5D.DD)
1150 PRINT USING 1140 ; M$[3*M2-
     2,3*M2],I1,P1,A1
1160 IF M2=12 THEN 1190
1170 IF A>0 THEN 1400
1180 Z2=1
1190 PRINT
1200 PRINT "PRINCIPAL REPAID =";
     FNA(S2)
1210 PRINT "INTEREST PAID    =";
     FNA(S1)
1220 PRINT "UNPAID PRINCIPAL =";
     FNA(A)
1230 PRINT
1240 IF Z2=1 THEN 1420
1250 T2=T2+1
1260 PRINT "-------------------
     ------------"
1270 PRINT
1280 IF M1=12*T3 THEN 1410
1290 PRINT "  FOR THE CALENDAR Y
     EAR";T2
1300 PRINT
1310 GOTO 1390
1320 IF M2=12 THEN 1350
1330 IF A>0 THEN 1400
1340 Z2=1
1350 PRINT USING 1140 ; VAL$(T2)
     ,S1,S2,A
1360 T2=T2+1
1370 IF M1=12*T3 THEN 1410
1380 IF Z2=1 THEN 1410
1390 S1=0 @ S2=0 @ M2=0
1400 NEXT M1
1410 PRINT
1420 END
```

Print monthly report

Print yearly summary

Print yearly report

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Capital Investment Analysis (Discounted Cash Flow Analysis)

File Name C A P D C F

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 12,841

Program Description: CAPDCF evaluates capital investment alternatives. Cash flows are determined and the rate of return is calculated using discounted cash flow analysis. An iterative technique is used to determine the rate of return rather than the trial and error technique.

PROGRAM DESCRIPTION II

Sample Problem

Time period	:	Annual	Normal expenses	:	Yes
Investment amount	:	350000	Expense option	:	Uniform
Tax credit	:	24500	Uniform expense amount	:	99648
Salvage value	:	35000	Extraordinary expenses	:	Yes
Life of investment	:	12	# of extraordinary expenses	:	2
Income tax rate	:	50	Period number & amount 1	:	5,25000
Earnings option	:	Uniform	Period number & amount 2	:	10,25000
Single earning amount	:	184320	Depreciation option	:	S O Y D
Extraordinary earnings	:	Yes	Percent not depreciated	:	0
# extraordinary earnings	:	1	Number of years to deprec.	:	12
Period number & amount	:	12,35000			

SOLUTION:

```
LOAD "CAPDCF".
RUN.

Enter input data as requested.
     RETURN = INVESTMENT IS  13.95%

       CAPITAL INVESTMENT ANALYSIS
       ***************************


     INVESTMENT COST          350000.00
     SALVAGE VALUE             35000.00
     INVESTMENT TAX CREDIT     24500.00
     LIFE OF INVESTMENT           12.00
     NET INVESTMENT COST      325500.00
     INCOME TAX RATE              50.00


     ---------------------------------


     PERIOD  1
     - - - - - -

     NORMAL EARNINGS          184320.00
     EXTRA EARNINGS                0.00
     NORMAL EXPENSES           99648.00
     EXTRA EXPENSES                0.00
     BEFORE TAX CASH FLOW      84672.00


     DEPRECIATION              48461.54
     TAXABLE INCOME            36210.46
     INCOME TAX                18105.23
     AFTER TAX CASH FLOW       66566.77
     DISCOUNTED CASH FLOW      58417.34

     ---------------------------------
```

PROGRAM DESCRIPTION II

PERIOD 2

NORMAL EARNINGS	184320.00
EXTRA EARNINGS	0.00
NORMAL EXPENSES	99648.00
EXTRA EXPENSES	0.00
BEFORE TAX CASH FLOW	84672.00
DEPRECIATION	44423.08
TAXABLE INCOME	40248.92
INCOME TAX	20124.46
AFTER TAX CASH FLOW	64547.54
DISCOUNTED CASH FLOW	49710.51

PERIOD 3

NORMAL EARNINGS	184320.00
EXTRA EARNINGS	0.00
NORMAL EXPENSES	99648.00
EXTRA EXPENSES	0.00
BEFORE TAX CASH FLOW	84672.00
DEPRECIATION	40384.62
TAXABLE INCOME	44287.38
INCOME TAX	22143.69
AFTER TAX CASH FLOW	62528.31
DISCOUNTED CASH FLOW	42260.00

PERIOD 4

NORMAL EARNINGS	184320.00
EXTRA EARNINGS	0.00
NORMAL EXPENSES	99648.00
EXTRA EXPENSES	0.00
BEFORE TAX CASH FLOW	84672.00
DEPRECIATION	36346.15
TAXABLE INCOME	48325.85
INCOME TAX	24162.92
AFTER TAX CASH FLOW	60509.08
DISCOUNTED CASH FLOW	35888.69

PERIOD 5

NORMAL EARNINGS	184320.00
EXTRA EARNINGS	0.00
NORMAL EXPENSES	99648.00
EXTRA EXPENSES	25000.00
BEFORE TAX CASH FLOW	59672.00
DEPRECIATION	32307.69
TAXABLE INCOME	27364.31
INCOME TAX	13682.15
AFTER TAX CASH FLOW	45989.85
DISCOUNTED CASH FLOW	23937.75

PERIOD 6

NORMAL EARNINGS	184320.00
EXTRA EARNINGS	0.00
NORMAL EXPENSES	99648.00
EXTRA EXPENSES	0.00
BEFORE TAX CASH FLOW	84672.00
DEPRECIATION	28269.23
TAXABLE INCOME	56402.77
INCOME TAX	28201.38
AFTER TAX CASH FLOW	56470.62
DISCOUNTED CASH FLOW	25794.56

PERIOD 7

NORMAL EARNINGS	184320.00
EXTRA EARNINGS	0.00
NORMAL EXPENSES	99648.00
EXTRA EXPENSES	0.00
BEFORE TAX CASH FLOW	84672.00
DEPRECIATION	24230.77
TAXABLE INCOME	60441.23
INCOME TAX	30220.62
AFTER TAX CASH FLOW	54451.38
DISCOUNTED CASH FLOW	21827.24

PROGRAM DESCRIPTION II

```
PERIOD  8
- - - - - -

NORMAL EARNINGS          184320.00
EXTRA EARNINGS                0.00
NORMAL EXPENSES           99648.00
EXTRA EXPENSES                0.00
BEFORE TAX CASH FLOW      84672.00

DEPRECIATION              20192.31
TAXABLE INCOME            64479.69
INCOME TAX                32239.85
AFTER TAX CASH FLOW       52432.15
DISCOUNTED CASH FLOW      18444.71

--------------------------------

PERIOD  9
- - - - - -

NORMAL EARNINGS          184320.00
EXTRA EARNINGS                0.00
NORMAL EXPENSES           99648.00
EXTRA EXPENSES                0.00
BEFORE TAX CASH FLOW      84672.00

DEPRECIATION              16153.85
TAXABLE INCOME            68518.15
INCOME TAX                34259.08
AFTER TAX CASH FLOW       50412.92
DISCOUNTED CASH FLOW      15563.25

--------------------------------

PERIOD  10
- - - - - -

NORMAL EARNINGS          184320.00
EXTRA EARNINGS                0.00
NORMAL EXPENSES           99648.00
EXTRA EXPENSES            25000.00
BEFORE TAX CASH FLOW      59672.00

DEPRECIATION              12115.38
TAXABLE INCOME            47556.62
INCOME TAX                23778.31
AFTER TAX CASH FLOW       35893.69
DISCOUNTED CASH FLOW       9724.36

--------------------------------
```

```
PERIOD  11
- - - - - -

NORMAL EARNINGS          184320.00
EXTRA EARNINGS                0.00
NORMAL EXPENSES           99648.00
EXTRA EXPENSES                0.00
BEFORE TAX CASH FLOW      84672.00

DEPRECIATION               8076.92
TAXABLE INCOME            76595.08
INCOME TAX                38297.54
AFTER TAX CASH FLOW       46374.46
DISCOUNTED CASH FLOW      11025.69

--------------------------------

PERIOD  12
- - - - - -

NORMAL EARNINGS          184320.00
EXTRA EARNINGS            35000.00
NORMAL EXPENSES           99648.00
EXTRA EXPENSES                0.00
BEFORE TAX CASH FLOW     119672.00

DEPRECIATION               4038.46
TAXABLE INCOME           115633.54
INCOME TAX                57816.77
AFTER TAX CASH FLOW       61855.23
DISCOUNTED CASH FLOW      12905.88

--------------------------------

TOTAL DISCOUNTED CASH    325500.00
INITIAL INVESTMENT       325500.00
NET PRESENT VALUE              .00
```

PROGRAM DESCRIPTION III

Variables:

Name	Description	Length	Comments
I1	Investment amount		
C1	Investment tax credit		
S1	Salvage value		
L1	Life of investment		
T1	Income tax rate		
E2	Earnings life in periods		
E3	Initial earnings		
E4	% of earnings to be final		
A(*)	Extra earnings by period		
X2	Expense life in periods		
X3	Initial expense		
X4	% of initial expense to be final		
Y(X)	Extra expenses by period		
D2	% of investment not to be depreciated		
D3	# of years to depreciate		
I	Period number		
E(*)	Normal earnings		
X(*)	Normal expenses		
B(*)	Before tax cash flow		
D(*)	Depreciation		
C(*)	Taxable income		
F(*)	Income tax		
G(*)	After tax cash flow		
H(*)	Discounted cash flow		
T2	Total discounted cash flow		

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USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "CAPDCF" and press RUN.
2	Enter data as prompted.
3	Report will be printed.
4	Select program option:
4a	To enter new data, go to Step 2.
4b	To change current data, enter changes as prompted--then:
4c	Recompute using current data, then go to Step 4.
4d	End program.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing **Comments**

```
 10 CLEAR @ DISP "Setting up. . ."
 20 DIM A(50),B(50),C(50),D(50),
    E(50),F(50),G(50),H(50),U(50
    ),X(50),Y(50)
 30 FOR X=1 TO 50
 40 A(X),B(X),C(X),D(X),E(X),F(X
    ),G(X),H(X),U(X),X(X),Y(X)=0
 50 NEXT X
 60 CLEAR @ DISP "     PERIOD OP
    TIONS:"
 70 DISP @ DISP "      1)  ANNUAL
    "
 80 DISP "      2)  SEMI-ANNUAL"
 90 DISP "      3)  QUARTERLY"
100 DISP "      4)  MONTHLY"
105 DISP @ DISP
110 DISP "ENTER THE TIME PERIOD
    TO BE USEDFOR CASH FLOWS AND
     LIFE";
120 INPUT K
130 K=(K=1)+2*(K=2)+4*(K=3)+5*(K
    =4)
140 CLEAR
150 DISP "INVESTMENT AMOUNT";
160 INPUT I1
170 DISP @ DISP "INVESTMENT TAX
    CREDIT";
180 INPUT C1
190 DISP @ DISP "SALVAGE VALUE";
200 INPUT S1
210 DISP @ DISP "LIFE OF INVESTM
    ENT";
220 INPUT L1
230 DISP @ DISP "INCOME TAX RATE
    ";
240 INPUT T1
250 GOSUB 7100
260 GOSUB 7300
270 CLEAR @ DISP "ANY EXTRAORDIN
    ARY EARNINGS";
280 GOSUB 7000
290 IF A=1 THEN GOSUB 7500
300 CLEAR @ DISP "ANY NORMAL EXP
    ENSES";
310 GOSUB 7000
320 IF A=1 THEN 340
330 X1=0
335 GOTO 360
340 GOSUB 7600
350 GOSUB 7800
360 CLEAR @ DISP "ANY EXTRAORDIN
    ARY EXPENSES";
370 GOSUB 7000
380 IF A=0 THEN 400
390 GOSUB 8000
400 GOSUB 8100
410 GOSUB 8300
4000 CLEAR @ DISP "Computing. . ."
4005 ON E1 GOTO 4180,4010,4050,4
     144
```

Housekeeping

Data entry

Compute

PROGRAM LISTING

Listing

Comments

```
4010 FOR I=1 TO L1
4020 E(I)=E3
4030 NEXT I
4040 GOTO 4180
4050 E9=INT((E3-E4*.01*E3)/(E2-1
     ))
4060 FOR I=1 TO E2
4070 E(I)=E3-(I-1)*E9
4080 NEXT I
4090 GOTO 4180
4100 E4=E4*.01
4104 E0=E3*E4
4108 E(1)=E3
4112 FOR N=2 TO E2
4116 E(N)=E(N-1)-2*(E2-N+1)*(E3-
     E0)/(E2*(E2-1))
4120 NEXT N
4140 GOTO 4180
4144 E4=E4*.01
4146 E0=E3*E4
4148 E(1)=E3
4152 FOR N=2 TO E2
4156 E(N)=E(N-1)-2*(N-1)*(E3-E0)
     /(E2*(E2-1))
4159 NEXT N
4180 ON X1 GOTO 4360,4190,4230,4
     280,4340
4182 IF X1=0 THEN 4360
4190 FOR I=1 TO L1
4200 X(I)=X3
4210 NEXT I
4220 GOTO 4360
4230 X9=INT((X3-X4*.01*X3)/(X2-1
     ))
4240 FOR I=1 TO X2
4250 X(I)=X3-(I-1)*X9
4260 NEXT I
4270 GOTO 4360
4280 X4=X4*.01
4283 X0=X3*X4
4286 X(1)=X3
4289 FOR N=2 TO X2
4291 X(N)=X(N-1)-2*(X2-N+1)*(X3-
     X0)/(X2*(X2-1))
4294 NEXT N
4300 GOTO 4360
4340 X4=X4*.01
4343 X0=X3*X4
4346 X(1)=X3
4349 FOR N=2 TO X2
4352 X(N)=X(N-1)-2*(N-1)*(X3-X0)
     /(X2*(X2-1))
4355 NEXT N
4360 ON D1 GOTO 4520,4370,4420,4
     490
4370 D(1)=(1-D2*.01)*(I1-S1)/D3
4380 FOR N=2 TO D3
4390 D(N)=D(1)
4400 NEXT N
4410 GOTO 4520
```

PROGRAM LISTING

Listing **Comments**

```
4420 D4=I1-S1
4430 D5=(1-D2*.01)*D4
4440 FOR N=1 TO D3
4450 D(N)=D5*2/D3
4460 D5=D5-D(N)
4470 NEXT N
4480 GOTO 4520
4490 FOR N=1 TO D3
4500 D(N)=2/(D3*(D3+1))*(D3+1-N)
     *(1-D2*.01)*(I1-S1)
4510 NEXT N
4520 FOR I=1 TO L1
4530 B(I)=E(I)+A(I)-X(I)-Y(I)
4540 C(I)=B(I)-D(I)
4550 F(I)=C(I)*(1-T1*.01)
4560 G(I)=C(I)-F(I)+D(I)
4570 NEXT I
4580 U9=L1+1
4590 U(1)=-(I1-C1)
4600 FOR I=2 TO L1+1
4610 U(I)=G(I-1)
4620 NEXT I
4630 GOSUB 9000
4640 R=U
4650 FOR I=1 TO L1
4660 H(I)=G(I)/(1+R/100)^I
4670 NEXT I
4680 R=((1+R/100)^K-1)*100
5000 IMAGE "RETURN = INVESTMENT
     IS ",DDD.DD,"%",//
5010 PRINT USING 5000 ; R
5020 CLEAR @ DISP "DO YOU WISH A
      COMPLETE REPORT";
5030 GOSUB 7000
5040 IF A=0 THEN 5900
5050 PRINT "  CAPITAL INVESTMENT
      ANALYSIS"
5060 PRINT "  ******************
     *********"
5070 PRINT @ PRINT
5080 IMAGE AAAAAAAAAAAAAAAAAAAA
     A,DDDDDD.DD
5090 PRINT USING 5080 ; "INVESTM
     ENT COST",I1
5100 PRINT USING 5080 ; "SALVAGE
      VALUE",S1
5110 PRINT USING 5080 ; "INVESTM
     ENT TAX CREDIT",C1
5120 PRINT USING 5080 ; "LIFE OF
      INVESTMENT",L1
5130 PRINT USING 5080 ; "NET INV
     ESTMENT COST",I1-C1
5140 PRINT USING 5080 ; "INCOME
     TAX RATE",T1
5150 PRINT @ PRINT
5160 PRINT "-------------------
     ------------" @ PRINT @ PRI
     NT
5165 T2=0
5170 FOR I=1 TO L1
```

Report

PROGRAM LISTING

Listing **Comments**

```
5180 PRINT "PERIOD ";I
5190 PRINT "- - - - - - -"
5200 PRINT
5210 PRINT USING 5080 ; "NORMAL
     EARNINGS",E(I)
5220 PRINT USING 5080 ; "EXTRA E
     ARNINGS",A(I)
5230 PRINT USING 5080 ; "NORMAL
     EXPENSES",X(I)
5240 PRINT USING 5080 ; "EXTRA E
     XPENSES",Y(I)
5250 PRINT USING 5080 ; "BEFORE
     TAX CASH FLOW",B(I)
5260 PRINT @ PRINT
5270 PRINT USING 5080 ; "DEPRECI
     ATION",D(I)
5280 PRINT USING 5080 ; "TAXABLE
      INCOME",C(I)
5290 PRINT USING 5080 ; "INCOME
     TAX",F(I)
5300 PRINT USING 5080 ; "AFTER T
     AX CASH FLOW",G(I)
5310 PRINT USING 5080 ; "DISCOUN
     TED CASH FLOW",H(I)
5320 PRINT @ PRINT "----------
     ----------" @ PRI
     NT
5330 T2=T2+H(I)
5340 NEXT I
5350 PRINT
5360 PRINT USING 5080 ; "TOTAL D
     ISCOUNTED CASH FLOW",T2
5370 PRINT USING 5080 ; "INITIAL
      INVESTMENT",I1-C1
5380 PRINT USING 5080 ; "NET PRE
     SENT VALUE",T2-(I1-C1)
5390 PRINT
5400 !                                  Program options
5900 CLEAR @ DISP
5910 DISP "      PROGRAM OPTIONS:
     "
5920 DISP @ DISP "      1) ENTER
     NEW DATA"
5930 DISP "      2) CHANGE CURREN
     T DATA"
5935 DISP "      3) RE-COMPUTE"
5940 DISP "      4) QUIT"
5950 DISP @ DISP "      ENTER OPT
     ION";
5960 INPUT Q2
5970 ON Q2 GOTO 70,6000,4000,599
     0
5980 GOTO 5900
5990 CLEAR @ DISP "DONE" @ END          Change options
6000 CLEAR @ DISP "      CHANGE O
     PTIONS:" @ DISP
6010 DISP "      1) BASIC DATA"
6020 DISP "      2) EARNINGS DATA
     "
6030 DISP "      3) EXPENSE DATA"
```

PROGRAM LISTING

Listing **Comments**

```
6040 DISP "      4) DEPRECIATION
     DATA"
6050 DISP "      5) EXIT"
6060 DISP @ DISP "      ENTER OPT
     ION";
6070 INPUT Q2@ CLEAR
6080 ON Q2 GOTO 6110,6410,6520,6
     640,5900
6090 GOTO 6000
6110 CLEAR @ DISP "      BASIC DA
     TA OPTIONS:" @ DISP
6120 DISP "      1) INVESTMENT AM
     OUNT"
6130 DISP "      2) INVESTMENT TA
     X CREDIT"
6140 DISP "      3) SALVAGE VALUE
     "
6150 DISP "      4) LIFE OF INVES
     TMENT"
6160 DISP "      5) INCOME TAX RA
     TE"
6170 DISP "      6) EXIT"
6180 DISP @ DISP "      ENTER OPT
     ION";
6190 INPUT Q2@ CLEAR
6200 ON Q2 GOTO 6230,6260,6290,6
     320,6350,6000
6210 GOTO 6110
6230 DISP "ENTER INVESTMENT AMOU
     NT";
6240 INPUT I1@ GOTO 6700
6260 DISP "ENTER INVESTMENT TAX
     CREDIT";
6270 INPUT C1@ GOTO 6700
6290 DISP "ENTER SALVAGE VALUE";
6300 INPUT S1@ GOTO 6700
6320 DISP "ENTER LIFE OF INVESTM
     ENT";
6330 INPUT L1@ GOTO 6700
6350 DISP "ENTER INCOME TAX RATE
     ";
6360 INPUT T1
6370 GOTO 6110
6410 DISP "CHANGE EARNINGS OPTIO
     N";
6420 GOSUB 7000
6430 IF A=0 THEN 6450
6440 GOSUB 7100
6450 GOSUB 7300
6460 CLEAR
6470 DISP "CHANGE EXTRAORDINARY
     EARNINGS";
6480 GOSUB 7000
6490 IF A=0 THEN 6710
6500 GOSUB 7500
6510 GOTO 6710
6520 CLEAR
6530 DISP "CHANGE EXPENSE OPTION
     S";
6540 GOSUB 7000
```

Basic data changes

Earnings & expense changes

PROGRAM LISTING

Listing **Comments**

```
6550 IF A=0 THEN 6570
6560 GOSUB 7600
6570 GOSUB 7800
6580 CLEAR
6590 DISP "CHANGE EXTRAORDINARY
     EXPENSES";
6600 GOSUB 7000
6610 IF A=0 THEN 6710
6620 GOSUB 8000
6630 GOTO 6710
6640 CLEAR
6650 DISP "CHANGE DEPRECIATION O
     PTION";
6660 GOSUB 7000
6670 IF A=0 THEN 6690
6680 GOSUB 8100
6690 GOSUB 8300
6700 CLEAR
6710 DISP "ANY MORE CHANGES";
6720 GOSUB 7000
6730 IF A=0 THEN 4000
6740 GOTO 6000
7000 INPUT Q$
7005 A=2                              Question response routine
7010 IF Q$[1,1]="Y" THEN A=1
7020 IF Q$[1,1]="N" THEN A=0
7030 IF A#2 THEN RETURN
7040 BEEP @ DISP "Respond YES or
      NO please...";@ GOTO 7000
7100 CLEAR @ DISP "      EARNINGS
      OPTIONS:"                       Enter earnings data
7110 DISP
7120 DISP "      1) ENTER EARNING
     S BY PERIOD"
7130 DISP "      2) UNIFORM EARNI
     NGS"
7140 DISP "      3) STRAIGHT LINE
      DECLINE"
7150 DISP "      4) EARLY RAPID D
     ECLINE"
7160 DISP "      5) LATER RAPID D
     ECLINE"
7165 DISP "      6) EXIT"
7170 DISP
7180 DISP "      ENTER OPTION";
7190 INPUT E1
7200 IF E1<1 OR E1>6 THEN 7100
7210 RETURN
7300 CLEAR @ ON E1 GOTO 7310,737
     0,7410,7410,7410,7470
7310 DISP "ENTER EARNINGS:" @ DI
     SP
7320 FOR I=1 TO L1
7330 DISP "PERIOD";I;
7340 INPUT E(I)
7350 NEXT I
7360 GOTO 7470
7370 DISP "ENTER SINGLE EARNING
     AMOUNT";
7380 E2,E4=0
```

PROGRAM LISTING

Listing | Comments

```
7390 INPUT E3
7400 GOTO 7470
7410 DISP "ENTER EARNINGS LIFE I
     N YEARS";
7420 INPUT E2
7430 DISP @ DISP "ENTER INITIAL
     EARNINGS";
7440 INPUT E3
7450 DISP @ DISP "ENTER % OF INI
     TIAL VALUE TO     BE FINAL"
     ;
7460 INPUT E4@ E4=E4*.01
7470 RETURN
7480 !
7500 CLEAR @ DISP "ENTER NUMBER
     OF EXTRAORDINARY   EARNINGS
     ";
7510 INPUT E6
7520 DISP @ DISP "FOR EACH EARNI
     NG, ENTER PERIOD  NUMBER AN
     D AMOUNT:" @ DISP
7530 FOR I=1 TO E6
7540 DISP "EARNING #";I;
7550 INPUT E7,E8
7560 A(E7)=E8
7570 NEXT I
7580 RETURN
7600 CLEAR @ DISP "     EXPENSE     Enter expense data
     OPTIONS:" @ DISP
7610 DISP "      1) ENTER EXPENSE
     S BY PERIOD"
7620 DISP "      2) UNIFORM EXPEN
     SES"
7630 DISP "      3) STRAIGHT LINE
      DECLINE"
7640 DISP "      4) EARLY RAPID D
     ECLINE"
7650 DISP "      5) LATER RAPID D
     ECLINE"
7660 DISP "      6) EXIT"
7670 DISP
7680 DISP "      ENTER OPTION";
7690 INPUT X1
7700 IF X1<1 OR X1>6 THEN 7600
7710 RETURN
7800 CLEAR @ ON X1 GOTO 7810,787
     0,7910,7910,7910,7970
7810 DISP "ENTER EXPENSES:" @ DI
     SP
7820 FOR I=1 TO L1
7830 DISP "PERIOD";I;
7840 INPUT X(I)
7850 NEXT I
7860 GOTO 7970
7870 DISP "ENTER UNIFORM EXPENSE
      AMOUNT";
7880 X2,X4=0
7890 INPUT X3
7900 GOTO 7970
7910 DISP "ENTER EXPENSE LIFE IN
      YEARS";
```

PROGRAM LISTING

Listing **Comments**

```
7920 INPUT X2
7930 DISP @ DISP "INITIAL EXPENS
     E";
7940 INPUT X3
7950 DISP @ DISP "ENTER % OF INI
     TIAL EXPENSE TO BEFINAL VAL
     UE";
7960 INPUT X4
7970 RETURN
8000 CLEAR @ DISP "ENTER NUMBER
     OF EXTRAORDINARY   EXPENSES
     ";
8010 INPUT X6
8020 DISP @ DISP "FOR EACH EXPEN
     SE, ENTER PERIOD  NUMBER AN
     D AMOUNT:" @ DISP
8030 FOR I=1 TO X6
8040 DISP "EXPENSE #";I;
8050 INPUT X7,X8
8060 Y(X7)=X8
8070 NEXT I
8080 RETURN
8100 CLEAR @ DISP
8110 DISP "      DEPRECIATION OPT
     IONS:"
8120 DISP "      1) EACH IS ENTER
     ED"
8130 DISP "      2) STRAIGHT LINE
     "
8140 DISP "      3) DECLINING BAL
     ANCE"
8150 DISP "      4) SUM OF YEARS
     DIGITS"
8160 DISP "      5) EXIT"
8170 DISP
8180 DISP "      ENTER OPTION";
8190 INPUT D1
8200 IF D1<1 OR D1>5 THEN 8100
8210 RETURN
8300 CLEAR @ IF D1=1 THEN 8370
8310 IF D1=5 THEN 8420
8320 DISP "ENTER % OF INVESTMENT
      NOT TO BE DEPRECIATED";
8330 INPUT D2
8340 DISP @ DISP "ENTER NUMBER O
     F YEARS TO        DEPRECIAT
     E";
8350 INPUT D3
8360 GOTO 8420
8370 DISP "FOR EACH PERIOD, ENTE
     R THE       DEPRECIATION:" @
      DISP
8380 FOR I=1 TO L1
8390 DISP "PERIOD";I;
8400 INPUT D(I)
8410 NEXT I
8420 RETURN
9000 U=0
9010 U1,U2=0
9020 FOR U3=1 TO U9
```

Depreciation options

Discounting routine

PROGRAM LISTING

Listing Comments

```
9030 U4=U(U3)*EXP(-U*(U3-1))
9040 U1=U1+U4
9050 U2=U2+(U3-1)*U4
9060 NEXT U3
9070 U=U+U1/U2
9080 IF ABS(U1/U2)>.00001 THEN 9
     010
9090 U=100*(EXP(U)-1)
9100 RETURN
```

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Mortgage Plan Comparison

File Name M C O S T

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 2,144

Program Description: MCOST permits the user to easily compare and evaluate up to 1000 mortgage payment plans simultaneously. The program computes monthly mortgage payments for various principal amounts at different interest rates over varying periods.

PROGRAM DESCRIPTION II

Sample Problem

Compare two mortgages:

```
Number of principal amounts:     1
Amount 1                    : 22000
Number of rates             :     2
Rate 1                      :     7.5
Rate 2                      :     8.0
Number of terms             :     2
Term 1                      :    20
Term 2                      :    25
```

SOLUTION:

```
LOAD "MCOST".
RUN.

Enter input data as prompted.

     AMOUNT =  22000

       RATE =  7.5

           TERM=  20 YEARS
             PAYMENT =  177.23
             INTEREST =  20535.32

           TERM=  25 YEARS
             PAYMENT =  162.58
             INTEREST =  26773.42
             DEC MONTH PMT=  14.65
             INC TOTAL INT=  6238.1


       RATE =  8

           TERM=  20 YEARS
             PAYMENT =  184.02
             INTEREST =  22164.04

           TERM=  25 YEARS
             PAYMENT =  169.8
             INTEREST =  28939.87
             DEC MONTH PMT=  14.22
             INC TOTAL INT=  6775.83

     --------------------------------
```

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
A(*)	Principal Amounts		
R(*)	Rates		
T(*)	Terms		
P	Payment		
R4	Interest		

SERIES 80 USERS' LIBRARY

USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "MCOST" and press RUN.
2	Enter input data as prompted.
	NOTE: Rates are in percentages (I>1, e.g. 7.5).
3	Results will be printed.

PROGRAM LISTING

Listing **Comments**

```
 10 DIM A(36),R(36),T(36)
 20 DEF FNA(X) = INT((X*1000+5)/
    10)/100
 30 CLEAR
 40 DISP "ENTER NUMBER OF PRINCI
    PAL       AMOUNTS";
 50 INPUT A2
 60 DISP @ DISP "ENTER THE AMOUN
    TS:"
 70 FOR X=1 TO A2
 80 DISP "AMOUNT ";X;@ INPUT A(X
    )
 90 NEXT X
100 CLEAR
110 DISP "ENTER THE NUMBER OF RA
    TES";
120 INPUT R2
130 DISP @ DISP "ENTER THE RATES
    :"
140 FOR X=1 TO R2
150 DISP "RATE ";X;@ INPUT R(X)
160 NEXT X
170 CLEAR
180 DISP "ENTER THE NUMBER OF TE
    RMS";
190 INPUT T2
200 DISP @ DISP "ENTER THE TERMS
    :"
210 FOR X=1 TO T2
220 DISP "TERM ";X;@ INPUT T(X)
230 NEXT X
240 CLEAR
250 FOR A1=1 TO A2                    Amount loop
260 PRINT "AMOUNT = ";FNA(A(A1))
270 PRINT
280 FOR R1=1 TO R2
290 PRINT "  RATE = ";FNA(R(R1))      Rate loop
300 PRINT
310 R5=0 @ P1=0
320 FOR T1=1 TO T2                    Term loop
330 PRINT TAB(6);"TERM= ";T(T1);
    "YEARS"
340 N=12*T(T1)
350 R3=R(R1)/1200                     Payment
360 P=A(A1)*R3/(1-1/(1+R3)^N)
370 R4=P*N-A(A1)                      Interest
380 PRINT TAB(8);"PAYMENT = ";FN
    A(P)                              Print report
390 PRINT TAB(8);"INTEREST = ";F
    NA(R4)
400 IF P1=0 THEN 420
410 PRINT TAB(8);"DEC MONTH PMT=
     ";FNA(P1-P)
420 IF R5=0 THEN 440
430 PRINT TAB(8);"INC TOTAL INT=
     ";FNA(R4-R5)
440 PRINT
450 R5=R4
460 P1=P
470 NEXT T1
```

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing

Comments

```
480 PRINT
490 NEXT R1
500 PRINT "----------------------
    -----------"
510 PRINT
520 NEXT A1
530 END
```

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Investment Return

File Name I R R P V

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 2,930

Program Description: This program calculates internal rates of return and present values for sets of cash inflows and outflows over time.

PROGRAM DESCRIPTION II

Sample Problem

```
Number of periods    :      5
Initial cash flow    : -18000
Cash flow 1st period:   5600
Rest of flows same   :      Y
Option               :     K3
Option               :     K4
Discount rate        :     10
```

SOLUTION:

```
LOAD "IRRPV".
RUN.

Enter input data as prompted.

     The internal rate of return
     is 16.8 percent.

     Net present value is
          3,228.41
```

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
A$	Input work string		
F( )	Cash flows for each period		
I	Loop counter		
K	Discount rate		
N	Number of periods		
P	Present value		
R	Rate of return		

SERIES 80 USERS' LIBRARY

USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "IRRPV" and press RUN.
2	Select option.
3	Input data as prompted.
4	Select option.
5	Results will be displayed.

PROGRAM LISTING

Listing **Comments**

```
 10 DIM A$[10],Z$[10],F(100)
 20 T9=100
 30 ON KEY# 1," ENTER" GOTO 160
 40 ON KEY# 2,"  HELP" GOTO 70
 50 ON KEY# 3,"   IRR" GOSUB 440
 60 ON KEY# 4,"    PV" GOSUB 780
 70 CLEAR @ KEY LABEL
 80 DISP @ DISP TAB(11);"SELECT
    OPTION"
 90 DISP
100 DISP " K1: Enter data"
110 DISP " K2: List key function
    s"
120 DISP " K3: Internal Rate of
    Return"
130 DISP " K4: Present Value"
140 GOTO 140
150 ! GET DATA                          Enter data
160 CLEAR
170 DISP " Number of periods aft
    er"
180 DISP " period 0";
190 INPUT N
200 N=N+1
210 DISP " + represents a net in
    flow"
220 DISP " - represents a net ou
    tflow"
230 DISP " Initial cash flow in
    period 0";
240 INPUT F(1)
250 DISP " Cash flow in first pe
    riod";
260 INPUT F(2)
270 IF N<=2 THEN 410
280 DISP " Are all the rest of t
    he flows"
290 DISP " the same";
300 INPUT A$
310 IF UPC$(A$[1,1])="Y" THEN 38
    0
320 FOR I=3 TO N
330 DISP " Period";I-1;"flow";
340 INPUT F(I)
350 NEXT I
360 GOTO 410
370 ! ALL FLOWS THE SAME
380 FOR I=3 TO N
390 F(I)=F(2)
400 NEXT I
410 DISP @ DISP
420 GOTO 70
430 ! INTERNAL RATE OF RETURN          Internal rate of return
440 CLEAR @ KEY LABEL
450 IF F(1)<0 THEN 500
460 DISP " Internal rate of retu
    rn cannot"
470 DISP " be calculated unless
    the"
480 DISP " initial cash flow is
    an outflow"
```

PROGRAM LISTING

Listing **Comments**

```
490 KEY LABEL @ RETURN
500 R=.95 @ M=0
510 F1=1 @ M=M+1 @ S1=F(1)
520 IF M>20 THEN 670
530 S2=0
540 FOR I=2 TO N
550 S2=S2+(I-1)*F1*F(I)
560 F1=F1*R
570 S1=S1+F1*F(I)
580 NEXT I
590 D=S1/S2 @ R=R-D
600 IF ABS(D)>.0005 THEN 510
610 R=100*(1/R-1)
620 R=.01*INT(100*R+.5)
630 DISP " The internal rate of
    return"
640 DISP " is";R;"percent."
650 KEY LABEL @ RETURN
660 ! NO SOLUTION FOUND
670 DISP " No internal rate of r
    eturn"
680 DISP " found using standard"
690 DISP " procedures. You might
     find it"
700 DISP " with trial-and-error"
710 DISP " computations of prese
    nt values."
720 DISP " If you want to try, s
    tart"
730 DISP " with a discount rate
    of";
740 DISP USING 750 ; 100*(1/R-1)
750 IMAGE " ",DDD.DD,"percent."
760 KEY LABEL @ RETURN
770 ! PRESENT VALUE OF FLOWS
780 CLEAR @ KEY LABEL
790 DISP " Discount rate (percen
    t)";
800 INPUT K
810 K=.01*K @ P=0 @ K1=1
820 FOR I=1 TO N
830 P=P+F(I)/K1 @ K1=K1*(1+K)
840 NEXT I
850 DISP " Net present value is"
860 DISP USING "3DC3DC3D.DD" ; P
870 RETURN
880 END
```

No solution found

Display present value of flows

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Discounted Return on Investment and Payback

File Name D R O I P B

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 6,173

Program Description: This program calculates the discounted return on investment and payback. From initial investment and cash flow information, depreciation, taxable income, taxes and cash flow after taxes are predicted. Three depreciation methods can be used for the calculations.

PROGRAM DESCRIPTION II

Sample Problem

```
Initial investment:  129876.80        Enter cash flows:
Investment life   :       7                  Year 1:  125314.56
Cpaital cost      :  120200                    Year 2:  150377.47
Depreciable life  :       5                  Year 3:  169174.66
Capital cost      :    9676.70               Year 4:  169174.66
Depreciable life  :       1                  Year 5:  169174.66
Capital cost      :       0                  Year 6:  169174.66
Method number     :       1                  Year 7:  169174.66

                              Tax rate = 52
```

SOLUTION:

```
LOAD "DROIPB".
RUN.

Input data as prompted.

   INVESTMENT= $ 129876.8
   INVESTMENT LIFE= 7 YEARS
   CAPITAL COST= $ 120200
   DEPRECIATION LIFE= 5 YEARS
   CAPITAL COST= $ 9676.7
   DEPRECIATION LIFE= 1 YEARS
   TAX RATE= 52 %

   YEAR          CASH FLOW
     1         125,314.56
     2         150,377.47
     3         169,174.66
     4         169,174.66
     5         169,174.66
     6         169,174.66
     7         169,174.66

   YEAR       DEPRECIATION
     1          33,716.70
     2          24,040.00
     3          24,040.00
     4          24,040.00
     5          24,040.00
     6               0.00
     7               0.00
```

PROGRAM DESCRIPTION II

YEAR	TAXABLE INCOME
1	91,597.86
2	126,337.47
3	145,134.66
4	145,134.66
5	145,134.66
6	169,174.66
7	169,174.66

YEAR	TAXES
1	47,630.89
2	65,695.48
3	75,470.02
4	75,470.02
5	75,470.02
6	87,970.82
7	87,970.82

YEAR	CASH FLOW AFTER TAX
1	77,683.67
2	84,681.99
3	93,704.64
4	93,704.64
5	93,704.64
6	81,203.84
7	81,203.84

Years to pay back = 1.80
Rate of return = 62.84%

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PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
C( )	Capital costs		
CØ	Total capital costs		
D( )	Depreciation for each year of investment life		
IØ,JØ,KØ	Loop and iteration counters		
N( )	Depreciable life for capital costs		
NØ	Investment life		
RØ	Rate of return		
S1	Sum of cash flows after taxes		
TØ	Tax rate		
W( )	Cash flow after taxes each year		
VØ	Initial investment		
V( )	Cash flows for each year of investment life		
Y	Years to payback		
Z	Depreciation method number		
Z$	Input work string		

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USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "DROIPB" and press RUN.
2	Enter input data as prompted.
3	Results will be printed.

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PROGRAM LISTING

Listing

```
 10 OPTION BASE 1
 20 DIM V(42),D(42),W(42),F(42)
 30 DIM C(42),N(42)
 40 CLEAR @ DISP "Do you want in
    structions";
 50 INPUT Z$
 60 IF UPC$(Z$[1,1])#"Y" THEN 29
    0
 70 CLEAR
 80 DISP "  Enter the initial in
    vestment"
 90 DISP "and the life of the in
    vestment."
100 DISP "  Next enter individua
    l capital"
110 DISP "costs and depreciable
    lifes."
120 DISP "The capital investment
     can be"
130 DISP "entered in parts, each
     with its"
140 DISP "own depreciable life.
    When all"
150 DISP "investments are entere
    d, enter"
160 DISP "capital cost '0' to co
    ntinue."
170 DISP "  Do not enter a depre
    ciable"
180 DISP "life greater than the
    initial"
190 DISP "investment life."
200 DISP
210 DISP "  Press END LINE to co
    ntinue";
220 INPUT Z$
230 CLEAR
240 DISP "  Select a method to c
    alculate"
250 DISP "depreciation, and ente
    r cash"
260 DISP "flows for each year ot
     the"
270 DISP "investment's useful li
    fe."
280 DISP "  Finally, enter the t
    ax rate."
290 DISP
300 DISP "What is the initial in
    vestment";
310 INPUT V0
320 V0=-ABS(V0)
330 DISP "Investment life";
340 INPUT N0
350 N3=0 @ C0=0
360 N3=N3+1
370 DISP "Capital cost";
380 INPUT C(N3)
390 IF C(N3)=0 THEN 450
400 C(N3)=ABS(C(N3))*SGN(V0)
```

Comments

Instructions

Data input

PROGRAM LISTING

Listing **Comments**

```
410 C0=C0+C(N3)
420 DISP "Depreciable life (Yrs)
    ";
430 INPUT N(N3)
440 GOTO 360
450 N3=N3-1
460 DISP
470 DISP "Depreciation methods:"
480 DISP " 1. Straight line"
490 DISP " 2. Double declining b
    alance to"
500 DISP "    straight line"
510 DISP " 3. Sum-of-years digit
    s"
520 DISP "Method number";
530 INPUT Z
540 DISP @ DISP "Cash flow:"
550 FOR I0=1 TO N0
560 DISP "Year";I0;
570 INPUT V(I0)
580 NEXT I0
590 FOR I0=1 TO N0
600 D(I0)=0
610 NEXT I0
620 IF Z>1 THEN 690
630 FOR J0=1 TO N3
640 FOR I0=1 TO N(J0) STEP 1
650 D(I0)=D(I0)-C(J0)/N(J0)
660 NEXT I0
670 NEXT J0
680 GOTO 930
690 IF Z>2 THEN 840
700 FOR J0=1 TO N3
710 Y1=ABS(C(J0))
720 FOR I0=1 TO N(J0) STEP 1
730 X=Y1/(N(J0)+1-I0)
740 X1=Y1*2/N(J0)
750 IF X>=X1 THEN 790
760 D(I0)=D(I0)+X1
770 Y1=Y1-X1
780 GOTO 810
790 D(I0)=D(I0)+X
800 Y1=Y1-X
810 NEXT I0
820 NEXT J0
830 GOTO 930
840 FOR J0=1 TO N3
850 D0=2/(N(J0)*(N(J0)+1))
860 D1=0
870 FOR I0=N(J0) TO 1 STEP -1
880 D1=D1+D0
890 IF I0>N0 THEN 910
900 D(I0)=D(I0)-C(J0)*D1
910 NEXT I0
920 NEXT J0
930 DISP
940 DISP "What is the tax rate (
    percent)";
950 INPUT T0
960 DISP @ DISP "Do you want a P
    rintout";
```

Begin computations

Print option

PROGRAM LISTING

Listing **Comments**

```
970 INPUT Z$
980 IF UPC$(Z$[1,1])="Y" THEN PR
    INT ALL
990 DISP
1000 DISP "INVESTMENT= $";ABS(V0
     )
1010 DISP "INVESTMENT LIFE=";N0;
     "YEARS"
1020 I0=0
1030 I0=I0+1
1040 IF C(I0)=0 THEN 1080
1050 DISP "CAPITAL COST= $";ABS(
     C(I0))
1060 DISP "DEPRECIATION LIFE=";N
     (I0);"YEARS"
1070 GOTO 1030
1080 DISP "TAX RATE=";T0;"%"
1090 T0=T0/100
1100 DISP
1110 DISP "YEAR        CASH FLOW"
1120 FOR I0=1 TO N0
1130 DISP USING 1190 ; I0,V(I0)
1140 NEXT I0
1150 DISP
1160 DISP "YEAR     DEPRECIATION
     "
1170 FOR I0=1 TO N0
1180 DISP USING 1190 ; I0,D(I0)
1190 IMAGE X,DD,3X,3DC3DC3D.DD
1200 NEXT I0
1210 DISP
1220 DISP "YEAR    TAXABLE INCOM
     E"
1230 FOR I0=1 TO N0
1240 I1=V(I0)-D(I0)
1250 DISP USING 1190 ; I0,I1
1260 NEXT I0
1270 DISP
1280 DISP "YEAR         TAXES"
1290 FOR I0=1 TO N0
1300 T1=T0*(V(I0)-D(I0))
1310 DISP USING 1190 ; I0,T1
1320 NEXT I0
1330 DISP
1340 DISP "YEAR  CASH FLOW AFTER
      TAX"
1350 FOR I0=1 TO N0
1360 W(I0)=V(I0)-T0*(V(I0)-D(I0)
     )
1370 DISP USING 1190 ; I0,W(I0)
1380 NEXT I0
1390 S1=0
1400 FOR I0=1 TO N0
1410 S1=S1+W(I0)
1420 IF (S1+V0)*SGN(V0)<0 THEN 1
     530
1430 NEXT I0
1440 DISP
1450 DISP "Initial investment no
     t"
```

Print/display tables

PROGRAM LISTING

Listing **Comments**

```
1460 DISP "recovered. The sum of
      the net"
1470 DISP "cash flows after taxe
     s="
1480 DISP USING "3DC3DC3D.2D" ;
     S1
1490 DISP "Net after-tax value o
     f the"
1500 DISP "investment=";
1510 DISP USING "3DC3DC3D.2D" ;
     S1+V0
1520 GOTO 1870
1530 S0=S1=W(I0)
1540 Y=I0-1-(V0+S0)/(S1-S0)
1550 DISP
1560 DISP "Years to pay back =";
1570 DISP USING "2DC3D.2D" ; Y
1580 K0=0 @ R0=0
1590 K0=K0+1
1600 F0=1/(1+R0)
1610 F(1)=F0
1620 FOR I0=2 TO N0+1
1630 F(I0)=F(I0-1)*F0
1640 NEXT I0
1650 P0=V0
1660 P1=0
1670 FOR I0=1 TO N0
1680 P0=P0+W(I0)*F(I0)
1690 P1=P1+I0*W(I0)*F(I0+1)
1700 NEXT I0
1710 IF P1=0 THEN 1800
1720 R1=P0/P1
1730 R0=R0+R1
1740 IF R0<0 THEN 1590
1750 IF ABS(R1)<.0001 THEN 1840
1760 IF K0<100 THEN 1590
1770 DISP "R non-convergent afte
     r"
1780 DISP K0;"iterations."
1790 GOTO 1840
1800 DISP "DP/DR=0 after";K0;"it
     erations"
1810 GOTO 1840
1820 DISP "R becomes negative af
     ter";K0
1830 DISP "iterations."
1840 DISP USING 1850 ; R0*100
1850 IMAGE "Rate of return =",DD
     D.DD,"%"
1860 NORMAL @ DISP "DONE"
1870 END
```

Display rate of return

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PROGRAM DESCRIPTION I

Program Title Real Estate Investment Analysis

File Name R E I N V

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 10,389

Program Description: This program allows the user to 1) select a rent vs. buy or rental investment property analysis; 2) input information about the property under review; and 3) obtain a tabular and/or graphic output of the internal rate of return and other specific financial results.

PROGRAM DESCRIPTION II

Sample Problem

Program mode	: Rent/Buy		
Years purchase to sale:	3		
Defer income tax :	Y	Annual property taxes:	475
Property price :	50000	Annual maint. costs :	375
Percent down :	25	Annual insurance exp.:	455
Interest rate % :	12.5	Other annual expenses:	475
Tax-ded. closing costs:	2000	Marginal income tax %:	37
Non-ded. closing costs:	1750	Iflation %: rent & exp:	13
Mortgage term years :	25	Est. prop. appr. % yr:	13
Alternate mo. rental :	525		
Annual utilities exp. :	425		

SOLUTION:

```
LOAD "REINV".
RUN.

Input data as prompted.

     **** CASHFLOW & INCOME ****


     YEAR    1                  (ANNUAL $)

     ALTER. RENTAL COSTS =          6300.

     EXPENSES:
     INTEREST EXPENSE =             4674.
     DEPREC. EXPENSE =                 0.
     OTHER EXPENSE =                2724.
     TOTAL EXPENSES =               7398.

     NET INCOME =                  -1098.
     B.T. CASH FLOW =              -1098.
     INCOME TAX SAVINGS =           1905.
     A.T. CASH FLOW =                807.
```

PROGRAM DESCRIPTION II

```
YEAR   2                (ANNUAL $)

ALTER. RENTAL COSTS =       7119.

EXPENSES:
INTEREST EXPENSE =          4644.
DEPREC. EXPENSE =              0.
OTHER EXPENSE =             3078.
TOTAL EXPENSES =            7722.

NET INCOME =                -603.
B.T. CASH FLOW =            -603.
INCOME TAX SAVINGS =        1894.
A.T. CASH FLOW =            1291.


YEAR   3                (ANNUAL $)

ALTER. RENTAL COSTS =       8044.

EXPENSES:
INTEREST EXPENSE =          4609.
DEPREC. EXPENSE =              0.
OTHER EXPENSE =             3479.
TOTAL EXPENSES =            8088.

NET INCOME =                 -44.
B.T. CASH FLOW =             -44.
INCOME TAX SAVINGS =        1881.
A.T. CASH FLOW =            1837.


SUMMARY OF MARGINAL AFTER TAX
CASH FLOWS


YEAR  0          -15510
YEAR  1             807
YEAR  2            1291
YEAR  3           32946


FINAL SALE PRICE =      72145.

WITH 6% REAL ESTATE COMMISSION,
SALE PROCEEDS IN YEAR 3 IS
     67816.

AT ANN. APPREC. RATE = 13 %
A.T. INT. RATE OF RETURN=
 32.34375 %
```

PROGRAM DESCRIPTION III

Operating Limits and Warnings

Reference(s)

Variables:

Name	Description	Length	Comments
M(*)	Storage for inputs		
01-09	Annual cash flows		
C2$	Tape storage file name		

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USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "REINV" and press RUN.
2	Select program mode.
3	Enter input data as prompted.
4	Choose option.
5	Results will be displayed.

PROGRAM LISTING

Listing **Comments**

```
 10 DIM M(27),C(30)
 20 ON KEY# 1,"RENT/BUY" GOTO 60
 30 ON KEY# 4," INVEST" GOTO 70
 40 CLEAR @ KEY LABEL @ DISP @ D
    ISP @ DISP "SELECT REAL ESTA
    TE ANALYSIS     PROGRAM MODE
    "
 50 GOTO 50
 60 X1=0 @ GOTO 80
 70 X1=1 @ GOTO 80
 80 CLEAR @ GCLEAR @ CRT IS 1
 90 IF X1#1 THEN 150 ELSE H=0
100 DISP "INVESTMENT PROPERTY AN
    ALYSIS"
110 DISP
120 DISP "THIS PROGRAM PROVIDES
    A FINANCIAL ANALYSIS OF A PR
    OSPECTIVE INVESTMENT PROPERT
    Y."
130 DISP
140 DISP "READ DIRECTIONS CAREFU
    LLY." @ GOTO 180
150 H=0 @ DISP "RENT VS. BUY ANA
    LYSIS PROGRAM" @ DISP @ DISP
     "THIS PROGRAM PROVIDES FINA
    NCIAL"
160 DISP "ANALYSIS OF THE ADDITI
    ONAL      INVESTMENT REQUIRE
    D TO BUY A    HOME RATHER TH
    AN RENT."
170 DISP @ DISP "READ DIRECTIONS
     CAREFULLY."
180 DISP
190 DISP
200 DISP "DO YOU WANT TO USE DAT
    A ALREADY STORED ON THE TAPE
     CARTRIDGE ?  (Y/N)"
210 INPUT T1$
220 IF T1$[1,1]#"Y" THEN 300
230 DISP "WHICH FILE NAME ?"
240 INPUT C2$
250 ASSIGN# 1 TO C2$
260 READ# 1 ; M(,)
270 ASSIGN# 1 TO *
280 IF M(20)#1 THEN DISP "FILE N
    OT FOR USE WITH THIS PROGRAM
    ." @ DISP @ GOTO 200
290 GOTO 860
300 DISP "NUMBER OF YEARS FROM P
    URCHASE   UNTIL SALE (2-5 YR
    S. SUGGESTED)?"
310 INPUT M(19)
320 IF X1=1 THEN 340 ELSE DISP "
    DO YOU EXPECT TO DEFER INCOM
    E   TAXES ON CAPITAL GAINS W
    HEN YOU"
321 DISP "SELL, BY REINVESTING?"
330 DISP "(Y/N)" @ INPUT T5$@ IF
     T5$[1,1]="Y" THEN M(26)=0 E
    LSE M(26)=1
```

Select program mode

X1=0 for Rent vs. Buy
X1=1 for Investment Analysis

Instructions

Read in previous data from tape

Input data

Enter number of years from purchase to sale

Select Capital Gains deferment

PROGRAM LISTING

Listing	Comments
340 DISP "PRICE OF THE PROPERTY? "	Enter price of the property
350 INPUT M(1)	
360 DISP "% DOWNPAYMENT?"	Enter downpayment percent
370 INPUT M(2)	
380 DISP "INTEREST RATE?"	Enter interest rate
390 INPUT M(3)	
400 DISP "TAX DEDUCTABLE CLOSING COSTS ($)?"	Amount of tax-deductible closing costs
410 INPUT M(17)	
420 DISP "NON-DEDUCTABLE CLOSING COSTS($) OR OTHER INITIAL C OSTS?"	Amount of non-deductible closing costs
430 INPUT M(18)	
440 DISP "MORTGAGE TERM IN YRS?"	Mortgage term
450 INPUT M(5)	
460 IF X1=1 THEN DISP "VALUE OF THE LAND?" ELSE 490	Enter value of land
470 INPUT M(6)	
480 DISP "MONTHLY RENTAL INCOME (ALL UNITS OCCUPIED)?" @ GOT O 500	Monthly rental income
490 DISP "MONTHLY ALTERNATIVE RE NT COST FOR EQUIVALENT HOU SING, PLUS MO. UTILITIES YOU PAY"	Alternative rental cost
500 INPUT M(7)	
510 IF X1=1 THEN DISP "% ESTIMAT ED VACANCY RATE" ELSE 530	Estimated vacancy rate
520 INPUT M(4)	
530 DISP "ANNUAL UTILITIES EXPEN SE?"	Annual utilities expense
540 INPUT M(8)	
550 DISP "ANNUAL PROPERTY TAXES? "	Annual property taxes
560 INPUT M(9)	
570 IF X1=1 THEN DISP "MAINTANEN CE AS % OF RENTAL INCOME ? (25-30% SUGGESTED)" ELSE 590	Maintenance as % of rental income
580 GOTO 600	
590 DISP "ANNUAL MAINTENANCE COS TS"	Maintenance costs
600 INPUT M(10)	
610 DISP "ANNUAL INS. COSTS ?"	Enter annual insurance costs
620 INPUT M(11)	
630 DISP "OTHER ANNUAL EXP.?"	Enter other annual expenses
640 INPUT M(12)	
650 IF X1=1 THEN 670 ELSE M(13)= 0	
660 GOTO 690	
670 DISP "DEPRECIATION RATE %/YR . (USES 'DECLINING BALANCE ' METHOD)?"	Enter depreciation rate
680 INPUT M(13)	
690 DISP "MARGINAL INCOME TAX BR ACKET ?"	Enter marginal income tax bracket
700 INPUT M(14)	
710 DISP "INFLATION FACTOR FOR R ENTS, EXPENSES, AND PROPERTY TAXES ?"	Inflation factor

PROGRAM LISTING

Listing | **Comments**

```
720 INPUT M(15)
730 DISP "ASSUMED APPRECIATION R
    ATE (% PER YEAR)?"
740 INPUT M(16)
750 IF M(16)<0 THEN DISP "MUST N
    OT BE LESS THAN ZERO" @ GOTO
     730
760 IF X1=1 THEN M(20)=1 ELSE M(
    20)=2
770 DISP "DO YOU WANT TO STORE T
    HE DATA ON TAPE ? (Y/N)"
780 INPUT T2$
790 IF T2$[1,1]#"Y" THEN 860
800 DISP "NAME THE FILE"
810 INPUT C3$
820 CREATE C3$,5
830 ASSIGN# 1 TO C3$
840 PRINT# 1 ; M(,)
850 ASSIGN# 1 TO *
860 ! SELECT COMPUTATION OPTION
870 DISP "CHOOSE ONE OF THE FOLL
    OWING OPTIONS:"
880 DISP "      1 = LIST INPUT DA
    TA"
890 DISP "      2 = A.T.CASH FLOW
    S & IRR"
900 DISP "      3 = CHART OF RATE
     OF RETURN          (PER YEAR
    ) VS ANNUAL"
910 DISP "           APPRECIATION
    RATE"
920 DISP "      4 = COMPUTE IRR O
    NLY"
930 DISP "      5 = CHANGE A VARI
    ABLE"
940 DISP "      6 = STOP"
950 INPUT F1
960 IF INT(F1)#F1 OR INT(F1)<1 O
    R INT(F1)>6 THEN DISP "NO GO
    OD, TRY AGAIN" @ GOTO 880
970 IF F1=3 THEN DISP @ DISP "CO
    MPUTING RETURN RATE (IRR)...
    " @ DISP @ A1=M(16) @ M(16)=
    0 @ H=0
980 I6=1
990 O3=0
1000 Y2=0
1010 IF F1=1 THEN 2600
1020 IF F1=2 THEN 1060
1030 IF F1=3 OR F1=4 THEN 1080
1040 IF F1=5 THEN 2560
1050 IF F1=6 THEN DISP "DONE" @
     PRINT USING "/////" @ STOP
1060 GOSUB 2930
1070 DISP USING "/////,32A" ; "*
     *** CASHFLOW & INCOME ****"
1080 !  START COMPUTATIONS *****
1090 M(21)=M(1)-M(2)/100*M(1)
1100 IF X1=1 THEN M(22)=M(1)-M(6
     )
```

Assumed appreciate rate

Option to store the inputs into a data file

Option to store data on tape

Select output/data change option

Compute cash flows and income projections

PROGRAM LISTING

Listing | Comments

```
1110 IF X1=1 THEN M(24)=M(22) EL
     SE M(24),M(22)=0
1120 M(25)=M(21)
1130 GOSUB 1510
1140 ! PRINTS EACH YEARS CASH FL
     OWS."
1150 Y2=Y2+1
1160 P1=1+(Y2-1)*12
1170 P2=P1+11
1180 GOSUB 1610
1190 IF X1=1 THEN O1=12*M(7)*(10
     0-M(4))/100*I6 ELSE O1=12*M
     (7)*I6
1200 I6=I6*(1+M(15)/100)
1210 IF X1=1 THEN O3=M(24)*M(13)
     /100 ELSE O3=0
1220 IF X1=1 THEN O4=(M(8)+M(9)+
     M(11)+M(12))*I6+O1*M(10)/10
     0 ELSE 1240
1230 GOTO 1250
1240 O4=(M(8)+M(9)+M(10)+M(11)+M
     (12))*I6+M(23)-O2
1250 O5=O2+O3+O4 @ IF X1#1 THEN
     O5=O5-O3
1260 O6=O1-O5
1270 IF X1=1 THEN O7=O6*(-M(14)/
     100) ELSE P7=(O2+M(9))*(M(1
     4)/100)
1280 IF X1=1 THEN O8=O1-M(23)-O4
      ELSE O8=O1-O2-O4
1290 IF X1=1 THEN O9=O8+O7 ELSE
     O9=O8+P7
1300 C(Y2)=O9 @ IF X1#1 THEN 132
     0
1310 M(24)=M(24)-O3
1320 M(25)=M(25)-M(23)+O2
1330 ! PRINTOUT ANNUAL CASHFLOWS
     !
1340 IF F1#2 THEN 1490
1350 DISP USING "////,5A,3D,14X,
     10A,/" ; "YEAR ",Y2,"(ANNUA
     L $)"
1360 IF X1=1 THEN DISP USING "24
     A,7D.,/" ; "GROSS RENTAL IN
     COME =",O1 ELSE 1380
1370 GOTO 1390
1380 DISP USING "24A,7D.,/" ; "A
     LTER. RENTAL COSTS =",O1
1390 DISP USING "24A,7D." ; "EXP
     ENSES:"
1400 DISP USING "24A,7D." ; "INT
     EREST EXPENSE =",O2
1410 DISP USING "24A,7D." ; "DEP
     REC. EXPENSE =",O3
1420 DISP USING "24A,7D." ; "OTH
     ER EXPENSE =",O4
1430 DISP USING "24A,7D." ; "TOT
     AL EXPENSES =",O5
1440 DISP
1450 DISP USING "24A,7D." ; "NET
      INCOME =",O6
```

Output cash flows

PROGRAM LISTING

Listing **Comments**

```
1460 DISP USING "24A,7D." ; "B.T
     . CASH FLOW =",08
1470 IF X1#1 THEN DISP USING "24
     A,7D." ; "INCOME TAX SAVING
     S =",P7
1480 DISP USING "24A,7D." ; "A.T
     . CASH FLOW =",09
1490 IF Y2<M(19) THEN 1150
1500 GOTO 1670
1510 ! PAYMENT COMPUTATION !
1520 S3=M(21)
1530 V1=M(21)
1540 J=M(3)/1200
1550 N=M(5)*12
1560 R=(1+J)^(-N)
1570 P=-V1/((1-R)/J)
1580 P=INT(P*100+.5)/100
1590 M(23)=-12*P
1600 RETURN
1610 ! *** COMPUTE ANN. INTER.EX
     PENSE ***
1620 O2=0
1630 FOR I=P1 TO P2
1640 S2=J*S3 @ S2=INT(S2*100+.5)
     /100 @ S3=S3+S2+P @ O2=O2+S
     2
1650 NEXT I
1660 RETURN
1670 WAIT 500
1680 C(0)=-M(1)*M(2)/100-M(18)-M
     (17)*(100-M(14))/100
1690 A2=C(M(19))
1700 G1=M(1)*(1+M(16)/100)^M(19)
1710 IF X1=1 THEN T=(M(22)-M(24)
     )*M(14)/100+(G1*.94-M(1))*.
     4*M(14)/100 ELSE 1730
1720 GOTO 1740
1730 T=M(26)*(G1*.94-M(1))*.4*M(
     14)/100
1740 C(M(19))=A2+G1*.94-T-M(25)
1750 IF F1#2 THEN 1920
1760 IF X1=1 THEN DISP USING "//
     //,32A,//" ; "SUMMARY OF AF
     TER TAX CASH FLOWS" ELSE 17
     70
1770 DISP USING "////,64A,//" ;
     "SUMMARY OF MARGINAL AFTER
     TAX   CASH FLOWS"
1780 FOR I=0 TO M(19)
1790 DISP USING "5A,2D,5X,10D" ;
      "YEAR ",I,C(I)
1800 NEXT I
1810 DISP USING "///"
1820 IF C1$[1]#"Y" THEN WAIT 300
     0
1830 DISP USING "19A,10D." ; "FI
     NAL SALE PRICE = ";G1
1840 DISP
1850 DISP "WITH 6% REAL ESTATE C
     OMMISSION, SALE PROCEEDS IN
      YEAR";M(19);"IS"
```

Tax effect on cash flow

Calculate sale price

Output cash flows

Output sale price

PROGRAM LISTING

Listing **Comments**

```
1860 DISP USING "10D." ; G1*.94
1870 CRT IS 1
1880 DISP USING "//"
1890 DISP "INTERNAL RATE OF RETU
     RN BEING COMPUTED."
1900 IF C1$[1,1]="Y" THEN CRT IS
      2
1910 DISP
1920 ! *** COMPUTE IRR ***
1930 K1=1 ! SIGN OF P.V. INDICAT
     OR
1940 K2=.2 ! INITIAL IRR INCREM.
1950 J2=0 ! FLAG FOR NEG. IRR
1960 J=0
1970 V2=0
1980 V4=0
1990 FOR I=0 TO M(19)
2000 R=(1+J)^I
2010 V1=C(I)/R
2020 V2=V2+V1
2030 NEXT I
2040 K=ABS(V2)/V2
2050 IF K#K1 THEN K1=K @ K2=K2/2
2060 J1=J+K1*K2
2070 IF J1<0 THEN DISP "APPR. RA
     TE ";M(16);"%";"     IRR NEG
     ATIVE" @ J=0 @ J1=J @ J2=1
     @ GOTO 2100
2080 IF ABS(J-J1)>.001 THEN J=J1
      @ GOTO 1970
2090 IF F1#3 THEN DISP "AT ANN.
     APPREC. RATE =";M(16);"%";"
     A.T. INT. RATE OF RETURN=";
     J*100;"%"
2100 IF F1#3 THEN WAIT 1500 @ DI
     SP USING "/////" @ CRT IS 1
      @ GOTO 860
2110 IF J=0 THEN 2170
2120 X=M(16)
2130 D(H)=X
2140 E(H)=J*100
2150 H=H+1
2160 DISP USING "(10A,3D,2A,8A,3
     D.D,A)" ; "APPR. RATE",M(16
     )," %","      IRR =",E(H-1),
     " %"
2170 IF J2=1 AND M(16)<24 THEN M
     (16)=M(16)+2 @ GOTO 1700 !
     STEPS 2% UNTIL IRR TURNS PO
     SITIVE
2180 IF M(16)<25 THEN M(16)=M(16
     )+10 @ GOTO 1700
2190 WAIT 500
2200 ! *** PLOT IRR ***
2210 PENUP
2220 SCALE -7,26,-20,63
2230 XAXIS 0,5,0,25
2240 YAXIS 0,10,0,60
2250 FOR I=0 TO H-1
2260 PLOT D(I),E(I)
```

Compute IRR

Step through appreciation rates

Plot IRR

PROGRAM LISTING

Listing **Comments**

```
2270 NEXT I
2280 LDIR 0
2290 FOR I1=5 TO 25 STEP 5
2300 MOVE I1-.8,-9
2310 LABEL VAL$(I1)
2320 NEXT I1
2330 FOR I2=10 TO 60 STEP 10
2340 MOVE -3,I2-1.8
2350 LABEL VAL$(I2)
2360 NEXT I2
2370 MOVE 0,-18
2380 LABEL "ANNUAL APPREC. RATE
     %"
2390 LDIR 45
2400 MOVE -5,-15
2410 LABEL "INT.RATE RETURN (%/Y
     R)"
2420 M(16)=A1
2430 WAIT 3000
2440 CLEAR
2450 DISP "DO YOU WANT TO COPY ?
      (Y/N)"
2460 INPUT T3$
2470 IF T3$[1,1]="Y" THEN PRINT
     USING "////" @ GRAPH @ COPY
      ELSE 860                      Copy graphics screen to printer
2480 PRINT USING "/////"
2490 GOTO 860
2500 ! *** CHANGES ONE OR MORE V
     ARIABLES ***
2510 CRT IS 1
2520 DISP
2530 DISP "DO YOU WANT TO CHANGE
      A VARIABLE ? (Y/N)"
2540 INPUT T4$
2550 IF T4$[1,1]#"Y" THEN 870
2560 DISP "TYPE IN CHANGE. IE. M
     (1)=60000. PRESS END LINE.
     WHEN DONE, PRESS CONTINUE."
2570 PAUSE
2580 GOTO 860
2590 STOP
2600 ! *** DISP INPUT VARIABLES
     ***                            Display input variables
2610 GOSUB 2930
2620 DISP USING "////"
2630 A$="22A,9D."
2640 DISP "**** INPUT DATA ****"
2650 DISP USING "////"
2660 DISP USING A$ ; "PROPERTY P
     RICE",M(1)
2670 DISP USING A$ ; "% DOWN",M(
     2)
2680 DISP USING "21A,7D.2D,X" ;
     "INTEREST RATE %",M(3)
2690 DISP USING A$ ; "TAX-DED. C
     LOSING COSTS",M(17)
2700 DISP USING A$ ; "NON-DED. C
     LOSING COSTS",M(18)
2710 DISP
```

PROGRAM LISTING

Listing | Comments

```
2720 DISP USING A$ ; "MORTGAGE T
     ERM YRS.",M(5)
2730 IF X1=1 THEN DISP USING A$
     ; "LAND VALUE",M(6) ELSE 27
     50
2740 DISP USING A$ ; "MONTHLY RE
     NTAL INCOME",M(7) @ GOTO 27
     60
2750 DISP USING A$ ; "ALTER. MO.
      RENTAL COSTS",M(7)
2760 IF X1=1 THEN DISP USING A$
     ; "% EST VACANCY RATE",M(4)
2770 DISP USING A$ ; "ANNUAL UTI
     LITIES EXP.",M(8)
2780 DISP
2790 DISP USING A$ ; "ANNUAL PRO
     PERTY TAXES.",M(9)
2800 IF X1=1 THEN DISP USING A$
     ; "MAINT.% OF RENTAL INC.",
     M(10) ELSE 2820
2810 GOTO 2830
2820 DISP USING A$ ; "ANNUAL MAI
     NT. COSTS",M(10)
2830 DISP USING A$ ; "ANNUAL INS
     URANCE EXP.",M(11)
2840 DISP USING A$ ; "OTHER ANNU
     AL EXP.",M(12)
2850 IF X1=1 THEN DISP USING "21
     A,7D.2D,X" ; "%/YR. DEPRECI
     ATION.",M(13)
2860 DISP
2870 DISP USING A$ ; "MARGINAL I
     NCOME TAX %.",M(14)
2880 DISP USING A$ ; "INFLATION
     %:RENT & EXP",M(15)
2890 DISP USING A$ ; "EST.PROPER
     TY APPR.%/YR",M(16)
2900 DISP USING A$ ; "YEARS:PURC
     HASE TO SALE",M(19)
2910 IF C1$[1]#"Y" THEN WAIT 500
     0 @ DISP USING "////" ELSE
     PRINT USING "////" @ CRT IS
      1 @ CLEAR
2920 GOTO 860
2930 ! SUBROUTINE FOR PRINTOUTS
2940 DISP "DO YOU WANT A PRINTED
      COPY ?    (Y/N)"
2950 INPUT C1$
2960 IF C1$[1,1]="Y" THEN CRT IS
      2                          Set display for print
2970 RETURN
2980 END
```

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Cash Flow Analysis

File Name C F L O W

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 8,245

Program Description: CFLOW calculates: 1) Present value of up to four cash flows for a given cost of capital; 2) Implicit rate of return which equates the present value of the cash flow to zero; and 3) Period in which payback occurs if applicable.

PROGRAM DESCRIPTION II

Sample Problem

Estimated cost of capital : 15%
Number of periods : 5
Number of flows considered: 4

Period	Flow 1	Flow 2	Flow 3	Flow 4
0	-100	-100	-100	-100
1	50	40	30	20
2	40	30	20	10
3	30	20	10	50
4	20	10	50	40
5	10	50	40	30

SOLUTION:

```
LOAD "CFLOW".
RUN.

Enter input data as prompted.
```

```
*** FLOW  1

PAYBACK FOR INITIAL INVESTMENT
IS IN PERIOD  4

PRESENT VALUE =  9.86

RATE OF RETURN EQUATING P.V. OF
FLOW TO ZERO IS  20.27  %
      ---------------------

*** FLOW  2

PAYBACK FOR INITIAL INVESTMENT
IS IN PERIOD  5

PRESENT VALUE =  1.19

RATE OF RETURN EQUATING P.V. OF
FLOW TO ZERO IS  15.52  %
      ---------------------

*** FLOW  3

PRESENT VALUE = -3.74

RATE OF RETURN EQUATING P.V. OF
FLOW TO ZERO IS  13.56  %
      ---------------------

*** FLOW  4

PRESENT VALUE = -4.39

RATE OF RETURN EQUATING P.V. OF
FLOW TO ZERO IS  13.36  %
      ---------------------
```

PROGRAM DESCRIPTION III

Operating Limits and Warnings Number of periods must be less than 120.

Reference(s)

Variables:

Name	Description	Length	Comments
R	Cost of capital (%)		
N	Number of periods		
F	Number of flows		
D(*)	Income data		
I	Period number		
P3	Present value		
C	Rate of return		

SERIES 80 USERS' LIBRARY

USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "CFLOW" and press RUN.
2	Enter input data as prompted.
3	Results will be printed.

PROGRAM LISTING

Listing **Comments**

```
 10 DIM B(121),D(5,121)
 20 CLEAR
 30 DEF FNA(X) = INT((X*1000+5)/
    10)/100
 40 DISP "ENTER THE ESTIMATED CO
    ST OF     CAPITAL IN PERCENT
    ";
 50 INPUT R@ R=ABS(R/100)
 60 DISP @ DISP "ENTER THE NUMBE
    R OF PERIODS";
 70 INPUT N
 80 DISP @ DISP "ENTER THE NUMBE
    R OF FLOWS BEING CONSIDERED
    (1-5)";
 90 INPUT F
100 FOR F1=1 TO F
110 CLEAR @ DISP "  *** ENTRY FO
    R FLOW ";F1;" ***"
120 DISP @ DISP
130 FOR I=0 TO N
140 DISP "PERIOD ";I;"INCOME";
150 INPUT D(F1,I)
160 NEXT I
170 NEXT F1
180 CLEAR
190 FOR F1=1 TO F
200 PRINT @ PRINT "*** FLOW ";F1
210 S1=0 @ S=0 @ P3=0 @ D=1
220 FOR I=0 TO N
230 S1=S1+D(F1,I)
240 B(I)=D(F1,I)
250 P3=P3+D(F1,I)/(R+1)^I
260 IF B(I)<0 THEN D=-1
270 IF S=1 THEN 320
280 IF P3<0 THEN 320
290 IF I=0 THEN 310
300 PRINT @ PRINT "PAYBACK FOR I
    NITIAL INVESTMENT  IS IN PER
    IOD ";I
310 S=1
320 NEXT I
330 PRINT @ PRINT "PRESENT VALUE
     = ";FNA(P3)
340 IF D>0 THEN 470
350 C=0
360 P=0 @ Q=0
370 FOR T=0 TO N
380 P=P+B(T)*EXP(C*(-T))
390 Q=Q+T*B(T)*EXP(C*(-T))
400 NEXT T
410 C=C+P/Q
420 IF C<0 THEN PRINT @ PRINT "O
    UTLAY EXCEEDS INCOME BY ";FN
    A(-S1) @ GOTO 470
430 IF EXP(C)-1>10 THEN PRINT @
    PRINT "RATE OF RETURN EXCEED
    S 1000 %" @ GOTO 470
440 IF ABS(P/Q)>.00001 THEN 360
450 C=EXP(C)-1
460 PRINT @ PRINT "RATE OF RETUR
    N EQUATING P.V. OF FLOW TO Z
    ERO IS ";FNA(C*100);" %"
```

Data entry

Flow loop

Flow overhead

Period loop

Error traps

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing **Comments**

```
470 PRINT "          ---------------
    ------"
480 NEXT F1
490 END
```

SERIES 80 USERS' LIBRARY

PROGRAM DESCRIPTION I

Program Title Annuity Analysis

File Name A N N U I T

Contributor's Name

Company *(if applicable)*

Address

City **State/Country**

Zip Code/Mail Code

Machine Size: **16K** ☒ **32K** ☐

Peripherals Required: none

ROMs Required: none

Number of Bytes: 4,171

Program Description: This program performs the calculations necessary for determining both payment and withdrawal annuities. Variables are as follows: N=number of periods, P=original amount, A=total amount at end of N periods, I=interest rate per period in percent, and R=amount of payment/withdrawal each period. For a payment annuity, you give any three of N, A, I, R, and find the fourth. For a withdrawal annuity, you give any three of N, P, I, R and find the fourth. For a loan or mortgage, use the withdrawal option.

PROGRAM DESCRIPTION II

Sample Problem

For withdrawal annuity, find the amount of payment per period given:

Number of periods = N = 10
Original principal amount = P = 1000
Interest rate/period = I = 10%

SOLUTION:

```
LOAD "ANNUIT".
RUN.

Enter input data as prompted.
Select program option after 'R' is displayed.
(The following printout is option 5)

    WITHDRAWAL EACH PERIOD=R=
      162.75


    PERIOD 0
    PRINCIPAL                    1000.00

    PERIOD  1
    PRINCIPAL                      62.75
    INTEREST                      100.00
    PRINCIPAL BALANCE             937.25
    INTEREST TO DATE              100.00

    PERIOD  2
    PRINCIPAL                      69.02
    INTEREST                       93.73
    PRINCIPAL BALANCE             868.23
    INTEREST TO DATE              193.73

    PERIOD  3
    PRINCIPAL                      75.92
    INTEREST                       86.82
    PRINCIPAL BALANCE             792.31
    INTEREST TO DATE              280.55

    PERIOD  4
    PRINCIPAL                      83.51
    INTEREST                       79.23
    PRINCIPAL BALANCE             708.80
    INTEREST TO DATE              359.78
```

PROGRAM DESCRIPTION II

```
PERIOD  5
PRINCIPAL                    91.87
INTEREST                     70.88
PRINCIPAL BALANCE           616.93
INTEREST TO DATE            430.66

PERIOD  6
PRINCIPAL                   101.05
INTEREST                     61.69
PRINCIPAL BALANCE           515.88
INTEREST TO DATE            492.35

PERIOD  7
PRINCIPAL                   111.16
INTEREST                     51.59
PRINCIPAL BALANCE           404.72
INTEREST TO DATE            543.94

PERIOD  8
PRINCIPAL                   122.27
INTEREST                     40.47
PRINCIPAL BALANCE           282.45
INTEREST TO DATE            584.41

PERIOD  9
PRINCIPAL                   134.50
INTEREST                     28.25
PRINCIPAL BALANCE           147.95
INTEREST TO DATE            612.66

PRINCIPAL                   147.95
INTEREST                     14.80
PRINCIPAL BALANCE             0.00
INTEREST TO DATE            627.46
```

PROGRAM DESCRIPTION III

Operating Limits and Warnings The answer does not account for any simple interest that might have been paid on deposits prior to the first compounding period.

Reference(s)

Variables:

Name	Description	Length	Comments
N1	Number of periods		
P1	Original principal amount		
A1	Total amount at end of N periods		
I1	Interest rate per period in percent		
R1	Amount of payment/withdrawal each period		
Y	Total interest paid		
A2	Principal per period		
B,C	Interest per period		
X9	Principal balance		

SERIES 80 USERS' LIBRARY

USER INSTRUCTIONS

STEP	INSTRUCTIONS
1	LOAD "ANNUIT" and press RUN.
2	Enter input data as prompted.
3	After unknown amount is displayed, select option.
4	Results will be printed.

SERIES 80 USERS' LIBRARY

PROGRAM LISTING

Listing **Comments**

```
 10 CLEAR
 20 PRINT "DEFINITION OF VARIABL
    ES:"
 30 PRINT
 40 PRINT "N = NUMBER OF PERIODS
    "
 50 PRINT "A = AMOUNT LEFT AT EN
    D OF            N PERIODS"
 60 PRINT "I = INTEREST IN PERCE
    NT / PERIOD"
 70 PRINT "R = AMOUNT OF PAYMENT
     / PERIOD"
 80 PRINT "P = ORIGINAL PRINCIPA
    L AMOUNT"
 90 PRINT
100 PRINT
110 S=0
120 CLEAR
130 DEF FNA(X) = INT((1000*X+5)/
    10)/100
140 DISP "ENTER ANNUITY TYPE:"                Data entry
150 DISP @ DISP "1)  PAYMENT" @
    DISP "2)  WITHDRAWAL"
160 INPUT A
170 GOTO 220
180 IF A=1 THEN 210
190 A=1
200 GOTO 220
210 A=2
220 IF A=1 THEN 270
230 IF A=2 THEN 840
240 DISP
250 DISP "ANSWER 1 OR 2 PLEASE"
260 GOTO 140
270 IF S=1 THEN 320
280 DISP
290 DISP "WHICH VARIABLE IS UNKN
    OWN       (1=N, 2=A, 3=I, 4=
    R)";
300 INPUT D
310 IF D<1 OR D>4 THEN 330
320 ON D GOTO 360,440,520,580
330 DISP
340 DISP "ANSWER 1,2,3, OR 4 PLE
    ASE."
350 GOTO 280
360 DISP
370 DISP "WHAT ARE A,I, AND R";
380 INPUT A1,I1,R1
390 I1=I1/100
400 N1=LOG(A1*I1/R1+1)/LOG(1+I1)
410 DISP
420 PRINT "NUMBER OF PERIODS = N
     = ";FNA(N1)
430 GOTO 650
440 DISP
450 DISP "WHAT ARE N,I, AND R";
460 INPUT N1,I1,R1
470 I1=I1/100
480 A1=R1*((1+I1)^N1-1)/I1
```

PROGRAM LISTING

Listing Comments

```
490 DISP
500 PRINT "AMOUNT AT END OF ";N
    @ DISP "PERIODS A=";FNA(A1)
510 GOTO 650
520 DISP
530 DISP "WHAT ARE N,A, AND R";
540 INPUT N1,P1,R1
550 DISP
560 IF N1*R1>P1 THEN 2010
570 GOTO 1600
580 DISP
590 DISP "WHAT ARE N,A, AND I";
600 INPUT N1,A1,I1
610 I1=I1/100
620 R1=A1*I1/((1+I1)^N1-1)
630 DISP
640 PRINT "PAYMENT EACH PERIOD =
     R=";FNA(R1)
650 CLEAR
660 DISP "   PROGRAM OPTIONS:"
670 DISP @ DISP "   1)  NEW CASE
    , SAME TYPE"
680 DISP "   2)  NEW CASE, ANOTH
    ER UNKNOWN"
690 DISP "   3)  NEW CASE, OTHER
     ANNUITY"
700 DISP "   4)  PRINT TOTAL INT
    EREST PAID"
710 DISP "   5)  PRINT WITHDRAWA
    LS TABLE"
720 DISP "   6)  END"
730 DISP "   ENTER OPTION";@ INP
    UT S
740 IF S=1 THEN 220
750 IF S=2 THEN 220
760 IF S=3 THEN 180
770 IF S=6 THEN 2030
780 IF A<>1 THEN 820
790 CLEAR
800 DISP "OPTION";S;"NOT APPLICA
    BLE TO PAY-" @ DISP "MENT AN
    NUITIES" @ DISP
810 GOTO 660
820 IF S=4 THEN 980
830 IF S=5 THEN 980
840 IF S=1 THEN 880
850 DISP
860 DISP "WHICH VARIABLE IS UNKN
    OWN       (1=N, 2=P, 3=I, 4=
    R)";
870 INPUT A1
880 IF A1<1 OR A1>4 THEN 850
890 ON A1 GOTO 900,1470,1550,191
    0
900 DISP
910 DISP "WHAT ARE P,I, AND R";
920 INPUT P1,I1,R1
930 I1=I1/100
940 N1=LOG(R1/(R1-P1*I1))/LOG(1+
    I1)
```

PROGRAM LISTING

Listing **Comments**

```
950 DISP
960 PRINT "NUMBER OF PERIODS = N
    =";FNA(N)
970 GOTO 650
980 N1=N1+.00001
990 P2=INT(N1)-N1
1000 IF ABS(P2)>.00001 THEN 1030
1010 N1=N1-1
1020 GOTO 1040
1030 N1=INT(N1)
1040 P2=1
1050 IF S=4 THEN 1110
1060 IF S=5 THEN 1070
1070 P2=0
1080 PRINT "PERIOD 0"
1090 PRINT USING 1230 ; "PRINCIP
     AL",P1
1100 PRINT
1110 X=0
1120 X9=P1
1130 Y=0
1140 FOR S=1 TO N1
1150 A3=(R1-P1*I1)*(1+I1)^(S-1)
1160 A2=FNA(A3)
1170 C=R1-A3
1180 B=FNA(C)
1190 X=X+A3
1200 X9=X9-A3
1210 Y=FNA(Y+C)
1220 IF P2<>0 THEN 1290
1230 IMAGE 23A,6D.DD
1240 PRINT "PERIOD ";S
1250 PRINT USING 1230 ; "PRINCIP
     AL",A2
1260 PRINT USING 1230 ; "INTERES
     T",B
1270 PRINT USING 1230 ; "PRINCIP
     AL BALANCE",X9
1280 PRINT USING 1230 ; "INTERES
     T TO DATE",Y @ PRINT
1290 NEXT S
1300 S=N1+1
1310 A3=P1-X
1320 A2=FNA(A3)
1330 B1=I1*A3
1340 B=FNA(B1)
1350 X=X+A3
1360 X9=0
1370 Y=Y+B1
1380 IF P2=0 THEN 1420
1390 DISP
1400 PRINT "TOTAL INTEREST PAID=
     ";Y
1410 GOTO 650
1420 PRINT USING 1230 ; "PRINCIP
     AL",A2
1430 PRINT USING 1230 ; "INTERES
     T",B
1440 PRINT USING 1230 ; "PRINCIP
     AL BALANCE",X9
```

Print table

PROGRAM LISTING

Listing **Comments**

```
1450 PRINT USING 1230 ; "INTERES
     T TO DATE",Y
1460 GOTO 650
1470 DISP
1480 DISP "WHAT ARE N,I, AND R";
1490 INPUT N1,I1,R1
1500 I1=I1/100
1510 P1=R1*((1+I1)^N1-1)/(I1*(1+
     I1)^N1)
1520 DISP
1530 PRINT "ORIGINAL PRINCIPAL =
     ";P1
1540 GOTO 650
1550 DISP
1560 DISP "WHAT ARE N,P, AND R";
1570 INPUT N1,P1,R1
1580 DISP
1590 IF N1*R1<=P1 THEN 1990
1600 DISP
1610 I1=.1
1620 I2=0
1630 I3=1
1640 IF A<>1 THEN 1670
1650 P3=R1*((1+I1)^N1-1)/I1
1660 GOTO 1680
1670 P3=R1*((1+I1)^N1-1)/(I1*(1+
     I1)^N1)
1680 P4=ABS(P1-P3)
1690 IF P4>.001 THEN 1720
1700 PRINT "INTEREST RATE / PERI
     OD=";FNA(I1*100)
1710 GOTO 650
1720 IF P4/P1>.3 THEN 1830
1730 IF A=1 THEN 1760
1740 IF P3<P1 THEN 1800
1750 GOTO 1770
1760 IF P3>P1 THEN 1800
1770 I2=I1
1780 I1=(I1+I3)/2
1790 GOTO 1640
1800 I3=I1
1810 I1=(I1+I2)/2
1820 GOTO 1640
1830 IF A=1 THEN 1860
1840 IF P3<P1 THEN 1880
1850 GOTO 1770
1860 IF P3>P1 THEN 1880
1870 GOTO 1770
1880 I3=I1
1890 I1=(I1+I2)/4
1900 GOTO 1640
1910 DISP
1920 DISP "WHAT ARE N,P, AND I";
1930 INPUT N1,P1,I1
1940 I1=I1/100
1950 R1=P1*I1*(1+I1)^N1/((1+I1)^
     N1-1)
1960 DISP
1970 PRINT "WITHDRAWAL EACH PERI
     OD=R=";FNA(R1)
```

Data entry for withdrawal annuities

PROGRAM LISTING

Listing Comments

```
1980 GOTO 650
1990 DISP "THE PRINCIPAL P IS NO
     T RECOVEREDI MUST BE POSITI
     VE"
2000 GOTO 1550
2010 DISP "AMOUNT PAID IN N*R NO
     T RECOVEREDI MUST BE POSITI
     VE"
2020 GOTO 520
2030 CLEAR @ END
```

REAL ESTATE

LOAN AMORTIZATION
MORTGAGE ANALYSIS
CAPITAL INVESTMENT ANALYSIS
MORTGAGE PLAN COMPARISON
INVESTMENT RETURN
DISCOUNTED RETURN ON INVESTMENT AND PAYBACK
REAL ESTATE INVESTMENT ANALYSIS
CASH FLOW ANALYSIS
ANNUITY ANALYSIS

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