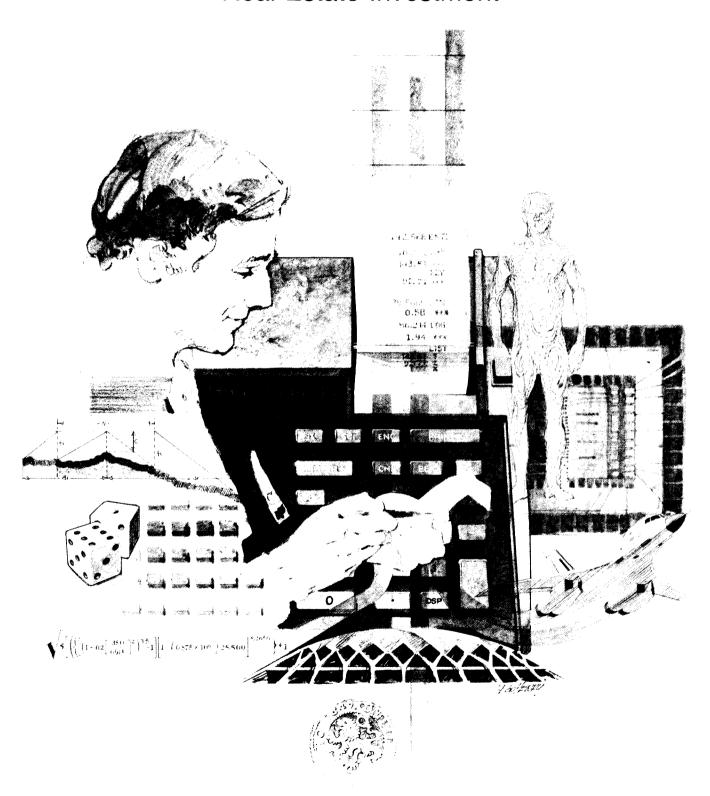
# HP67 HP97

Users' Library Solutions

#### Real Estate Investment



#### INTRODUCTION

In an effort to provide continued value to it's customers, Hewlett-Packard is introducing a unique service for the HP fully programmable calculator user. This service is designed to save you time and programming effort. As users are aware, Programmable Calculators are capable of delivering tremendous problem solving potential in terms of power and flexibility, but the real genie in the bottle is program solutions. HP's introduction of the first handheld programmable calculator in 1974 immediately led to a request for program solutions — hence the beginning of the HP-65 Users' Library. In order to save HP calculator customers time, users wrote their own programs and sent them to the Library for the benefit of other program users. In a short period of time over 5,000 programs were accepted and made available. This overwhelming response indicated the value of the program library and a Users' Library was then established for the HP-67/97 users.

To extend the value of the Users' Library, Hewlett-Packard is introducing a unique service—a service designed to save you time and money. The Users' Library has collected the best programs in the most popular categories from the HP-67/97 and HP-65 Libraries. These programs have been packaged into a series of low-cost books, resulting in substantial savings for our valued HP-67/97 users.

We feel this new software service will extend the capabilities of our programmable calculators and provide a great benefit to our HP-67/97 users.

#### A WORD ABOUT PROGRAM USAGE

Each program contained herein is reproduced on the standard forms used by the Users' Library. Magnetic cards are not included. The Program Description I page gives a basic description of the program. The Program Description II page provides a sample problem and the keystrokes used to solve it. The User Instructions page contains a description of the keystrokes used to solve problems in general and the options which are available to the user. The Program Listing I and Program Listing II pages list the program steps necessary to operate the calculator. The comments, listed next to the steps, describe the reason for a step or group of steps. Other pertinent information about data register contents, uses of labels and flags and the initial calculator status mode is also found on these pages. Following the directions in your HP-67 or HP-97 **Owners' Handbook and Programming Guide**, "Loading a Program" (page 134, HP-67; page 119, HP-97), key in the program from the Program Listing I and Program Listing II pages. A number at the top of the Program Listing indicates on which calculator the program was written (HP-67 or HP-97). If the calculator indicated differs from the calculator you will be using, consult Appendix E of your **Owner's Handbook** for the corresponding keycodes and keystrokes converting HP-67 to HP-97 keycodes and vice versa. No program conversion is necessary. The HP-67 and HP-97 are totally compatible, but some differences do occur in the keycodes used to represent some of the functions.

A program loaded into the HP-67 or HP-97 is not permanent—once the calculator is turned off, the program will not be retained. You can, however, permanently save any program by recording it on a blank magnetic card, several of which were provided in the Standard Pac that was shipped with your calculator. Consult your **Owner's Handbook** for full instructions. A few points to remember:

The Set Status section indicates the status of flags, angular mode, and display setting. After keying in your program, review the status section and set the conditions as indicated before using or permanently recording the program.

REMEMBER! To save the program permanently, **clip** the corners of the magnetic card once you have recorded the program. This simple step will protect the magnetic card and keep the program from being inadvertently erased.

As a part of HP's continuing effort to provide value to our customers, we hope you will enjoy our newest concept.

#### TABLE OF CONTENTS

MORTGAGE YIELD,,,,,,,	
MORTGAGE PRICING NO. $1$ . Program calculates the price of a discounted mortgage which has a periodic balloon payment in addition to a regular monthly payment. Also solves for the total amortization period.	;
MORTGAGE PRICING NO. 2	.1
YEARLY AMORTIZATION SCHEDULE Program prints a yearly amortization schedule (annual interest and principal paid, remaining balance, and total interest to date), although it assumes that payments are paid monthly.	.6
AMOUNT OF EQUITY AT ANY TIME	1
ELLWOOD INCOME VALUATION FOR INCOME PROPERTY APPRAISAL	5 m
Program computes capitalization rate, spendable income, spendable income rate, taxable income, equity income and equity income rate for a piece of income property for any given amount of years.	9
RETURN ON EQUITY RENTAL PROPERTY  Given the asking price of an investment property and mortgage details, program calculates net annual income (after interest payments), owners equity and return on equity. Further, if a new income (expected future income) is input, a second calculation is printed showing net income, equity, and return on equity.	4
REAL ESTATE INVESTMENT ANALYSIS  This program performs the financial analysis of a real estate investment including all loan amortizations, accelerated depreciations, straight line depreciations, and net income. The program provides all pertinent financial data leading to return on investment (ROI) and %ROI. The program will calculate the financial data for any year of operation after the investment has been made.	
INTERNAL RATE OF RETURN  Program calculates the internal rate of return (discounted rate of return or yield) given a non-zero initial investment and up to 44 positive cash flows. If there are negative as well as positive cash flows, up to 22 cash flows can be entered.	8
DEPRECIATION SCHEDULES	5

#### **Program Description I**

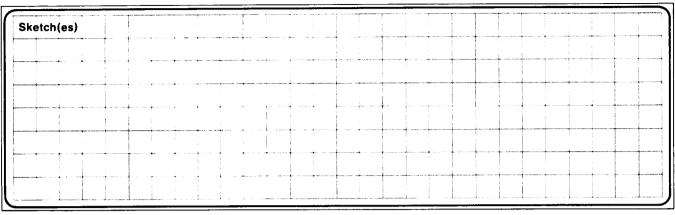
Program Title Mo	rtgage Yield		
Contributor's Name	Jack B. Buster		
Address	P. O. Box 8062		
City	Anchorage	State Alaska	Zip Code 99508

Program Description, Equations, Variables By injecting the periodic (monthly) interest rate of a mortgage (STO B), the monthly payment amount (STO C), the amount owing on the mortgage (STO D) and the purchase price of the note (STO Q), the following calculations are possible:
Total amortization period (Press A)
Full term yield (Press B)
Yield at a specified point in time (Enter months to prepayment, press C)
Yield at a specified prepaying balloon (Enter balloon and press D) - Thew C
Successive yields at different prepayment points (After C then enter months and R/S
Total amount of prepaying Balloon, total amount of accumulated monthly payments and total amount of cash paid on the mortgage. (Press E)
This program provides the basic tool for analysis of mortgage performance and
creation of desired data to be specified by the user. The field and the application
of the calculations possible with this program are too widespread to be encompassed
completely herein and are therefore left to the development of the user.
Operating Limits and Warnings Label C is not totally interactive with Labels A, B,D and
E. Information desired from Labels A, B and D must be obtained before going to
C. After C is pressed, only the routine contained in Label E and another loop
through C is possible(by pressing $R/S$ ) . An attempted A, B or D calculation after
a C routine is run will give meaningless information.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

NEITHER HP NOR THE CONTRIBUTOR MAKES ANY EXPRESS OR IMPLIED WARRANTY OF ANY KIND WITH REGARD TO THIS PROGRAM MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. NEITHER HP NOR THE CONTRIBUTOR SHALL BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES IN CONNECTION WITH OR ARISING OUT OF THE FURNISHING, USE OR PERFORMANCE OF THIS PROGRAM MATERIAL.

#### **Program Description II**



Sample Problem(s) Given a \$11,125 mortgage payable at \$140 per month including 8.5% interest purchased for \$7,200 cash. Analyze the mortgage with the use of this program finding total amortization period, full term yield, yield if prepaid when remaining balance is \$5,000 and construct a chart of performance at 24 month intervals. SOLUTION: f a Initialize Load data: 8.5 : 12 = .71 STO B 140 STO C 11125 STO D 7200 STO 0 Amortization period - - - Press A - - - = 117.24 months Full Term Yield - - - - Press B - - - - = 19.96% (Pressing A before B is not necessary) Yield if prepaid when balance is \$5,000 - - - key in 5000 - - - Press D - - = 75.92 months Press C - - = 20.98% Total cash paid at this point - - Press E - - 5000.00 (Balloon) - 10,628.00 (Amount received in monthly payments to this point - 15,628.00 (Total cash paid on mortgage) Construct a chart of performance at 24 month intervals: Solution(s) Initialize and reload data as above. Balloon Payments Cash Mos from purchase Amount Received Received Yield to prepayment 9530.16 3360.00 12890.16 Enter 24 [C] 34.76% Press [E] 24.25% Press [E] 7640.91 6720.00 14360.91 Enter 48 [R/S] 10080.00 15482.92 Enter 72 [R/S]21.24% Press [E] 5402.92 20.18% Press [E] 2751.81 16191.81 Enter 96 [R/S] 13440.00 16413.73 Enter 117.24 [R/S] 19.96% Press [E] .13 16413.60

Reference(s) This program	m was developed fro	om the HP-67 standard	d pac program L05-03,
Annuities and Compound	Amounts, and the H	IP-80 reference book	, Real Estate Application
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## **User Instructions**

<b>4</b> 1 £	START	MORTGAGE YIELD	7
1 1	SIAKI	PREPAYMENT PREPAYMENT	ر 📭 ا
	n	FT YIELD YIELD PERIOD SUMM	MATION_
	n	FT YIELD YIELD PERIOD SUMM	ATTON

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Load side 1 and side 2	DATAGINIS		DATAONITS
2	Initialize		f A	0.00
3	Enter data as follows:			0.00
	Monthly interest rate		STO B	
	Monthly payment	Dollars	STO C	i PMT
	Amount of mortgage	Dollars	STO D	PV
	Purchase price of mortgage	Dollars	STO 0	PP
4	CALCULATE:	DOTTALS		
	a. Total amortization period		A	Months
	b. Full term yield			Per-cent
	C. Months to specified balance	Dollars		Months
	d. Yield at specified point	Months		Per-cent
	e. Cash totals: (i) Balloon Payment			Dollars
	(ii) Accumulated Payments	1		Dollars
	(iii) Total Cash Received			Dollars
	f. Yields at successive points:			
	Key in point at which yield desired	Months		Per-cent
	Key in next point	Months	R/S	Per-cent
		*****		
		<del>                                     </del>		
		1		
		<del>                                     </del>		
		1		
		1		
		+		<del>                                     </del>
				<u> </u>
		+		<b></b>
ليبيا	~			<u>L</u>

## Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001 *	f LBL A	31 25 11			0	00	
	0	00	1		STO B	33 12 02	
ļ	STO A	33 11 31 22 00	1	060	1	Q1	1
	GSB 0	34 15	1	-	ST I	35 33	1
<u> </u>	RCL E	35 82	1		RCL E	34 15	Figure
		51	Figure	-	RCL A	34 11	Yield
<u> </u>	RCL D	34 14	riguie	<u></u>	RCL C	34 13	Yiela
	LST X	35 82	Amortization	<del>                                     </del>	X	71	Routino
010	-	51	ANDILIZACION		+	61	Routine
	÷	81	Period		RCL D	34 14	1 1
	f LN	31 52	161100		-	51	1 '
	RCL 7	34 07			RCL A	34 11	1
	f LN	31 52		070	है	81	
	÷	81			RCL D	34 14	]
	STO A	33 11			÷	81	]
	h RTN	35 22				83	]
*	f LBL 4	31 25 04			9	09	]
	1	01	Figu <b>r</b> e		CHS	42	]
020	STO D	33 14	Balloon Amount		<i>x</i> <b>&lt;</b> <i>y</i>	32 71	, l
	f GSB 0	31 22 00			x = y	35 52	
<u> </u>	STO D	33 14			f GSB 5	31 22 05	ļ l
<del> </del>	h RTN	35 22		080	x = 0 $h RTN$	31 51 35 22	{
<u> </u>	f LBL 0	31 25 00		*			<del></del>
	1 STO 5	01 33 05			f LBL 6	31 25 06	1
<u> </u>		34 12	Calculation		f GSB 0	31 22 00 61	1
<b>-</b>	RCL B		l		RCL D	34 14	1
-	STO 9	31 82 33 09	Routine		-	51	i i
030	+	61	1		RCL 8	34 08	1 1
	STO 7	33 07	1	<del>                                     </del>	RCL A	34 11	1
	RCL A	34 11	1	-	RCL 7	34 07	1
	CHS	42	1	<u> </u>	÷	81	Calculate f(i) and
	u <sup>x</sup>	35 63	1	090	X	71	1
	STO 8	33 08	1		STO 6	33 06	f'(i)
	RCL E	34 15	1		RCL 4	34 04	]
	X	71	1		RCL 9	34 09	]
	1	01	]		÷	81	]
	RCL 8	34 08	]		-	51	]
040		51	]	<u> </u>	RCL 5	34 05	<u> </u>
	STO 4	33 04	ļ		X	71	
	RCL C	34 13			RCL C	34 13	4 1
	RCL 9	34 09		100	X	71	4
<u> </u>	<u>*</u>	81 33 03		100	RCL 9	34 09 81	<b>1</b>
	STO 3 RCL 5	33 03		<b></b>	RCL 6		<b> </b>
ļ	<del>†                                      </del>	71	1		RCL 6	34 06 34 15	1 1
	X	71			X X	71	1
<u> </u>	h RTN	35 22			_	51	1
050 *	g LBL a	32 25 11	******	<u> </u>	÷	81	1
	CL REG	31 43	1		CHS	42	j l
	P 2 S	31 42	Initialize		f GSB 5	31 22 05	]
	CL REG	31 43			RCL B	34 12	1 1
	CL X	44		110	÷	81	1
	h RTN	35 22		ļ	f RND	31 24	<b>.</b>
*	f LBL 3	31 25 03	5531	L	x ≠ 0	31 61	
ō	<u></u>	12	To the second se	STERS	6 -n-	1 7	8 9
Pric	e Used	Used	$\frac{1}{3} \pm \frac{PMT}{i} = \frac{1}{(1-(1+i))}$	1 or 1	+i n(1+i)		1+i <sup>-n</sup> i/100
S0	S1	S2	S3 S4 Balloon	S5	S6	S7	S8 S9
A	<del>1</del>	<b>L</b> B	i Balloon	D	I	<u>l</u>	I I
<b> </b> ^	n	i.	$\sim$ $PMT$	PV		Balloon	Used

### 67Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	СОММ	ENTS
	GTO 6	22 06			510 1	33 01		
	RCL B_	34 12		170	RCL D	34 14		
	h RTN	35 22			STO 2	33 02		
*	f LBL 5	31 25 05			RCL 0	34 00		
	EEX	43	Convert to % and		STO D	33 14		
	2	02	Convert to % and		f GSB 3	31 22 03		
	X	71			RCL 2	34 02		
120	STO + (i)		add to $R_{\overline{B}}$		STO D	33 14		
	h RTN	35 22			RCL 1	34 01		
*	<del></del>	31 25 13			STO B	33 12		
	STO 1	33 01	Control routine		R ↓	35 53		
	P Z S	31 42	for prepayment	180	R ↓	35 53		
	RCL B	34 12	yield		1	I		
-	STO 4	33 04	giela		2	0 <u>1</u> 02		
	PZ S				X			ļ
		31 42		<u> </u>	h RTN	71 35 22		į
	f GSB A	31 22 11		*	f LBL D	31 25 14		
130	STO 2	33 02			E+			
130	RCL 1	34 01		<b></b>		21	Figure	
<b></b>	-	51			f GSB A	31 22 11	Prepayment	<u>.</u> [
ļ	STO A	33 11		<b>-</b>	STO 1	33 01	Period	ĺ
-	f LBL 9	<u>31 25 09</u>	ł	190	RCL D	34 14		
-	f GSB 4	31 22 04	1	130	STO 2	33 02		
<u> </u>	STO E	33 15		<b></b>	RCL E+	34 21		
	RCL 0	34 00			STO D	33 14		
	STO D	33 14			f GSB A	31 22 11		
	RCL 1	34 01			RCL 1	34 01		
	STO A	33 11	1		STO A	33 11		
140	f GSB 3	31 22 03				51		
	1	01	Į		CHS	42		
	2	02			RCL 2	34 02		
	X	71			STO D	33 14		
	f LBL 2	3 <b>1</b> 25 02		200	x <b>≥</b> y	35 52	]	
	R/S	84			h RTN	35 22	<del> </del>	
	STO 1	33 01	Successive					
	RCL 2	34 02	prepayment				]	
	x₹y	35 5 <b>2</b>	yield					
	_	51	100p				]	
150	STO A	33 11					}	
	$P \stackrel{>}{\sim} S$	31 42						
	RCL 4	34 04					]	
	$P \stackrel{?}{\sim} S$	31 42						
	STO B	33 12		210			]	
	GTO 9	22 09	<b>}</b>					
*	f LBL E	31 25 15						
	RCL E	34 15	Summation routine				]	ŀ
	-x-	31 84				1	]	
	RCL 1	34 01					]	ļ
160	RCL C	34 13					]	
	X	71					]	]
	-x-	31 84					]	
	+	61					]	1
	-x-	31 84		220			1	
	GTO 2	22 02	]				]	}
*	f LBL B	31 25 12	]				]	
	f GSB A	31 22 11	i (				]	ł
	RCL B	34 12		<u> </u>			<u>L</u>	
			LABELS		FLAGS		SET STATUS	
A	B FT Yi	C pre	paid D prepay E		0	FLAGS	TRIG	DISP
a To de de		eld yie	<u>ld period Su</u>	mmation	1	ON OFF		
Initi	ialize					0 🗆 🖳	DEG ∑≊∕	FIX 🔀
Calcul	late 1	2	$i$ routine $\stackrel{4}{PV}$	routing	2	1 🗆 🗷	GRAD □	SCI 🗆
15	lb.	. 7	8 9		3	<u> </u>	RAD 🗆	ENG 🗆
% rc	outine ite	rate	1 1		1	3 □ 8🗖	I	··-

## **Program Description I**

Program Title Mo	rtgage Pricing No. 1		and the second s
			and the second s
Contributor's Name	Jack B. Buster		
Address	P. O. Box 8062		
City	Anchorage	State Alaska	<b>Zip Code</b> 99508

Program Description, Equations, Variables
This program will calculate the price of a mortgage which involves two different
payment streams one of which is monthly and the other user selectable. The pro-
gram will compensate for mortgages with a monthly payment too low to amortize the
balance in the absence of the periodic balloon. Insertion of one step will allow
the user to determine the total amortization period. Required data for input is
as follows:
Interest rate of mortgage
Monthly payment amount Present value of mortgage
Desired yield
Periodic balloon period
Periodic balloon amount
Number of months until first balloon
Operating Limits and Warnings
None known

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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#### **Program Description 11**

Sketch(es)		 	
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No. of April 100 and 100 are		 · · · · · · · · · · · · · · · · · · ·	and the second of the second o
	•		• • • • • • • • • • • • • • • • • • • •
	. •	A STATE OF THE STA	
			a non-constituent of the second of the secon

asked to purchase a mortgage with a face value of \$12,000.00 payable at \$80 per month with a balloon payment of \$1,000 each June all to include 9% interest. The

Purchaser desires to purchase mortgages for 24% yield. He is

```
purchase date will be August. (10 months to first balloon payment)
Solution(s)
          Keystrokes:
                                                      0.00
               [f][A]
               [9] [ENTER] [1] [2] [÷] [STO] [B]
                                                      0.75 (Interest rate)
               [8] [0] [STO] [C]
                                                     80.00
                                                            (Monthly payment)
               [1] [2] [0] [0] [0] [STO] [D]
                                                  12000.00 (Present value)
               [2] [4] [STO] [E]
                                                     24.00 (Desired yield)
               [1] [0] [0] [0] [STO] [0]
                                                   1000.00
                                                            (Annual balloon)
               [1] [0] [STO] [1]
                                                   10.00
                                                            (Months to 1st balloon)
                      (-1 minute 20 seconds)
                                                   7060.63
                                                            (Mortgage price)
```

Additional comments. The program operates by considering the two income streams from the mortgage separately. The first section keeps track of the number of payments until the balance is low enough to amortize on the monthly payment alone. The a loop is established alternately decrementing the pay off period by the number of months per balloon and the balance by the balloon amount. Finally, each stream is evaluated at the desired yield and the periodic stream adjusted to mortgage purchase date.

## **User Instructions**

41	f START		MORTGAGE PRIC	CING NO. 1		z
	COMPUTE	(i)	(PMT)	(PV)	(Y)	/

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Load side 1 and side 2			
2	Initialize		f A	0.00
3	Calculate & enter monthly interest rate	(i)	STO B	i/12
4	Enter monthly payment amount	(PMT)	STO C	PMT
5	Enter present value of mortgage	(PV)	$ _{STO}$ $ $ $ $ $ $ $ $	PV
6	Enter desired yield as a percent	(Y)	STO E	Y
7	Enter periodic balloon payment amount		STO 0	
8	Enter months until first balloon payment		STO 1	
9	Enter months of balloon period		STO 2	
	(Omit step if balloon period is 12 months)			
19	Compute price		A	
1.3	Compute piice			
_	The total amounting time and a in months in			
	The total amortization period in months is available in $r_6$ .			
	474114310 11. 16.			
<b></b>				
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<u> </u>				
<b>-</b>				
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		ļ		
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## 67 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001	LBL A	31 25 11			STO 5	33 05	
	RCL D	34 14	Will note amortize		GTO 1	22 01	]
}	RCL B	34 12	without balloon?	060	f LBL 4	31 25 04	-
-	f %	31 82	Without Barroom.	060	h x z y	35 52	4
	RCL C	34 13	4		STO + 6	33 61 06	4
	g x y y	32 81	If yes skip rest.	ļ	f LBL 1	31 25 01	4
	GTO 5	22 05 35 71 01	First loop?	<u> </u>	RCL 6	34 06	4 1
	GTO 6	22 06	filst loop!	-	RCL 2	34 02 51	-l
010	-	51	1		STO A	33 11	<del> </del>
	RCL 1	34 01	1	<b></b>	RCL E	34 15	Compute discounted
	f LBL 8	31 25 08	1	<u> </u>	1	01	value of monthly
<u> </u>	X	71	1	<b>-</b>	2	02	income stream.
	RCL 0	34 00	1	070	<u>-</u>	81	<del> </del>
	h x Z y	35 52	1		STO B	33 12	† i
		51	1		GSB D		1
	RCL D	34 14	1		STO + 5	31 22 14	Hold total
	hxZy	35 52	1	<del> </del>	RCL E+	·	
	_	51 51	1		STO A	34 21 33 11	Compute value of
020	STO D	33 14	1		RCL E	33 11	periodic income
	1	01	Increment balloon		STO B	33 12	steam.
	E+	21	counter.		RCL 0	34 00	1
	RCL 2	34 02	]		STO C	33 13	1
	STO + 6	33 61 06	1	080	GSB D	31 22 14	1
	SF <sub>1</sub>	35 51 01	1		RCL E	34 15	1
	GTO A	22 11	If no try again		1	01	1 1
	f LBL 5	31 25 05			2	02	Set up and compute
	GSB E	31 22 15	1		÷	81	present value of
	RCL 1	34 01	compare term		STO B	33 12	discounted periodic
030	STO + 6	33 61 06			h x≥y	35 52	income stream adjust
	RCL E+	34 21			STO E	33 15	ed to purchase date
	f x=0	31 51			RCL 1	34 01	]
	GTO 7	22 07	j		1	01	
	RCL A	34 11		090	2	02	]
	RCL 2	34 02			<u> </u>	81	
<u> </u>		51			STO A	33 11	
	f LBL 2	31 25 02			0	00	↓
	STO A	<u>33 11 </u>		<u> </u>	STO C	33 13	GTO calculate routine
040	RCL 2	34 02	1		g GSB d	JE 22 14	Add partial totals
040	STO + 6	33 61 06	1		RCL 5	34 03	and show price.
	GSB D	31 22 14	Compute balance		+	0.1	find show price.
	RCL 0	34 00	1	<u> </u>	h RTN	35 22	
	g x>y	32 81	Is balloon larger?	100	f LBL 0		Calculate routine
<b>—</b> —	GTO 3	22 03 51	1	100	ST I	01	for terms and
<del></del>	<del>†                                      </del>			<b></b>	RCL B	35 33	balances
<b>-</b>	STO D	33 14 01		ļ	f %	34 12	1
<b>——</b>	E+	21	Increment balloon	<b></b>	STO 9	31 82 33 09	1
	GSB E	31 22 15	counter. Compute new term	<b>-</b>	<i>STO 9</i> +	33 09 61	† l
050	RCL 2	34 02	compace new cerm		5TO 7	33 07	1
	$q \times 7 u$	32 81	Need balloon?		RCL A	34 11	1
	GTO 4	22 04			CHS	42	
		51			$u^X$	35 <i>63</i>	j l
	GTO 2	22 02		110	STO 8	33 08	į i
<u></u>	f LBL 3	31 25 03			1	01	
	h x 2 y	35 52			RCL 8	34 08	
<b></b>				STERS	-		
1	oon mos. to		I I	partia		~   -	8 9 9
amour		1. <u>balloo</u>  S2		<u>total</u>	<u>payment</u> S6	s used	used used
S0	S1	امح	Dairoon	<b>3</b> 0	ام	3'	39
Α	<u>l</u> .	<u> </u>		D	- <u>I</u> I	<b></b>	
	l-		rate monthly payment	_	į.	yield	used
1101	-yaye Lexill	THEFTEDE .	tace indicting payment	. vara	1	92024	

## Program Listing II

10				COMMENTS		VEV ENTRY	KEY CODE	COMM	ENTS
STEP	KEY ENTRY	KEY COD	E	COMMENTS	STEP	KEY ENTRY	KEY CODE	TOWM	LNIS
ļ		51			170	RCL D	34 14	{	
<u> </u>	STO 4	33 04			170	f x=0 h SF 1	31 51 35 51 01	stream to	
	RCL C	34 13				1 31 1	01	value at m	
	RCL 9	34 09				h ST I	35 33	purchase d	late.
	Σ	81				RCL B	34 12	1	
,	STO 3	33 03				f %	31 82	1	
100	h RC I	35 34				STO 9	33 09	-	
120	X	71				+	61	+	
<b> </b>	x	71			-	STO 7	33 07	1	
	h RTN	35 22	,			RCL A	34 11	1	
_	g LBL a	32 25 1		ialization	180	CHS	42	1	
<u> </u>	f CL REG	31 43	rout.	ine.	100	h y <sup>x</sup>	35 63	1	
	f P S	31 42			<u> </u>	STO 8	33 08	1	
-	f CL REG	31 43	<b></b> {			RCL E	34 15	1	
ļ	1	0.1			-	<del></del>		1	
<u> </u>	2	02			<b></b>	1 x	71	1	
120	STO 2	33 02	<del>, ,  </del>		<b> </b>		01	1	
130	h CF 1	35 61 0	11			RCL 8	34 08	1	
<b> </b>	CL X	44				- CMO 4	51	1	
}	h RTN	35 22	<del></del>			STO 4 RCL C	33 04 34 13	1	
-	f LBL E	<u>31 25 1</u>		7-4-5	190	RCL C	34 13	1	
	0	00		lation routin	ne   ···	* ±	81	1	
	STO A f GSB 0	33 11 31 22 0		erm of mort-		h F? 1	35 71 01	1	
<del>-</del>	0	00	gage.		<u> </u>	CHS	42	1	
<del> </del>		35 82			<u> </u>		1	1	
<u> </u>	LST X	51			<u> </u>	STO 3	33 03	1	
140	<u> </u>	<del></del>	_			h RC I	35 34 71	-	
140	RCL D	34 14 35 82	$\dashv$		<u> </u>	- X	71	1	
	LST X					<u> </u>		1	
<b></b>	<del>-</del>	51				STO D	33 14	1	
	f LN	81 31 52			200	h RTN	35 22	1	
	RCL 7	34 07				II KIIV	35 22		
<b></b>	f LN	31 52			<del>                                     </del>	<u> </u>	†	┪	
	i Liv	81			-		<del> </del>	1	
<del>                                     </del>	STO A	33 11				<del></del>		1	
<b></b>	h RTN	35 22			-	+		1	
150	f LBL D		14				<del> </del>	┨	
130		01	Remai	ning balance	-			1	
	STO D	33 14	routi	ne.				1	
<del>                                     </del>	f GSB 0	31 22 (	20					1	
<u> </u>	STO D	33 14	<del></del> -		210	1	1	1	
<del> </del>	h RTN	35 22	$\dashv$					1	
	f LBL 6	31 25 (	16		├──	<del> </del>		1	
<del> </del>		51 25 0	<del>~</del>			<del> </del>		1	
	RCL 2	34 02	$\dashv$			†		1	
<b></b>	GTO 8	22 08	<b>─</b>					1	
160	f LBL 7	31 25 0	77				<u> </u>	1	
1	RCL A	34 11						7	
	RCL 1	34 01						1	
	-	51						7	
	GTO 2	22 02			220			]	
	g LBL d	32 25 3	14					1	
	1	01	Calcu	lation routi	ne			]	
	STO D	33 14		djusting				_	
	h CF 1	35 61 (	//	dic income				<u> </u>	
			LA	BELS		FLAGS		SET STATUS	
ACATO	B CULATE	С		D Balance	Term	0	FLAGS	TRIG	DISP
2	h	c				1	ON OFF		I
initi	ialize			price		used		DEG 🗵	FIX 🛣
0 use	ed <sup>1</sup> us	sed 2	used	used 2	used	2	1 🗆 🖼	GRAD 🗆	SCI 🗆
5 use		sed 7	used	8 used		3	2 🗆 😡	RAD 🗆	ENG   n
1	""			1		1	3 🗆 🙀	1	ı <u></u>

### **Program Description I**

Program Title MOR	TGAGE PRICING NO. 2			arms	The second secon
Contributor's Name	Jack B. Buster				
Address	P. O. Box 8062	N 1	. *******		
City	Anchorage	State	Alaska	Zip Code	99508

	t yield of the wrap around and for each
mortgage the monthly payment	., interest rate (monthly), and the
remaining principal balance.	
	***
and the second second	
en e	
NAMES OF THE PROPERTY OF THE P	
perating Limits and Warnings	

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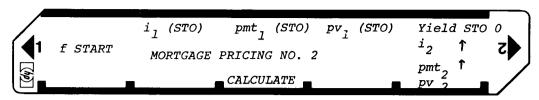
## Program Description II

iketch(es)				

	d) mortgage at an annual yiel e at the rate of \$1,161.67 pe	er month including 9.5% into	
	around) mortgage is \$214,123.	The state of the s	a series and a series and a series of the se
	The second secon	THE COLUMN TWO IS NOT	
10.25%	interest. What will the inv	estor pay for the mortgage	
A 2000 1000 11 1000 10 11 100 100 100			
,			N.A. ****
	MARKET THE TAXABLE PROPERTY OF THE PROPERTY OF	,	
			THE TRANSPORTER AND RECORD AND BY THE P. P. P. PROPERTY OF THE
ition(s)	(1) Initialize	f A	0.00
ition(s)	(2) Load i for first	9.5 ÷ 12 STO B	0.79
ition(s)	(2) Load i for first (3) Load pmt for first	9.5 ÷ 12 STO B 1161.67 STO C	0.79 1161.67
ıtion(s)	(2) Load i for first (3) Load pmt for first (4) Load pv for first	9.5 ÷ 12 STO B 1161.67 STO C 1 <b>2</b> 5647 STO D	0.79 1161.67 125647.00
ition(s)	(2) Load i for first (3) Load pmt for first (4) Load pv for first (5) Load yield	9.5 ÷ 12 STO B 1161.67 STO C 125647 STO D 22.5 ÷ 12 STO 0	0.79 1161.67 125647.00 1.88
ition(s)	(2) Load i for first (3) Load pmt for first (4) Load pv for first (5) Load yield (6) Load i for second	9.5 ÷ 12 STO B 1161.67 STO C 125647 STO D 22.5 ÷ 12 STO O 10.25 ÷ 12 ENTER	0.79 1161.67 125647.00 1.88 0.85
ition(s)	(2) Load i for first (3) Load pmt for first (4) Load pv for first (5) Load yield (6) Load i for second (7) Load pmt for second	9.5 ÷ 12 STO B 1161.67 STO C 125647 STO D 22.5 ÷ 12 STO 0 10.25 ÷ 12 ENTER 2300 ENTER	0.79 1161.67 125647.00 1.88 0.85 2300.00
ition(s)	(2) Load i for first (3) Load pmt for first (4) Load pv for first (5) Load yield (6) Load i for second (7) Load pmt for second (8) Load pv for second	9.5 ÷ 12 STO B 1161.67 STO C 125647 STO D 22.5 ÷ 12 STO O 10.25 ÷ 12 ENTER 2300 ENTER 214123	0.79 1161.67 125647.00 1.88 0.85 2300.00 214123.
ition(s)	(2) Load i for first (3) Load pmt for first (4) Load pv for first (5) Load yield (6) Load i for second (7) Load pmt for second	9.5 ÷ 12 STO B 1161.67 STO C 125647 STO D 22.5 ÷ 12 STO O 10.25 ÷ 12 ENTER 2300 ENTER 214123	0.79 1161.67 125647.00 1.88 0.85 2300.00 214123. 57510.36
ition(s)	(2) Load i for first (3) Load pmt for first (4) Load pv for first (5) Load yield (6) Load i for second (7) Load pmt for second (8) Load pv for second	9.5 ÷ 12 STO B 1161.67 STO C 125647 STO D 22.5 ÷ 12 STO O 10.25 ÷ 12 ENTER 2300 ENTER 214123	0.79 1161.67 125647.00 1.88 0.85 2300.00 214123.

H	
	Reference (s)
-	
1	

#### **User Instructions**



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Load sides 1 and 2 of card			
2	Initialize		fA	
3	Enter 1st periodic interest rate	i/12	$egin{bmatrix} STO \end{bmatrix} egin{bmatrix} B \end{bmatrix}$	
4	Enter 1st monthly payment	pmt_	STO [C	
5	Enter 1st principal balance	$pv_1$	STO D	
6	Enter periodic yield	Y/12	STO 0	
7	Enter 2nd periodic interest rate	i <sub>2</sub> /12	ENTER	
8	Enter 2nd monthly payment	pmt <sub>2</sub>	ENTER	
9	Enter 2nd principal balance	pv <sub>2</sub>		
10	Calculate price		C	price
11	For amortization period of first mortgage			months
12	For amortization period of second enter			
	data as follows:			
	Periodic interest rate		STO B	
	monthly payment		STO C	
	principal balance		STO D	
	Calculate		A	months
		1		
1				
				-
				<b>——</b>
-+				

## **67 Program Listing I**

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001 *	f LBL A	31 25 11			RCL 6 RCL 7	34 06	
	0	00			RCL /	34 07	4
<u> </u>	STO A GSB 0	33 11 31 22 00	Calculate total	060	STO A	51 33 11	ĺ, , l
	RCL E	34 15	amortization	-	RCL 1	34 01	housekeep
	LST X	35 82	period	-	STO C	33 13	1 1
- !	-	51	period		f P ex S	31 42	1 .1
	RCL D	34 14			GSB D	31 22 14	figure second paymen
	LST X	35 82			STO E	33 15	stream
010	-	51			0	00	]
	Divide	81	j		STO C	33 13	]
	f LN	31 52			f P ex S	31 42	Adjust, total and
	RCL 7	34 07			RCL 7	34 07	stop.
	f LN	31 52		070	STO A	33 11	
	Divide	81			f P ex S	31 42	
	STO A	<b>3</b> 3 11			GSB D	31 22 14	
ļ	h RTN	35 22			STO + 2	33 61 02	4
*	f LBL C	31 25 13	Calculate price		RCL 2	34 02	ļ
000	f P ex S	31 42	, to 7		H RTN	35 22	{
020	STO 0	33 00	pv <sub>2</sub> to R <sub>so</sub>	*	f LBL D	31 25 14	Pricing routine
<b> </b>	h ↓	35 53	pmt <sub>2</sub> to R <sub>s1</sub>	<u> </u>	1 CTO D	01	1
-	STO 1	33_01 35_53	2 ° 's1		STO D	33 14	1
<b></b>	h ↓	<u>35 53</u>	, ,	080	GSB 0 +	31 22 00 61	1
	STO 2	33 02	i <sub>2</sub> to R <sub>S</sub> 2		STO D	33 14	1
-	f P ex S	31 42	6/ 7-1	-	h RTN	35 22	1
	GSB A f P ex S	31 22 11 31 <b>4</b> 2	figure 1st pay-off	*	f LBL 0	31 25 00	
	STO 7	33 07	period	<del>                                     </del>	RCL D	34 14	1
<u> </u>	RCL B	34 12	1		1	01	Calculation
030	STO 3	33 03	1		STO 5	33 05	subroutine
	RCL C	34 13			RCL B	34 12	1 34310411110
	STO 4 .	33 04	housekeep		f %	31 82	]
	RCL D	34 14	1		STO 9	33 09	]
	STO 5	33 05		090	+	61	] [
	RCL 0	34 00			STO 7	33 07	]
	STO D	33 14			RCL A	34 11	]
	RCL 1	34 01			CHS	42	<u>]</u>
	STO C	33 13			y <sup>x</sup>	<i>35 63</i>	
ļ	RCL 2	34 02			STO 8	33 08	1
040	STO B	33 12			RCL E	34 15	- I
	f P ex S	31 42	ļ		X	71	- I
	GSB A		figure 2nd pay-off		1	01	- 1
ļ	f P ex S	31 42	period	100	RCL 8	34 08	-l i
	STO 6	33 06		100	- STO 4	51	1 1
	RCL 1	34 01		}	RCL C	33 04 34 13	1 1
	RCL 4	34 04			RCL C	34 13	1 1
	CTTO C	51 33 13		<b></b>	Divide	81	1
	STO C RCL 7	34 07		<u> </u>	STO 3	33 03	1
050	STO A	33 11	hougeleeen		RCL 5	34 05	1
	f P ex S	31 42	housekeep		X	71	]
	RCL 0	34 00			X	71	<u> </u>
	STO B	33 12			h RTN	35 22	1 <u> </u>
	GSB D	31 22 14	Figure first paymen	110 *	g LBL a	32 25 11	Initialize
	STO 2	33 02	stream	<b></b>	CL REG	31 43	4
	f P ex S	31 42		L	CL X	44	L
			10 14	STERS	16	17	18 To
O Yiel	a l'	<sup>2</sup> used	usęd 4 usęd	used	ľ°	used	used used
S0	S1		S3 S4	S5		S7	S8 S9
1	v <sub>2</sub>   omt <sub>2</sub>	S2 i <sub>2</sub>	$i_1$ $pmt_1$	$pv_1$	S6 n 2	$n_1$	
A		<del></del> В	lc T	D		<del></del>	1
pay-	off perds.	i <sub>l</sub> and i		pvı	& pv <sub>n</sub>	used	

## Program Listing II

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMM	IENTS
	f P ex S							
	CL REG h PTN	31 43 35 22		170			}	
	II P IIV	35 22		·			1	
-				<del></del>			1	
							1	
							]	
120							4	
		<del> </del>						
							1	
				180			]	
				<u> </u>			1	
<u> </u>				ļ				
1							1	
<b>———</b>	<del></del>						1	
130							]	
		<del> </del>					}	
				190			1	
							1	
							1	
							ł	
<b></b>							1	
140							1	
							1	
<u> </u>				200			-	
	<del>- · · · </del>							
<b></b>		ļ		<b></b>				
150				<u> </u>			ł	
							1	
				210				
<del></del>				210			ļ	
							1	
							]	
160								
		-						
						<u>.                                    </u>		
<b></b>				220				
A	ĪR	lc lc	LABELS D E		FLAGS 0		SET STATUS	
Amort	ization	Calc	ulate PV			FLAGS	TRIG	DISP
initi	alize	C	la le		1	ON OFF	DEG 🖄	FIX 🔀
calc.	rout.	2	3 4		2	1 🗆 🗷	GRAD □	SCI 🗆
5	6	7	8 9		3	2 🗆 🗷 1 3 🗆 <b>Z</b>	RAD 🗆	ENG □ n <u> </u>
L			<u> </u>					

### **Program Description I**

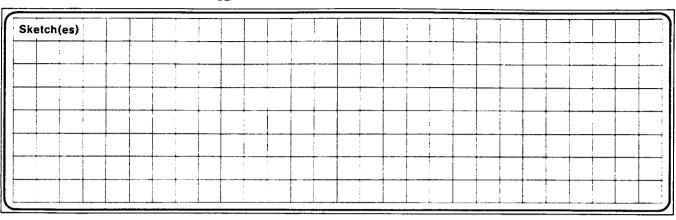
Program Title	Yearly Amort	zation Schedule			
 Contributor's Nan	ne Hewlett-Pack	ırd			
Address	1000 N.E. Circle I	Blvd.			
CityCor	vallis	State	Oregon	Zip Code _	97330

Program Description, Equations, Variables This program finds both the total interest paid	
over a specified number of years and the remaining balance at the end of the last	
	<u>·</u>
<u>specified year, given the monthly interest rate, monthly payment amount, loan</u>	
amount, and the beginning and ending years being considered. An option is also	
available to generate a yearly amortization schedule.	
All calculations accume that monthly nauments occur however the schedule	
All calculations assume that monthly payments occur, however the schedule	
generated is on an annual basis.	
	_
Operating Limits and Warnings Calculator performs all internal calculations to ten digit	
Operating Limits and Warnings Calculator performs all internal calculations to ten digit	3.
	- 2

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## Program Description II



	olem(s) Generate a yearly amortization schedule for the 7% mortgage having monthly payments of \$200.		3 yea	rs of a
	the accumulated interest for the 4th year, and what is	the rem	nainin	g
balance a	at the end of that time?			· · · ·
		_		
				11
				····
				-
Solution(s)	[f] [E]> 1.00			
	1 [ENTER+] 3[A]> 3.00			
	7 [ENTER+] 12 [÷] [B]> 0.58	4 80	4	
	200 [C]> 200.00 g	1 <b>.00</b> 99 <b>0.</b> 15	本本本 二水本	
		309.81	***	
	[6] [0]	690.19	***	-
	[1] [A]	090.19	***	
		2.00	***	
		<i>067.79</i>	***	
		332.21 352.07	***	
		357.97 157.97	***	
Reference (s		3.00	***	
	4 [ENTER↑] 4 [A]> 4.00	043.77 352 37	***	
	[E]> 2018.02 25	356.23 001.75	***	
		201.75	***	
	[R/S]> 28619.77			

## **User Instructions**

	. Calaal	YEARLY	AMOR	TIZAT	ION	SCHEDULI	E	-
<b>1</b>	→Sched.						P?	
	Y1 + Y2 _	i		PMT		PV	→INT:R.B.	/

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1.	Load side 1 and side 2.			
2.	Optional: Select print/pause mode for amortization schedule.		f E	1.00or0.00
3.	Key in			
	· Starting year number	<u> </u>	<u> </u>	Yl
	* Ending year number	Y2	A	Y2
	· Monthly interest rate	i(%)	B	i (%)
	· Monthly payment amount	PMT		PMT
	· Initial loan amount	PV		PV
4.	Compute the total interest paid between years			
	Y1 and Y2 inclusive and the remaining balance			
	at the end of year Y2.		E E	ΣΙΝΤ
			R7S	BAL
	<del>OR</del>			
5.	Generate the yearly amortization schedule			
	between years Yl and Y2 inclusive. If the			
	<pre>print/pause mode is on (1.00), the results are printed automatically.</pre>		f A	Υ٦
6.	Caclulate the amount paid to interest for			ļ
	year Yl.		R/S	PMT to INT
7.	Calculate amount paid to principal for		R/S	PMT to PRIN
8.	year Yl. Calculate remaining balance at the end of			
	year Yl.		R/S	BAL
9.	Calculate total interest paid between years	!		
	Y1 and Y2 inclusive.		R/S	TOT INT
10.	Increment Y1 for next period. If Y1≤Y2, go			Wa
	to step 6 for next period's values. Otherwise stop.		R/S	Y1 + 1
11.	For a new case, go to step 2 and change appropriate input values.			
	week of the there ares.			
<b> </b>				
$\vdash$				<b></b>

## 94 Program Listing 1

STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP K	EY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11		<b>0</b> 57	RCL3	36 03	
002	ST01	35 Ø1	Y2→R <sub>1</sub>	<b>058</b>	X	-35	BALN-BALN-12
003	XZY	-41	1	059	+	-55	+12(Y2-Y1+1)
004	ST00	<i>35 00</i>	Y1→R <sub>O</sub>	969	RTN	24	= INT
805		-41	1 0	061	RCL7	36 <b>0</b> 7	[- *"'
996		24		862	R/S	51	
007		21 12	_	063	*LBL1	21 61	1- 1
668		-23	1	864	CHS	-22	1 . 1
009		92	i/100+R <sub>2</sub>	065	γ×	31	$(1+i/100)^{-N} \rightarrow R_6$
010		-24	17100712	066	STO6	35 <b>0</b> 6	
011		35 <b>0</b> 2		867	1	91	
012		16-63		968	_ 1	-45	
012 013		-35		869			
013 014		24			RCL2 ÷	36 62 -34	1
017 015				979		-24	
01 <i>6</i>		21 13 75 97		071	RCL3	36 <b>0</b> 3	PMT (1+i/100) -N-1 +PV
		35 <b>0</b> 3	PMT→R <sub>3</sub>	<b>0</b> 72	X Box 4	-35	i/100
017		24	==	873	RCL4	36 04	
018		21 14		874	+	-55	F , ¬
019		35 04	PV→R	075	RCL6	36 <b>0</b> 6	(1+i/100)-N
020		24		876	÷	-24	[[+1/100]
021		21 15		077	RTN	24	
822		01		078	R∕S	51	
023		36 02	<u> </u>	079	#LBLa	21 16 11	
024		-55		989	RCL0	36 <b>00</b>	]
925		<i>35 05</i>	(1+i/100)→R <sub>5</sub>	981	F <b>0</b> ?	16 23 00	
02 <i>6</i>		36 01	3	082	SPC	16-11	1
827	1	61		983	GSB9	23 09	i i
628	2	02		884	1	01	1
029	X	-35	12(Y2)=N	085	RCL2	36 02	(2.1.200)
939	GSB1	23 01	` '	886	+	-55	(1+i/100)→ R <sub>5</sub>
031	ST07	35 <b>0</b> 7	BAL <sub>N</sub> →R <sub>7</sub>	<b>0</b> 87	ST05	<b>3</b> 5 <b>0</b> 5	"
<i>0</i> 32		36 <b>0</b> 5	N7	<b>088</b>	RCLO	36 00	
033		36 00		089	1	01	1
034		01		898	2	02	12(Y1)=N
935		02	1	091	x	-35	
836		-35		<b>8</b> 92	GSB1	23 01	
<b>037</b>		01	<u> </u>	<b>0</b> 93	ST08	35 Ø8	
<b>038</b>		<b>0</b> 2	(Y1)12-12=N	094	RCL5	36 <b>0</b> 5	1
<i>039</i>		-45		<i>09</i> 5	RCL0	36 <b>8</b> 8	1
040		23 01		096	1	91	1
Ø41		-22		<b>8</b> 97	2	01 02	1
842		36 07		<b>6</b> 98	x	-35	1
043		-55		<b>0</b> 99	^,		20/11/2
043 044		35 <b>0</b> 8	DAI DAI		2	61 60	12(Y1)-12=N
945		35 68 36 61	BAL <sub>N</sub> -BAL <sub>N-12</sub> →R <sub>8</sub>	100	2	62 -45	1
045 046		36 01 01	" " " "	101	een.	-45 27 6)	1
040 047		02		102	GSB1	23 <b>0</b> 1	1
047 048		-35		183	RCL8	36 08 -45	1
648 649		-35 36 00		104	CTOO	-45	† f
649 850		35 00 01		105	ST09	<b>35 65</b>	1
				106	RCL3	<b>36 0</b> 3	i I
051	2	02 75		107	1	Ø1	1
852 857		-35		188	2	02 35	j
<b>0</b> 53		-45		109	X	-35	INT
954	1	<b>6</b> 1		110	አ≵ሃ	-41	1
855 856		02	12(Y2-Y1+1)	111	-	-45	PRINC
956	+	-55 <sup>[</sup>	REGIS	112	GSB9	23 09	
0 ,,,	1	2	3 4	5	6	V	801 001 9007110
~ Y1	Y2	i/100	PMT PV	1+i/100		O) BAL <sub>N</sub>	BALN-BALN-12 PRINC
S0	S1	S2	S3 S4	S5	S6	S7	S8 S9
Α		В	С	D		6	1
		į.	1			1	1

97Program Listing II

20					7	i ogi an		LZEKYU					
STEP	KE	Y ENTRY	KEY CO	_		COMMENTS		STEP	KEY ENTRY	KEY	CODE	COMMI	ENTS
	13	RCL9	36 0										
	14	GSB9	23 Ø		BAL		ł	170					
	15	RCL8	36 Ø		عامر		ı						i
	15 16	GSB9	23 0				ı						
		RCL0					ŀ						i
	17	_	36 0				ŀ						
	18	1	8.				ŀ						1
	19	. 2	6.		70/77	\ DMT /DV D	۸. ۱						ì
	20	X	-3		12(1)	) • PMT-(PV-B	ᄮᄭ						
	21	RCL3	36 0.		_		ŀ						
	22	X	-3:		=1	OT INT	ŀ						l
	23	RCL4	36 €				- }	180					
	24	RCL8	36 0				-						
	25	-	-4				}						İ
	26	<u></u>	-4;				- 1						ŀ
	27	GSB9	23 0				ŀ						
	28	1	6										
	29	ST+0	35-55 0				ı						
	30	RCL1	36 0				I						
	31	1	Ũ				-						
	32	2	0.				1						
	33	Х	-3					190					1
	34	RCLO	36 0					130					
	35	1	8										j
	<i>36</i>	2	0.		10/11	\<10/v2\2							
	37	X	-3:		12(1)	)≤72(Y2)?							
	38	X¥Y?	16-3										1
	39	GTOa	22 16 1										ĺ
	40	1	Û				1						
	41	2	Ø.										
	42	÷	-2				· -						
	43	RTH	2					000		ļ			
1	44	*LBLe	21 16 1		Print	: Mode Optic	n	200	<del></del>	ļ			ŀ
	45	F0?	16 23 0	ē ļ									Ì
1	46	GT02	22 0.	2						ļ			
1	47	SF0	16 21 0	6						<b> </b>			
1	48	1	B	i l									<u>[</u>
1	49	RTN	2	4									l
1.	50	*LBL2	21 B.	2 .							-		1
1.	51	Ø	8	Û,						ļ			
1	52	CF@	16 22 0	6						ļ			
	53	RTH	2	4				010		ļ			
	54	<b>≭LBL9</b>	21 8.	, و				210					
	55	F8?	16 23 0	6						<u> </u>			j
	56	GT03	22 0										ì
1	57	R∕S	5	1									
	58	RTH	2										
	59	*LBL3	21 0										1
1	60	PRTX	-1										
	61	RTN	2										
1	62	R/S	5										
				-				220					ļ
				•				220		<del></del>			ł
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	<del>                                     </del>		+							<del> </del>			
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<u> </u>	ь		<u> </u>		LAB	FLS		<u> </u>	FLAGS	1		SET STATUS	
A V1.	+Υ2	В	i	<sup>2</sup> PM			E TI	NT;RB	OPrint?	╅╤	LAGS	TRIG	DISP
_ ' '				ב דויו					1		ON OFF		
<sup>a</sup> Sche	ed.	b						rint?		<b>⊣</b> ∘		DEG 🗹	FIX 🗹
0		¹ Use	ed i	<sup>2</sup> Use	d	<sup>3</sup> Used	4		2	1		GRAD 🗆	SCI 🗆
5		6		<u> </u>	<del>-</del>		9 11	sed	3	<b>-</b>   2		RAD 🗆	ENG □ n_2_
							U:	sea		3			

## **Program Description I**

Program Title Amount of equity at any	time	
Contributor's Name APD  Address 19310 Pruneridge Avenue		
City Cupertino	State Ca	Zip Code _95014

Program Description, Equations, Variables For a periodic repayed loan with full amortization after a stated number of years, given:
n (number of payments made),
i (periodic interest rate),  PMT (periodic payment),
Pp (purchase price)
D\$ (down payment), or D% (percent down), or Ns (net sales price).
This program calculates purchase price equity Epp and net sales equity Es.
Epp = Ns - Es
$Es = \frac{1}{(1+i)^{-n}} \left[ PMT \frac{(1+i)^{-n} - 1}{i} + PV \right]$
Operating Limits and Warnings

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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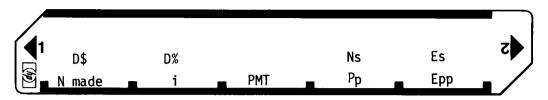
## Program Description II

Sketch(es)							i .				
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man a ferror of the		*./ %. ***					1				
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And the second s	griffig - purpose of the confidence of the confi	ay y mallerer in a recogni						The second second			
		-* :	•								
			•			***************************************				- 1	

nd Epp?	PMT = \$251.72, and D% = 20%. What are Es
M LPF.	
lution(s) (1) 72 [A] 7.5 [ENT] 12 [÷]	[B] 283.18 [C] 45000 [D] 4500 [f] [A] 63900
f] [D] [E]+7222.35 (Epp) [f] [E]+2	6122.35 (Es)
	.72 [C] 45000 [D] 20 [f] [B] 63900 [f] [D]
E]→11420.27 (Epp) [f] [E]→30320.27	(ES)

Reference(s) This program is a translation of the HP-65 User's Li	brary program
#229A submitted by Fred Sommer.	
	A CALLER WITH MINISTER OF THE PROPERTY OF THE

## **User Instructions**



STEP	INSTRUCTIONS		INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Load side 1				
2	Input: no. of payments made,	n	n	A	
	periodic interest rate		j	B [	
	periodic payment	PMT	PMT	C [ ]	
	purchase price	Pp	Pp	D	
	down payment	D\$	D\$	f a	
	or % down	D%	D%	f b	
	(optional) net sales price		Ns	f d	
3					Epp
4	Calculate net sales equity			f E	Es
5					
			<del>                                     </del>		
			<b></b>		
			<b></b>		
					-
				l	
	LABELS	<del></del>	FLAGS	SET STAT	FUE

					LABELS	FLAGS	SET STATUS				
A	n	В	i	C PMT	D P <sub>n</sub>	E →Epp	0	FLAGS	TRIG	DISP	
а	D\$	b	D%	С	d N	e →Es	1	ON OFF	DEG 🗹	FIX 🗹	
0		1	•	2	3	4	2		GRAD □ RAD □	SCI □ ENG □	
5		6		7	8	9	3	3 0 0	ראט 🗆	n_2	

### 97 Program Listing I

24			-	1 1081 am	1/1/741	-		
STEP KI	EY ENTRY	KEY CODE		COMMENTS	STEP K	EY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	4		057		36 12	
			# pii	ts mad <del>e</del> →R <sub>A</sub>	<i>051</i> <i>0</i> 58		-24	
002	STOA	35 11						
003	RTH	24		<del></del>	<b>0</b> 59		36 13	
664	*LBLB	21 12		od interest	060		-35	
005	EEX	-23	rate	<del>·</del> ≻R <sub>□</sub>	<b>06</b> 1		16 23 01	
996	2	<b>0</b> 2		D	062	etoe	22 00	
007	÷	-24			<b>0</b> 63	RCL3	<b>36 0</b> 3	
008	STOB	35 12		i	064		22 01	
009	1	01	] +	<del>i</del> 100 → R <sub>9</sub>	<b>0</b> 65		21 00	
010	+	-55		100 9	<b>0</b> 66		36 14	
011	STO9	35 <b>0</b> 9			967 960		21 01	
012	RTN	24	<del></del>	<del></del>	068		-41	
013	*LBLC	21 13		odic payment	069		-45	
014	STOC	<b>3</b> 5 13	→ R <sub>C</sub>		878		-14	
815	RTN	24	·		071	SPC	16-11	
016	*LBLD	21 14	Purc	hase price → R <sub>D</sub>	972		24	
017	STOD	35 14		اِلا	<b>073</b>		21 16 11	
018	RTH	24			074		35 01	\$ down → R <sub>1</sub>
019	*LBLE	21 15		· · · · · · · · · · · · · · · · · · ·	<b>0</b> 75		16 22 00	· · · · · · · · · · · · · · · · · · ·
020	SF1	16 21 01	Duna	hase price	976		24	
							21 16 12	
021	RCLD	36 14	equi	ιy	877 870			// do.us D
022	*LBL9	21 <b>0</b> 9	F	amatana	078		35 02	% down → R <sub>2</sub>
023	ST04	35 04	£qu1	ty subroutine	079		16 21 00	_
024	RCLD	36 14		i	080		24	
<i>0</i> 25	F0?	16 23 <b>00</b>			<b>0</b> 81	*LBLd	21 16 14	
026	6T08	22 <b>0</b> 8			082	ST03	<b>35 0</b> 3	Net sales price →
<b>0</b> 27	RCL1	36 01			<b>0</b> 83	RTN	24	R <sub>3</sub>
<b>0</b> 28	GT07	22 87			084	*LBLe	21 16 15	3
<b>82</b> 9	*LBL8	21 08			085		16 22 61	Net sales equity
<i>030</i>	RCL2	36 02			<b>0</b> 86		36 02	1.00 54.05 644.05
			1		<b>9</b> 87		22 <b>0</b> 9	
<b>0</b> 31	% 0704	55 25 24						
032	ST01	35 01			<b>0</b> 88	R∕S	51	1
<b>033</b>	<b>≭</b> LBL7	21 07						1
<i>0</i> 34	-	-45		ı				ł
<i>03</i> 5	ST00	35 <i>0</i> 0			<u> </u>		<del></del>	-
<i>036</i>	RCLB	36 12						-
<b>03</b> 7	X	<b>-35</b>	Ì				<u> </u>	<b>↓</b>
038	RCLC	36 13						_
039	÷	-24		i				
64 <i>0</i>	i	01	1	!				_
	_	-41	1					]
041	Х₽Ү						<u> </u>	7
042		-45			<del>                                     </del>		1	1 !
043	1/X	52			100		<del> </del>	1 !
044	LN	70	1		1			-l i
		32			<del></del>			
045	RCL9	<i>36 09</i>						4
045 046								
046	RCL9	36 <b>0</b> 9 32						
046 047	RCL9 LN ÷	36 09 32 -24						
046 047 048	RCL9 LN ÷ ST05	36 09 32 -24 35 05						
046 047 048 049	RCL9 LN ÷ ST05 *LBL1	36 09 32 -24 35 05 21 01						
046 047 048 049 050	RCL9 LN ÷ ST05 *LBL1 1	36 09 32 -24 35 05 21 01 01						
046 047 048 049 050 051	RCL9 LH ÷ ST05 *LBL1 1 RCL9	36 09 32 -24 35 05 21 01 01 36 09						- -
046 047 048 049 050 851	RCL9 LN ÷ STO5 *LBL1 1 RCL9 RCL9	36 09 32 -24 35 05 21 01 01 36 09 36 11						-
046 047 048 049 050 051 052	RCL9 LH ÷ ST05 *LBL1 1 RCL9	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05			110			
046 047 048 049 050 851	RCL9 LN ÷ STO5 *LBL1 1 RCL9 RCL9	36 09 32 -24 35 05 21 01 01 36 09 36 11			110			
046 047 048 049 050 051 052 053	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45	:		110			
046 047 048 049 050 051 052 053 054	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45 31						
046 047 048 049 050 051 052 053 054 055	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5 - Y×	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45			STERS			
046 047 048 049 050 051 052 053 054 055 056	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5 - YX -	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45 31 -45		sales <sup>4</sup>	STERS 5term of	6	7	8 9 1 + i
046 047 048 049 050 051 052 053 054 055 056 o amount financed	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5 - VX -	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45 31 -45	"	sales <sup>4</sup> orice Used	STERS  5term of loan			1 + i
046 047 048 049 050 051 052 053 054 055 056	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5 - YX -	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45 31 -45		sales <sup>4</sup> orice Used	STERS 5term of	6 S6	7 87	8 9 1 + i   S8   S9
046 047 048 049 050 051 052 053 054 055 056 o amount financed	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45 31 -45 own 2 % dow	"	t sales <sup>4</sup> Drice Used	STERS  5term of loan		S7	1 + i
046 047 048 049 050 051 052 053 054 055 056 o amount financed	RCL9 LN ÷ ST05 *LBL1 1 RCL9 RCLA RCL5	36 09 32 -24 35 05 21 01 01 36 09 36 11 36 05 -45 31 -45	"	t sales <sup>4</sup> Used	STERS  5term of loan	S6		] + i

### **Program Description I**

ELLWOOD INCOME VALUATION FOR INCOME PROPERTY APPRAISAL Program Title

Hewlett-Packard Co. Contributor's Name

19310 Pruneridge Avenue

Cupertino Citv

State CA Zip Code 95014

#### Program Description, Equations, Variables

Given a loan proportion to fair market value ( $\delta$ ), the annual interest rate on the loan  $(i_1)$  and the term of the loan (payable monthly in equal installments)  $(n_1)$ ; and given the horizon of the projection in years  $(n_2)$  and the expected appreciation or depreciation of the property at the end of  $n_2$  years  $(\pm \alpha)$ ; and given the desired return on equity (i2) the program computes the ELLWOOD factor by which the level income stream must be multiplied to find the value of the property which will give the desired rate of return on equity.

Value = AAI\*

$$\frac{\left[1-\delta-\frac{(1+\alpha_{1})}{(1+i_{2})^{n_{2}}}\right]+\delta\left[\frac{i_{1}(i_{1/2}+1)^{n_{1}(12)}}{(i_{1/2}+1)^{n_{1}(12)}-1}\right]\left[\frac{(1+i_{2})^{n_{2}}-1}{i_{2}(1+i_{2})^{n_{2}}}\right]+\delta\left[1-\frac{(i_{1/2}+1)^{n_{2}(12)}-1}{(i_{1/2}+1)^{n_{1}(12)}-1}\right]}{\frac{(1+i_{2})^{n_{2}}-1}{i_{2}(1+i_{2})^{n_{2}}}}$$

The actual "Ellwood" coefficient is stored in Register 0; the program produces its reciprocal which should be multiplied by the income stream.

#### Operating Limits and Warnings $\delta > 0$

This valuation technique is ubiquitous in spite of the fact that it does not explicitly take tax consequences into account. Investors should beware of shortcut techniques such as this one.

This program has been verified only with respect to the numerical example given in Program Description II. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

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## Program Description II

Sketch	n(es)		i i															` i		
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		<u>:</u>	• · · · · · ·		•	•	1		•		,									

mpl	e Problem(s)
	A property will produce an even cash flow before debt service of \$10,000. It
	is to be mortgaged at 80% of fair market value; the loan is for 19 years and
ł	has a 10.2% interest rate. The property is to be sold in 5 years and it is
	expected to depreciate 10% during the 5-year period. At what price will it
	produce a 6.3% yield on investment?
1	V <sub>1</sub> = 19
	i <sub>1</sub> = 10.2% (.102)
-	$i_2 = 6.3\%  (.063)$
, (	5 = 80% (.80)
C	$x = -10\% \ (10)$
/	AAI = \$10,000
lutio	on(s)
F	Factor = 9.1043
	Value = \$91,043
	Ellwood coefficient = .109838765

Reference (s) This	s program is a t	ranslation of	the HP-65 U	ser's Library	program
#728A by Ke	lvin C. Vanderli	p, Jr.			S NAME
	1 Common				
					THE CONTRACTOR STATE OF THE CONTRACTOR OF THE CO
	- Carlo de Maria de M	Account and the contract of th			

## **User Instructions**

,		-					
4	ELLWOOD	INCOME	VALUATION	FOR INCOME	PROPERTY	APPRAISAL	2
	δ i <sub>1</sub>	<sup>1</sup> 1 μα	n <sub>2</sub>	i <sub>2</sub>		(i + x) <sup>y</sup>	

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	Loan proportion (decimal form)	δ	<u> </u>	
3	Loan interest rate (decimal form)	iı	<b>†</b>	
4	Loan term, years	n <sub>1</sub>	A	δ
5	<pre>% Appreciation (+) or depreciation (-)</pre>	α	<b>↑</b>	
	(decimal form)			
6	Number of years of projection	n_	B. [	1 + α
7	Desired equity yield	1 <sub>2</sub>		1/Ell.factor
8	Annual income stream	\$AAI	$\mathbf{x}$	value(\$)
		DAVI.		Value(\$)
9	(optional) Ellwood factor		E	Ell. factor
9	Ellwood_lactor			EII. Iactur
	/for a new desired equity yield go to 7.			
	(for a new desired equity yield, go to 7;			
	for a new horizon or change in appreciat	1011/		
	depreciation, go to 5)			
		<del></del>		
Δ	LABELS  LABELS  C : D E [2]	FLAGS	1	STATUS
_	$1_1 \uparrow n_1$ $\alpha \uparrow n_2$ $1_2$ EII	.Factor		RIG DISP
3	b c d e	]		G of FIX of
<sup>0</sup> Us	sed 1 2 3 4	2	1 □ 🗹 ( GR	AD   SCI
5	6 7 8 9	3	- 2 □ ₾   RA 3 □	D   ENG

## 97 Program Listing I

			_	( <del>,</del>			$\Box$				
			COMME	NTS	STEP	KE	Y ENTRY	KEY C	ODE	COMM	IENTS
001	*LBLA	21 11			9	57	STOO	35 6	a G		
802	1	01				58	RCL4	35 t			Į
003	2	02							91		
004	x	-35	n v 12 -	D		5 <i>9</i>	1				
005	STO3	35 Ø3	$n_1 \times 12 \rightarrow$	$R_3$		60	2		92		
005 006	CLX	-5i				61	X		35		
						62	RCL1	35 (			
007	LSTX	16-63			0	63	6SB0	23 (	9 <i>0</i>		
998	÷	-24			0	64	1	(	91		ľ
<b>00</b> 9	ST01	35 01	$i_1/12 \rightarrow R$			65	_		45		
010	R↓	-31	1,	1		66	RCL3	36 (			
011	ST06	<i>35 06</i>				67	RCL1	36 (			
012	RTH	24	. D				GSB0	23 (			
	*LBLB	21 12	$\delta \rightarrow R_6$			68					
014	ST04	35 04	_			69	1		91		
<i>8</i> 15	CLX	-5i	$n_2 \rightarrow R_4$			76	-		45		
			4			71	÷		24		
016	1	<i>01</i>			0	72	CHS	-,	22		Ì
017	+	-55	1		0	73	1	i	01		
018	ST05	<i>35 05</i>	$1 + \alpha \rightarrow$	R_		74	+		55		
019	RTH	24	1 - 4	R <sub>5</sub>		75	RCL6	36			
828	*LBLC	21 13	1			76	X		35		
021	STO2	35 02	i → P.			77	RCL7	36 i			1
022	RCL4	36 04	$i_2 \rightarrow R_2$	ļ		78	RUL!		24		
<b>823</b>	XZY	-41									ľ
<i>8</i> 24	GSB0	23 00	/1 · · · \ <sup>n</sup> 2			79	RCL0	36			i
027 025	STO7	35 07	$(1 + i_2)^{-1}$	,		88	+		55		
		01		,		81	RCLS	36			
<i>026</i>	1			!		82	÷		24	Ellwood	Factor
<b>0</b> 27	-	-45			0	83	ST00	<i>3</i> 5 :	<b>0</b> 0		ractor
028	RCL7	36 07			8	84	1/X		52	→ R <sub>0</sub>	
<b>0</b> 29	÷	-24			0	85	RTN		24		
030	RCL2	36 02				86	*LBL0	21			
031	÷	-24				87	1		01		
032	STO8	35 <b>0</b> 8				88	+		55		
833	RCLI	36 01				89	XZY		41		
034	RCL3	36 <b>0</b> 3					γ×		31		
035	RCL1	36 01				90					
<i>036</i>	GSB0	23 06				91	RTN		24		
<b>03</b> 7	X	-35				92	*LBLE	21		Dicplay	Ellwood
<i>038</i>	LSTX	16-6 <del>3</del>		i		93	RCL0	36		Display	LIIWOOG
					Ø	94	RTN		24	Factor	
<b>0</b> 39	1	01 45		:	6	95	R/S		51		į
040	-	-45 04									į
041	÷	-24	•								1
042	1	Ø1									ļ
043	2	02									i
044	x	-35			1						
<b>045</b>	RCL8	36 08									
046	X	-35									
047	RCL6	<i>36 06</i>									
948	X	-35									
049	 1	Ð1									ĺ
050	+	-55									1
		-55 36 06			$\vdash$						l
051	RCL6				<del>                                     </del>						l
<b>0</b> 52	 	-45			$\vdash$		-	-			l
<b>05</b> 3	RCL5	<i>36 0</i> 5			110						l
854	RCL7	<i>36 07</i>			110						l
<i>0</i> 55	÷	-24			<del>                                     </del>						l
856	-	-45	L						i		
	·	T-	12		STERS		6	17		18	T9
1. fac	i <sub>1</sub> /12	2 <b>i</b> -	$^{3}$ n <sub>1</sub> x 12	4 n	5   1 + (	, I	6 δ	7   U	sed	Used	
i. lac		i <sub>2</sub>				~		S7		S8	S9
	S1	S2	S3	S4	S5		S6	امرا		~~	
	I	1		i						1	

#### **Program Description I**

Program Title

INCOME PROPERTY ANALYSIS

Contributor's Name

JACK B. BUSTER

Address

P. O. BOX 8062

City

ANCHORAGE

State ALASKA

Zip Code 99508

Program Description, Equations, Variables Capitalization Rate = Net Operating Income Purchase Price Taxable Income = Net Operating Income - Depreciation - Interest Spendable Income = Net Operating Income - Payments - Income tax Spendable Income Rate = Spendable Income Equity Equity Income = Net Operating Income - Interest - Income tax Equity Income Rate = Equity Income The above variables are the generally accepted parameters for the analysis and evaluation of income properties. This program follows the standard NIREB recommended format. Net Operating Income is gross income decreased by vacancies and operating expenses. Operating Limits and Warnings This program will operate with only one level of mortgage, i.e. properties with second mortgages cannot be analyzed by this program. This valuation or analysis technique is ubiquitous particularily since it takes explicit

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

tax consequences into consideration.

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## Program Description II

ketch(es)									1			
	- i.	•			•				· · · · · · · · · · · · · · · · · ·		 anger and war age to	
annedy. •• •						:		 *				
and the second s		• •	h	an indian an income			1			and the feet of the second		
							. 1					
-			:				1	 :			 The same of the sa	
			•		*							
	•	•						1			:	

nple Problem(s) An	investor w	ishes to know t	he performance	of a large a	apartment comple
over the next	five ye <mark>ar</mark> s	with respect to	initial capit	alization rat	e, taxable inco
net spendable .	income, sp	endable income	rate, equity i	ncome, and eq	uity income rat
The following	particular	s apply:			
Purchase Price	\$	750,000.00	Inflation/Ap	ite:	
Loan Amount		635,000.00	Current year	- : = 7%	
Interest rate		9 3/4%	Next year:	= 7 1/2%	
Land Value	\$	95,000.00	Next Year:	= 8%	The second secon
Building life			Thereafter:	= 8 1/2%	
Monthly paymen		7,000.00		•	
Net Operating .			AND THE RESERVE OF THE PROPERTY OF THE PROPERT	THE RESERVE OF THE PROPERTY OF	
Income tax bra					Annual Control of the
		SAMPLE SOLUTION			
Cap rate = 15.0			Year 3	Year 4	Year 5
		43,118.33			
	15,345.01	•	23,506.10	28,573.12	34,439.61
Rate	13.34 %	10.04 %	8.51 %	7.65 %	7.12 %
Equity					
Rate	33.43 %	23.39 %		15.93 %	•
ution(s) Input va Interest Rate	STO B	(.8125)	SOLVE AS FOLLO	WS:	
Monthly Paymen				**************************************	The state of the s
Loan Amount	STO D		Initialize	i Table to the second second second second second second second second second second second second second second	
Purchase Price	STO O		re variables		
N.O. INCOME			Capitaliza		
Economic Life	STO 2		<b></b> Taxable In		
Land value	STO 3				endable Income
Tax Bracket	STO 4	, <del>-</del> - /		-	y Income Rate
		_	in inflation		
			Advances t		
A TOP V MARKATANA O VICE OF MA		(9) Ret	urn to step (4	) for addition	nal totals

Reference (s)	National Institute of Real Estate Brokers income property analysis
	data sheet.
THE PROPERTY OF THE PROPERTY O	
1 MARKET 1 100 MAR	

#### **User Instructions**

INCOME PROPERTY ANALYSIS

f start CAP RATE

TAXABLE INCOME SPENDABLE INCOME EQUITY INCOME NEXT YEAR 7

INPUT OUTPUT STEP INSTRUCTIONS **KEYS** DATA/UNITS DATA/UNITS 1 Load sides 1 and 2 2 Initialize 3 Input Data: Interest rate per period STO Monthly payment STO Loan amount STO D STO 0 Purchase price STO Net Operating Income STO Remaining economic life of improvements STO Land value Investor's income tax bracket (as a %) STO CALCULATE Capitalization Rate Cap Rate 5 CALCULATE Taxable Income *Taxable* 6 CALCULATE Net Spendable Income and Rate Spendable | \$ & % CALCULATE Equity Income and Rate D. **Equity** \$ & % 8 Input current inflation/appreciation rate years beyond base year 9 Return to step 5 for the next year

## Program Listing I

STEFA	() KBY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
001 #	f LBL A	31 25 11			1	01	
	RCL 1	34 01			2	02	4
	RCL 0	34 00	Figure Cap Rate		STO 8	33 08	4
	Divide	81		060	CHS	42	4
	EEX	43			yx 1	35 63	4
<del></del>	2	02				01	4
	X	71			<i>x                                    </i>	35 52	4
	h RTN	35 22			_	51	4
<b>*</b> 010	f LBL B	31 25 12			RCL 5	34 05	4
010	DSP 2	23 02	Figure straight li	20	RCL 8	34 08	1
	h F? 0	35 71 00	Depreciation		RCL A	34 11 51	Interest
	GTO 1	22 01		<del>                                     </del>	y <sup>x</sup>	35 63	Calculation
<del></del>	RCL 0	34 00		070	RCL 9	34 09	Routine
	RCL 3	34 03		-	Divide	81	1
	RCL 2	51 34 02			X	71	1
<del> </del>	Divide	81			RCL 8	34 08	1
			1	<b></b>			1
	STO 2	33 02 01		<b></b>	x	35 52 51	†
020	RCL B	01 34 12	1	<del> </del>	RCL C	34 13	1
	f %	31 82	Figure		X	71	1
	STO 9	33 09	Loan	<del></del>	h RTN	35 22	<b>1</b>
	+	61	Amortization	*	f LBL C	31 25 13	1
	STO 7	33 07	Period	080	RCL 4	34 04	Figure
	RCL C	34 13	101104		EEX	43	Spendable
	RCL 9	34 09			2	02	pendable
	Divide	81			Divide	81	1
	Enter	41	1		RCL 3	34 03	1
	Enter	41	1		X	71	1
030	RCL D	34 14	1		STO 7	33 07	]
	-	51			RCL C	34 13	]
	Divide	81			RCL 8	34 08	]
	f LN	31 52	}		X	71	]
	RCL 7	34 07		090	STO E	33 15	_
	f LN	31 52			+	61	_
	Divide	81			CHS	42	_
	STO A	33 11			RCL 1	34 01	1
*	f LBL 1	31 25 01	]		+	61	4
	f GSB 0	31 22 00	l		-x-	31 84	show spendable
040	STO 6	33 06	Figure		RCL 0	34 00	4
	RCL 2	34 02	Accumulated		RCL D	34 14	4
	+	61	Interest for		-	51	4
	CHS	42	12 months	100	STO 9	33 09	4
	RCL 1	34 01	{	100	Divide	81	1
	+	61	R:		EEX	43	4
	STO 3	33 03	Figure Taxable	<b> </b>	2	02	1
-	h RTN	35 22	Taxable	<u> </u>	X h Day	71	show rate
	f LBL 0	31 25 00	1	<del>                                     </del>	h RTN	35 22 31 25 14	====================================
050	RCL B	34 12	1	<del>- "</del>	f LBL D RCL 7	31 25 14 34 07	1
000	EEX 2	43 02	1	<b></b>	RCL 6	34 06	1
	Divide	<i>02</i> <i>8</i> 1	1		+	61	Figure
	STO 9	33 09	1	<u> </u>	CHS	42	Equity
	1	01	1	110	RCL 1	34 01	Income
	+	61	1		+	61	1
	STO 5	33 05	1		-x-	31 84	show equity
			REGI	STERS			
0	1	2	3 4	5	6	7	8   9   used
	ice $N.O.I.$		Land val. tax rate	used		tax	
S0	S1	S2	S3 S4	S5	S6	S7	S8 S9
		L					<del></del>
A Loa	ו מנ	В	C	D _		E	I Voor counter
l	? Amort.	Interest F	Rate   Monthly PMT	Loan	Balance	USED	Year counter

## 67 Program Listing II

			<b>-</b>						33
STEP	KEY-ENTRY	KEY CODE	COMMENTS		STEP	KEY ENTRY	KEY CODE	COMI	MENTS
	RCL 9	34 09			T .	1	l ·		·
-	Divide	81	<del>-</del>		170			-	
<del> </del>	EEX	43	-{		170			-	
-		<del></del> _	<b>-</b>		<u> </u>	<del>                                     </del>	. <u> </u>	4	
	2	02	<b>-</b> }			<u> </u>		4	
	X	71			L	<u></u>		_	
i.	h RTN	35 22			-[			]	
*	f LBL E	31 25 15					_	1	
120	RCL E	34 15	Adjust for				··· ·· · · · · · · · · · · · · · · · ·	1	
	RCL 6	34 06	inflation and		<b>—</b>		_	1	
<b>——</b>					<b></b>			┨	
<b>}</b>	CHS	51 42	housekeep for					4	
	I.		new year's run					1	
ļ	RCL D	34 14	]		180			_	
1	+	61	l l						
	STO D	33 14	7					1	
	h 🗸	35 53	7					1	
	STO E	33 15						1	
<u> </u>								1	
130	RCL 0	34 00	-		<u> </u>			4	
130	x Z y	35 52	_					4	
	f %	31 82			<u></u>			J	
	+	61						]	
	STO 0	33 00						1	
	RCL 1	34 01	7		190	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		1	
	RCL E	34 15	7		<b></b>			1	
	f %		٦ .				·	1	
<del></del>	1	31 82	┥		<u> </u>			4	
<b>—</b>	+	61	<b>⊣</b>					4	
	STO 1	33 01	_]					<u>j</u>	
	h SF 0	35 51 00	_i					j	
140	RCL A	34 11						1	
	RCL 8	34 08	7					1	
	_	51	7					1	
	STO A	33 11	┥					1	
-					200			1	
	f ISZ	31 34			200			4	
	h RC I	35 34						j	
	DSP 0	23 00	_						
	h RTN	35 22						Ī	
*	g LBL a	32 25 11							
	h CF 0	35 61 00						1	
150	f CL REG		Initialize					+	
	CL X	44						1	
	DSP 2	23 02	-{		-				
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	h RTN	35 22	_					]	
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l									
			7					1	
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<b></b>	L	L	LAPELS		Li	FLACE		CET OTATIO	
Ä	В	lc	LABELS D	TE		FLAGS		SET STATUS	
Cap	Rate Taxa	ble   Sp	endable Equitu	E Ne.	xt Year	Toggle	FLAGS	TRIG	DISP
a	Rate Taxa	С	d	e		1	ON OFF		
Init	tialize						0 🗆 🗷	DEG 🕱	FIX 🖼
0	]1	2	3	4		2	1 🗆 🖼	GRAD □	SCI □
5	6	7	8	9		3	<b>-</b> 2 □ <b>S 3</b>	RAD 🗆	ENG 🗆
L_		l′		ľ		ľ	3 🗆 🗷		n_2

Program Title RETURN ON EQUITY RENTAL PROPERTY

Contributor's Name

COLIN E. WALTON

Address

26 SIMKIN AUF,

KOHMARA MARA,

City

AUCKLAND

State NEW ZEALAND

Zip Code

#### **Program Description, Equations, Variables**

GIVEN THE PRESENT VALUE (OR ASKING PRICE) OF AN INVESTMENT PROPERTY, AND MORTGAGE DETAILS, THIS PROGRAM WILL CALCULATE NET ANNUAL INCOME (AFTER INTEREST PAYMENTS) OWNERS EQUITY AND RETURN ON EQUITY EXPRESSED AS A PERCENTAGE.

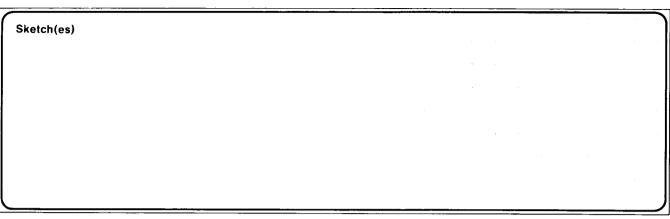
FURTHER IF A NEW INCOME (EXPECTED FUTURE INCOME) IS INPUT, A SECOND CALCULATION IS PRESENTED ONCE AGAIN SHOWING NET INCOME, EQUITY AND RETURN ON EQUITY

THIS PROGRAM CALCULATES ON THE BASIS OF A"FLAT" MORTGAGE WHERE ONLY INTEREST PAYMENTS ARE MADE - WHICH ARE COMMON IN INVESTMENT PROPERTIES.

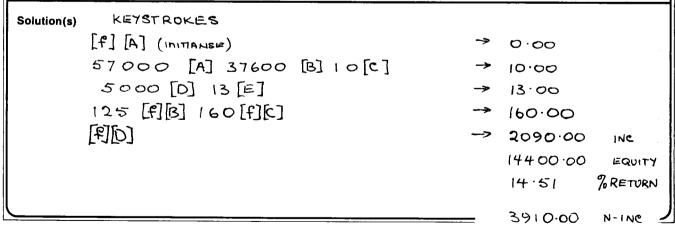
#### **Operating Limits and Warnings**

INITIALIZATION MUST BE USED AT BEGINNING (START) BUT THERE-AFTER ALL OR ANY VALUES MAY BE CHANGED

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.



```
Sample Problem(s)
     A RENTAL PROPERTY IS AVAILABLE
                                    AT
                                            $57000
                                            $ 37600
      FLAT MORTGAGE IS AVAILABLE OF
                                                     @ 10%
      INTEREST
      A SECOND FLAT MORTGAGE OF
                                           $ 5000
                                                     @ 13%
      INTEREST
      WEEKLY INCOME FROM THIS PROPERTY IS
      BUT YOU BELIEVE THIS MAY REASONABLY BE
      INCREASED
                                              $160
```



## **User Instructions**

4.	RETURN	ON EQUITY	RENTAL	PROPERTY		7
3	TART	INC/WEEK	INC/WEEK	-> INC, EQ, %  2010 MORT	P?	

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
	LOAD SIDE 1 AND SIDE 2			
2	INITIALISE		₽ A	0.00
3	OPTIONAL : SELECT PAUSE PRINT MODE		<u> 후</u> [ 트	1.00/0.00
4	INPUT PRESENT VALUE	PV	A [	<i>Ρ</i> . V
5	INPUT IST MORTGAGE VALUE	18T MORT	В	1ST MORT
6	INPUT IST MORTGAGE ANNUAL INTEREST	187		IST;
7	* INPUT 2nd MORTGAGE VALUE	2nd MORT		2nd MORT
ક	* INPUT 2nd MORTGAGE ANNUAL INTEREST	and i		and i
9	INPUT WEEKLY INCOME	INC/WEEK	₽ B	INC/ANNUM
10		N-INC/WETEK	f c	N-INC/ANNUM
11	COMPUTE RESULTS -		R D	NET INC >
12	FOR NEW CASE GO TO STEP 4			EQUITY,
	- IJII			% RETURN.
	* THESE ARE OPTIONAL INPUTS			
	** IF NEW WEEKLY INCOME INPUT			
	PRINTER WILL PRINT 2 SETS OF			
-	RESULTS			
	Marking .			
		1		
		1		
				<u> </u>
<u> </u>				
<u> </u>				
-		<u> </u>		
		-		
<u> </u>				
<u> </u>				

## Program Listing I

HBLE   21   15   51   51   51   51   52   52	STEP	KEY ENTRY	KEY CODE	COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
RIS   SI   SI   SI   SI   SI   SI   SI	001					_	-45	
PASE   91 12   12   12   15   15   15   15   15	<u> </u>		35 01			STD 9	35 09	
Note   10   10   10   10   10   10   10   1		RIS	51		ļ	RCL6	36 06	
STO 2   35 02		* LBLB	21 12		060	RCL8	36 08	
R S		STO 2	35 02				-4 <del>5</del>	
** ** ** ** ** ** ** ** ** ** ** ** **		R/S	51			FO?		_
STO 3   35 08   F.O.?   16 23 00   PRINT   FOR   FOR   16 23 00   PRINT   FOR		* LBLC	21 13			Sec		IF FO SET THEN
RIS		1				1		PRINT
STO   STO								
STO 4	010		21 14					
Part	1	3104						
P. BALE   21   15   15   15   15   16   15								PROGRAM TO BACKSTEP
SID S   35 OS		,						222 STERS TO MISS
PRIX					070			PSE IN PRINT MODE
# 168-a 21 16 11  CLRG (6-53) 2 02 2 02 2 02 2 02 2 1 0 01  STO I 36 tb -22 FF PROCRAM -222 FF PROCRAM -223 FF PROCRAM -223 FF PROCRAM -223 FF PROCRAM -223 FF PROCRAM -223 FF PROCRAM -223 FF PROCRAM -223 FF PROCRAM -224 FF PROCRAM -225 FF								
CARG								
2		1						
2			[ ]			1		
CHS	<b> </b>				<del></del>	1		
CHS	020					7		
STO   35 46   CLX						<del>                                     </del>		
CLX -51 RS 51 RS 52 RS 52 RS 52 RS 53 RS 54 RS 55 RS 5				SETS I REG WITH	<b></b>	<del></del>		,
RIS 51 LISH D 21 16 12 ENT 1 - 21 ENT 2 - 25  2 - 25  3 - 25  3 - 25  4 - 21 16 13  CHANGES WEEKLY NEDMIE TO ANNUAL ENT 1 - 21 ENT 1 - 23 ENT 2 - 21 ENT 1 - 21 ENT 1 - 21 ENT 1 - 23 ENT 2 - 20 ENT 2 - 20 ENT 2 - 20 ENT 2 - 20 ENT 2 - 20 ENT 2 - 20 ENT 2 - 20 ENT 2		T		<b>—</b> • • • • • • • • • • • • • • • • • • •				
Malh 21   16   12   12   15   12   15   12   15   15	<b> </b>				080			
ST   S   C   C   C   C   C   C   C   C   C	<del>                                     </del>	T			<del></del>	_		
S	<del>                                     </del>							
Note   Part	<b>}</b>							
STO 6	<u> </u>		_	CHANGES WEEKLY	-			
STO 6   35 O6   R S   51   R S   57   ARA 1 DOWS NEW INCOME CANCULATOR				INCOME TO ANNUAL	-			
R S   S	020							
LRL C   2  16 13	030							
ENT 1								
S	<b></b>				L		21 01	ABA 1 DOWS NEW
2		ENTA	-21		ļ		36 07	INCOME CALCULATON
STO 7   35 07   SF1   16 21 01   F0?   16 23 00   SFC   16 -11   F0?   16 23 00   SFC			05		090	RCL8	36 08	
STD 7   35 07     SPC   16-11     FO?   16 23 00   PRTX   -14   PRTX   -14   PRTX   -24   PRTX   -35   PROBAM TO BREKET   PROBAM T	<u> </u>	2						,
SF1		×	-35			Fo?	16 23 00	, ·
RIS   SI   O40   PRTX   SI   O7   O40   PRTX   SI   O50   O50   O50   RCL 2   36 02   RCL 3   36 03   RCL 4   36 04   RCL 2   36 02   RCL 2   36 02   RCL 2   36 02   RCL 3   RCL 4   36 04   RCL 2   36 02   RCL 2   36 02   RCL 4   36 04   RCL 2   36 02   RCL 4   36 04   RCL 2   36 02   RCL 4   36 04   RCL 4   36 04   RCL 2   36 02   RCL 4   36 04   RCL 4		STO 7	35 07			SPC	16-11	
RIS   SI   O40   PRTX   SI   O7   O40   PRTX   SI   O50   O50   O50   RCL 2   36 02   RCL 3   36 03   RCL 4   36 04   RCL 2   36 02   RCL 2   36 02   RCL 2   36 02   RCL 3   RCL 4   36 04   RCL 2   36 02   RCL 2   36 02   RCL 4   36 04   RCL 2   36 02   RCL 4   36 04   RCL 2   36 02   RCL 4   36 04   RCL 4   36 04   RCL 2   36 02   RCL 4   36 04   RCL 4	L	SF1	16 21 01			Fo?	16 23 00	j
RCLT   36 07   CHECK IF NEW INCOME   PSE   16 51   16 23 00		RIS	51			PRTX		
X = O?	040	*LBL d	21 16 14			FO?	16 23 00	
X = O ?		RCLT	36 07			GTDi	22 45	GTO(i) CAUSES
CF1   16 22 0   INPUT - IF NO CANCLE   RCL 9   36 09   222 STEPS TO MIS   RCL 2   36 02   F1   100   F0?   16 23 00   P8   IN PRINT MODE   RCL 3   36 03   PRTX   -14   F0?   16 23 00   RCL 4   36 04   PSE   16 51   RCL 4   36 04   RCL 2   36 02   RCL 4   RCL 2   RCL 4				CHECK IF NEW INCOME				PROGRAM TO BACKSTEP
Rel 2								222 STIEPS TO MISS
RCL 3				F1	100			PSE IN PRINT MODE
Total   Stock   Stoc								
STD 8   35 08   GTO i   22 45								
RCL 4								
RCLS   36 05								
1								
ST+8   35-55 08	050							<b>I</b>
RCL 2   36 02						0		
RCL 4   36 04			1					
110   FO?   16 23 00						X	-35	
RCL 1   36 01   RRTX   -14     X = 2				ļ	110	Fo?		ļ
N   1   PV   2   ST   MORT   3   ST   1   4   2   MORT   5   2   NO     6   PRESENT   7   NIEW   8   TOT   NT   9   ERVITY		RCL 1						
PV   2   ST MORT   3   ST   4 2 NO MORT   5 2 NO   6 PRESENT   7 NEW ANNIVAL INC.   STOT INT   9 LEQUITY						RIS	51	
PV   ST MORT   18T   2NO MORT 2NO   INNOAL INC.   ANNOYAL INC.   TOT INT   EQUITY.   SO   S1   S2   S3   S4   S5   S6   S7   S8   S9   S1   S1   S2   S3   S4   S5   S6   S7   S8   S9   S1   S1   S2   S3   S4   S5   S6   S7   S8   S9   S1   S1   S2   S3   S4   S5   S6   S7   S8   S9   S1   S1   S2   S3   S4   S5   S6   S7   S8   S9   S1   S1   S1   S1   S2   S1   S1   S1				REGIS	TERS			
S0 S1 S2 S3 S4 S5 S6 S7 S8 S9	0	1 011	2	3 187	5		I'	
	S0	S1	S2	S3  S4	S5	S6	S7	58  59
	<u></u>		<u> </u>				l	1
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	L	i						

Program Listing II

38									VEV	CODE	COMME	ENTS
STEP	KEY ENTRY		Y CODE	СОММ	ENTS		STEP	KEY ENTRY	KEY	CODE	COMMI	1113
	LBLe	21	16 15			L						ļ
	F0?	16	23 00			1	70					i
	GTO 0	1_	22 00	PRINT TOGG	}LE	- }-						ł
	SFO	16	21 00	T KITT 1505		⊢						
	CLX	<b>↓</b>	-51			<u> </u>						ŀ
		ļ	01			L						
	RTN	<u> </u>	24			L						i
120	LBLO		21 00			L						
	CFO	16	22 00			⊢						
	CLX	ļ	-51			L						ł
	0	<u> </u>	00			-						i
	RTN	<u> </u>	24			<u>[</u>	80					
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	<del>                                     </del>	<del> </del>		1		- }			<del> </del>		-	
	<del> </del>			1		-					}	
	1			LABELO		1		FLAGS	<u> </u>		SET STATUS	
Α Ο	Ip.		C	LABELS	T	E .		10				5:05
A P	V B IST	MORT	ופו	1 2 2 1 2 1 2 1 2	MORT	21	ND j	USED		AGS	TRIG	DISP
a STA	RT b INC	WEE	c	1 - 3 d		е	۶۹	1 USED	0	ON OFF   □	DEG 🛛	FIX 🛭
			١,	WEEK 3		4	· •	2			GRAD	sci □
PKII		C PRI	NI								RAD 🗆	ENG  n_2
5	6		7	8	j	9		3	١٠	m <b>5</b> 3	l	n 2

Program Title REAL ESTATE INVESTMENT ANALYSIS

Contributor's Name BRUCE K. MUROOCK

Address 6875 Sabado Tarde Rd

City Goleta State Calif Zip Code 93017

Program Description, Equations, Variables This program performs the financial analysis of a real estate investment such as an apartment building. The user enters the first mortgage particulars (principal, yearly interest rate, and number of years loan runs), the second mortgage particulars (principal and yearly interest rate), the net income (gross less utilities, taxes, and services). the down payment (the buyers investment), the value of items to be depreciated at an accelerated rate, the accelerated rate, and the life in years, the yearly straight line acceleration amount, and the buyers tax bracket. A financial analysis for any year of the investment life may now be made. The year number is entered, and the program returns a financial summary that includes the down payment, the first mortgage particulars (principal value, interest rate, life, and monthly payment), the second mortgage particulars (principal value, interest rate, and monthly payment), total monthly payment, total yearly mortgage payment, interest paid to the first, and the second mortgage, total yearly interest, accelerated depreciation summary (original value, acceleration rate, lifetime, depreciation for the selected year). straight line depreciation, and total depreciation for the selected year. interest plus depreciation less income (taxable income writeoff), tax writeoff (tax bracket times taxable income writeoff), yearly cash flow (net monthly income less monthly mortgage payments times twelve), money in pocket (tax savings plus cash flow), payments to principal, and dollars returned on investment (tax savings plus cash flow plus principal payments). By dividing the dollar return on investment by the down payment, the percent return on investment is obtained. The sample calculation shows all the above information for each of the first five years of operation of a hypothetical apartment.

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

The second mortgage payments are calculated at 10% of the yearly interest rate per month, i.e. the monthly payment for a second with 10% interest rate per year is 1% of the principal per month. This is a typical arrangement for second trust deeds, however, with any loan having a balloon payment, the monthly payments can be flexible, an extreme case is the interest only loan.

The program may be modified to allow entry of a second loan payment. The subroutine that calculates yearly interest uses as inputs, the principal, the monthly interest rate, and the payment, so only the part of the program where the second trust deed monthly payment is calculated need be changed. This section is contained under label B. The coding shown below replaces the existing section of the program under label B, and allows the user to enter the second principal, yearly interest rate as a percent, and the monthly payment. The program will then summarize, as before, the amounts paid to principal and interest each year.

026 \*LBLB 027 5T06 028 R↓ 029 GSB3 030 031 ST05  $P_{i}$ 032 ST04 033 034 \*LBL1 035 RCL3 036 RCL6 *037* 038 ST07 039 RTN

Program Title	REAL	ESTATE	INVESTMENT	ANALYSIS
Contributor's I	Name	-		
Address			The state of the second contract contra	
City	t All World .		State	Zip Code

Program Description, Equations, Variables		
1 <sup>ST</sup> T.D. monthly payment =	im. PV1	LM = Lgr = monthly INTO rate
1 <sup>st</sup> T.D. monthly payment = (pmt)	$1-\frac{1}{(1+im)^n}$	n = total number of payments
		$n = 12 \times # of years$
1 or 2 no interest payments to	r year k.,	IŁ
$1^{ST}$ or $2^{NO}$ interest payments to $I_{k} = 12 \cdot pmt + (11)$	V- PMT )((1+im	) - 1)(1+i) 12(16-1)
1 st T.a paymonts to principa		
2 <sup>NO</sup> 7.0. monthly payment		
Tr ( )		
Operating Limits and Warnings If no first	y be outere	ed, but a dummy
interest rate must be used 3ero interest rate causes a	tivision by	Entry of a zero in the
monthly payment calculation for tops displaying "Error"	n, and pro	ogram execution
ofop a groping are	•	

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

Program Title REAL	ESTATE	INVESTMENT	ANALYSIS
		to the transfer of the second	
Contributor's Name			**************************************
Address		1 A M. COMPANIE MANAGEMENT CONTROL CONTROL	
City		State	Zip Code

```
Program Description, Equations, Variables
     accelerated depreciation = (Bldg value) \frac{R}{n} \left(1 - \frac{R}{n}\right)^{n}
                                                R= acceleration rate
                                               k = year number
                                               n = life, yrs
     Taxable income writeoff = (Depreciation) + (interest posts)
                                     - (net income.)
     net moome = (gross income) - (taxes) - (insurance)
- (utilities) - (sarvices) - (main tamence)
    Income tax reduction = (incremental tax brkt) (Taxable income w/o)
   Cash flow = net income - mortgage payments
                (on yearly basis)
   money in pocket = Income fox reduction + Cash flow
   Total return on investment = money in pocket + payments to principal
   To return on investment = Total return/down payment
             (the down payment is assumed to be the total invastment by the buyer)
```

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

Sketch(es)		
	and we consider a consideration of the constant of the constan	
	*	
parameter and pa	The state of the second control of the superconduction of the control of the superconduction of the superconductin	
	e e e e e e e e e e e e e e e e e e e	
The second production of the second contract	and the second s	
	en en en en en en en en en en en en en e	
	The second secon	
Sample Problem(s) A \$100,000	anartment building is to	be purchased with the following
	e, \$80000, 9.5%/yr, 30 ye	
•	%yr. (payments 1%/mo.);	-
	•	intenence, and services is
<del>-</del> ;	•	and is to be depreciated over
	•	ght line depreciation items
	frigerators, water heater	- · ·
•		ined federal, state, and local.
(the tax bracket is the	incremental percentage	shown in the tax schedules).
The analysis is performe	ed for years one through	five of building life
( investment life).		
ANNUAL TO IN 1979 SERVINGE THE COMMAND NO CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF THE CONTRACTOR OF T		
**************************************		
- · · · · · · · · · · · · · · · · · · ·		
Solution(s) See attached s	sheet	
• •		1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
**************************************		
	<del>.</del> .	
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Reference (s)		
Reference (s)		
Reference (s)		
Reference (s)		

```
PROGRAM INPUT
                    10000.00 GSBa
                                  down payment
                    80000.00 ENT: first principal
                       30.00 ENT: first lifetime, years
                        5.58 63BA first interest rate per year
                      672.68 *** output, first monthly payment
                    10000.00 ENT†
                                  second principal
                       10.00 6888 second yearly interest rate
                     7000.00 GSBC
                                  net yearly income
                    80000.00 ENT1
                                  accelerated depreciation value
                       20.00 ENT1
                                  accel. depr. lifetime, years
                       1.25 GSBb accel depr. rate
                      500.00 SSBc straight line depreciation per year
                        .50 635e incremental tax bracket (state & fed )
                        1.00 GSBD
                                  year number for analysis
                                       D returns full analysis
           PROGRAM OUTPUT
                                       E returns abbreviated analysis
down payment
                    10000.00 ***
first principal
                    80000.00 ***
first life, years
                      30.00
                            本東京
                      9.50 *** (percent)
first yearly interest
first monthly payment 672.68
second principal
                    10000.00 ***
second yearly interest 10.00 ***
second monthly pmt. 100.00 ***
                                           2.00 GSBE
                                                            3.00 GSBE
                     772.68 ***
total monthly pmt.
                    9272.20 ***
total yearly pmt.
                   7578.89
                                       7529.93
first yearly int.
                                                         7476.11
                                                                 苯苯苯
                    990.57 ***
                                        968.64 ***
second yearly int.
                                                         944.42 ***
                    8569.46 ***
                                       8498.57 ***
                                                         8420.53 ***
total yearly int.
accel depr assets
                                       80000.00 ***
                   80000.00 ***
                                                        80000.00 ***
accel depr rate
                                         1.25 ***
                      1.25 ***
                                                         1.25 ***
accel depr life, years 20.00 ***
                                          20.00 ***
                                                           20.00 ***
                    5000.00 ***
                                      4687.50 ***
accel depr
                                                         4394.53 ***
straight line depr.
                    500.00 ***
                                       500.00 ***
                                                          500.00 ***
                    5500.00 ***
                                       5187.50 ***
total depreciation
                                                         4894.53 ***
depr plus int.
                   14069.46 ***
                                       13686.07 ***
                                                        13315.06 ***
net income
                    7000.00 ***
                                       7000.00 ***
                                                         7000.00 ***
                    7069.46 ***
taxable income w/o
                                       6686.07 ***
                                                         6315.06 ***
                       0.50 ***
incremental tax rate
                                          0.50 ***
                                                            0.50 ***
                                       3343.04 ***
income tax writeoff 3534.73 ***
                                                         3157.53 ***
yearly cash flow -2272.20 ***
                                       -2272.20 ***
                                                        -2272.20 ***
                  1262.53 ***
                                      1070.84 ***
money in pocket
                                                        885.33 ***
                    702.74 ***
                                       773.63 ***
payments to princ.
                                                         851.67
$ return in invest. 1965.27 ***
                                      1844.46 ***
                                                        1737.00 ***
% return on invest. 19.65 ***
                                        18.44 ***
                                                         17.37 ***
```

## **User Instructions**

1	REA	L ESTATE	INVESTM	ENT ANAL	<b>15</b> 15	
4	down payment	Jally blogg the	straight line appr. ant/yr		(incremental)	5
	first murtgase Put n.t eldyr	second mort. PV1 %/yr	net income	Compute full analysis. Quloryr#	compute abbr. analysis enter yr #	

STEP	INSTRUCTIONS	INPUT DATA/UNITS	K	EYS	OUTPUT DATA/UNITS
/	Load both sides of magnetic cord				
z	Ley in first movtage particulars				
	a mortgage value (PV)	PV,	4		
	b mortgage life, years	n	•		
	key in first movigage particulars  a movigage value (PV,)  b movigage life, years  c yearly interest rate, percent	C'ye	A		monthly pact
3	hey in Second mortgage porticulars				
	a mortgage volue (PV2)	PVz	•		
	hey in Second mortgage particulars a mortgage volue (PVz) b yearly interest rate	Cyr	8		
ļ	Luy in net Income per year	net income	e		
L	bey in down payment	\$ down	<b>.</b>		
	, , , , , , , , , , , , , , , , , , ,				
6	huy in accelerated depreciation				
	a amount to be depreciated	#	<b> </b>		
	b depreciation period or life	п	A		
	particulars a amount to be depreciated b depreciation period or life c acceleration rate as decimal	R	£	B	:
	hey in yearly straight line depreciation amount	\$ 5/4	<b>f</b>	e	
0	hey in to(al incrementa / tax nate (state & Federal) as decimal	1 . 1 14	<b>+</b>		
	rate (state & regular) as decimal	tax brkt	<b>T</b>		
9	key in year number to be analyzed	year	<b>a</b>		Summary
lin					
10	go back to 9 for another year, or, for abbreviated printout,				
	enter year number	year	E		Summary
	Stop or go back and change				
	problem pavameters and rerun.		[		
				[	

## 97 Program Listing I

STEP	KEY ENTRY	KEY CODE	сомм	ENTS	STEP KI	EY ENTRY	KEY CODE	COMMENTS
704			IST		054	*LBLb	21 16 12	accelerated
00		21 11	Princ + # yrs	1 %/yr	055	P≢S	16-51	depreciation
00		23 <b>0</b> 3	•	•	056	ST01	35 01	data
90		-24			057	R↓	-31	A A n A n /a
00		35 02			958	ST00	35 00	# 4 n.1 rate
00	5 <i>R</i> ↓	-31			059	R↓	-31	
90	6 ST01	35 01			969	ST02	35 <b>0</b> 2	
00	7 R↓	-31			961	₽≢S	16-51	
99	8 ST00	35 <b>00</b>			062	RTN	24	
99	9 RCL2	36 02			063	*LBLc	21 16 13	Straight line depr.
01		-35			964	STOC	35 13	por year
01		36 01			<u>065</u>	RTN	24	per gener
01		23 04			066	*LBLE	21 15	abbreviated
01		-22			067	GSB6	23 06	printaut
01		36 02			968	STOB	35 12	her in wear #
01		01			069	6T00	22 00 <b>-</b>	key in year #
01		-55			070	*LBLD	21 14	Pull prevalent
01		-41			071			full printout, hey in year #
01		31				STOB CSR4	35 12   27 02	my m year #
01		91			072	GSB6	23 06 70 14	
02		-41			073	RCLD	36 14	
					074	GSB5	23 05	$\overline{}$
02		-45			075	RCLØ	36 00	) 15T + D.
02.		-24	IST .	. / /	076	PRTX	-14	1 ST T.D. Summary
02.		35 03	1 ST T.O. MONT	uly post	077	RCL1	36 01	Juniniary
02		23 05			978	PRTX	-14	(
02		22 01			079	RCL2	36 02	7
92		21 12	200	,	989	GSB3	23 03	(
02		23 03 🛊	princ + %	o/yr	081	X	-35	\
02	8 ÷	-24			<b>0</b> 82	PRTX	-14	\
02:	9 ST05	35 05			083	RCL3	36 03	<b>\</b>
030	0 R↓	-31			084	GSB5	23 05	)
03.	1 ST04	35 04			085	RCL4	36 04	
033		21 01 <b>-1</b>			086	PRTX	-14	}
03.		<i>36</i> 04			087	RCL5	36 Ø5	/ 2 <sup>νο</sup> τ.ο.
03		36 05			988	GSB3	23 03	200 T.O. Summary
03		- <b>3</b> 5			089	63 <b>5</b> 3	-35	> 5411,11117
030		0i			090			(
03		-62				PRTX	70 00	(
038		02 02			091	RCL6	36 06	}
					092	GSB5	23 05	<b>4</b>
033		-35 <b>35</b> 06	2ND MO PR	rt	093	RCL7	36 07	) total movingage
041			2 200 7	-	094	PRTX	-14	( pay mont
04:		36 03 55			095	GSB4	23 04	Summary
04:		-55	11.7. "	1	096	PRTX	-14	<i>う</i>
04.			total month	14 pmt	097	*LBL0	21 00 <b>- 3</b> -	-
94		24			098	SPC	16-11	
043			net rental	income	099	RCL2	<i>36 02</i>	
040		35 Ø8			100	RCL3	36 03	
04		24	******		101	<i>RCL0</i>	<i>36 00</i>	
948			incremen ta	l fax	102	GSB2	23 02	
04:	9 STOA	35 11	bracket		103	ST09	35 <i>0</i> 9	1st yearly interest
050	<u>0 RTN</u>	24			104	PRTX	-14	
05.		21 16 11	Down pay	mant	105	RCL5	36 05	
<b>0</b> 52		35 14	July puly	,	106	RCL6	36 Ø6	
05		24			107	RCL4	36 04	
[ ]					108	GSB2	23 02	_
		<del>                                     </del>			100	PRTX	-14 .	2No year ly interest
$\vdash$		<del></del>		REGIS	TERS	1 15 1 15	-14	
0 1ST T.D.	1 /5T De	riod, 2/ST interes	+ 3/57 month /L		5 2 NP Interest	62NO	4/4 7 total Mo.	8 Act rental 9 total
Principa			payment	principal	0/0/mo	Paymen	"7   mar + 4 666	income griy mort.
Sobida 1.4		ng S2b/dg	[C2	S4	S5	S6 .	S7	S8 S9
years	balance v	nte Value &	SS PV	PMT	i/mo	1+4/m	,	
Alacrem	en tal		CStrain	14.7 line	Down	·	E	I
tox bra	cket	Byeav #	deprocio	Hon lyear	paymen			
L		<u> </u>	1		, , ,			

97 Program Listing II

				- "-				· — · —	0.4		71
STEP KE	Y ENTRY	KEY CODE		COMMENTS			56	÷	-24	COM	MENTS
110	ST+9	35-55 09					57	EEX	-23		
111	RCL9	36 <b>0</b> 9	Talal	yearly interes		16	8	2	02		
			IOTOI	your ig interes	-S C	16	59	X	-35		
112	PRTX	-14				17		GSB5	23 05	% ROI	
113	GSB6	23 <b>0</b> 6	_			17		*LBL6	21 06	10 120 4	
114	₽≢S	16-51	1								
115	RCL2	36 02	)			17		SPC	16-11		
116	PRTX	-14	- 1			17	<b>'</b> 3	SPC	16-11		
			- 1			17	74	RTN	24		
117	RCL1	36 01	- 1			17		*LBL2	21 02	100-11	in language
118	PRTX	-14	- 1					P≢S		yearly 1	HEVEST
119	RCL0	36 00	- 1			17			16-51	Subrout	ine
120	PRTX	-14	- 1	1 ,		17		ST03	35 <i>03</i>		
121	÷	-24	ac	celerated		17	'8	R↓	-31		
<b>I</b>			de	preciation		17	9	ST04	35 04		
122	ENT†	-21	( 40	7120147.00		18		R↓	-31		
123	ENT1	-21	> 50	umary							
124	CHS	-22	- 1	,		18		STO5	35 <u>0</u> 5		
125	1	01	- 1			18		1	Ø1		
			1			18	3	+	-55		
126	+ no. c	-55 -55	1			18		ST06	35 <i>06</i>	•	
127	RCLB	36 12	1			18		RCLB	36 12	1	
128	1	<i>0</i> 1	1								
129	_	-45	1			18		1	0 i		
130	γ×	31	1			18	7	-	-45		
1			\			18	8	GSB4	23 64		
131	RCL2	36 <b>0</b> 2	1			18		γ×	31		
132	X	-35	1								
133	X	-35	. 1			19		RCL6	36 06		
134	₽≢S	16-51	}			19		1	01		
135	PRTX	-14	)			19	2	2	<i>02</i>		
			- /,			19	3	γ×	31		
136	RCLC	36 13	5/L	deprecia Hon	n	19		1	ē1		
137	PRTX	-14						_			
138	+	-55	_			19		<del>-</del>	-45 -75		
139	GSB5	23 05	tota	1 depresint	in	19		X	-35		
140	RCL9	25 <b>0</b> 5 36 <b>0</b> 9	,-,-	, wan		19	7	RCL3	36 Ø3		
				depreciation		19		RCL4	36 04		
141	+	-55		depr + inter		19		RCL5	36 05		
142	PRTX	-14	total	depr + inter	est						
143	RCL8	36 08	_	·		20		÷	-24		
144	PRTX	-14	not .	income		20	1	-	-45		
1	LKIN		1101	77007		20	2	X	-35		
145		-45				20		RCL4	36 04		
146	PRTX	-14	incom	e-int & dep	7						
147	RCLA	36 11	= in	come writed	944	20		GSB4	23 04		
148	PRTX	-14	inevel	mental tax o	roke	20		+	-55		
149	X	-35				20	6	₽≢S	16-51		
ľ			,	ne fax write	110	20		RTN	24		
150	PRTX	-14	INCOM	R FUX WITH	-71	20		*LBL3	21 03	-	
151	RCL8	36 08								"/200"	
152	RCL7	36 07				20		1	01		
153	GSB4	23 04				21		2	<b>0</b> 2		
154	-	-45				21	1	Ø	00		
			. 1			21.		Ū	00		
155	PRTX	-14	yearly	1 cash flow 1 m pocket h flow +faxs	_ر	21		RTN	24		į
156	÷	-55	v							-	
157	GSB5	23 05	MONEL	in pocket		21		*LBL4	21 04	/2×	i
158	RCL7	36 <b>0</b> 7	= cae	h flow + Lox <	ude	21.		1	01		
,					7"	21	6	2	ΘZ		
159	GSB4	23 04				21		X	-35		ſ
160	RCL9	<i>36 09</i>									
161	-	-45				21:		RTN	24	<del> </del>	
162	PRTX	-14	total 1	emts to princi	jal	21:		<b>≭LBL</b> 5	21 05	print &	space
163	+	-55	<i>,</i>	,	<b>'</b>	220	9	PRTX	-14	[ ]	· .
4			A 0	'O.T'		22.		SPC	16-11		
164	PRTX	-14	# R	$o_{\mathcal{L}}$		22:		RTN	24		İ
165	RCLD	36 14		SEL 6		22.	-				
1	10	· · · · · · · · · · · · · · · · · · ·	LAE	BELS	·			FLAGS	1	SET STATUS	
AJST T.O.	B 2NO	T.D. Cnet	INCOME	for pute	E COR		0		FLACE	TRIC	DISB
a down	baccer	levolul - Char	ACUME	full output		output			FLAGS	TRIG	DISP
pay ment	deprec	vation de	ght line reciation	ľ	e inen		1		ON OFF	DEC 57	[ <sub>EIV</sub> , <sub>EM</sub>
Oabbr	1 Cocal	dead steen	INTERIOR	3	4	procket	2			DEG 🕱	FIX 🛛
oabbr printout	dastina	ton Subn	entine	3 1200	] /:	2 x	_		1 🗆 🕱	GRAD 🗆	SCI 🗆
5 prt &	6 days			8	9		3		2 🗆 🔀	RAD 🗆	ENG □
DIACE	300			i	l				3 🗆 🖎		n_2

Program Title	INTERNAL RATE OF RETURN		
Contributor's Name Address	HEWLETT-PACKARD COMPANY Corvallis Division 1000 N.E. Circle Boulevard Corvallis, OR 97330	State	Zip Code
Program Descript	CF CF CF CF CF CF CF CF CF CF CF CF CF C	CF CF CF 42 43 44	
	Figure	1	
	Note: The above diagram is representative of dia The horizontal line represents the time prepresent the cash flows. The interest rate that equates the present voriginal investment is known as the interdiscounted rate of return or yield). Given a 44 positive cash flows, this program calculates the present voriginal investment is known as the interdiscounted rate of return or yield). Given a 44 positive cash flows, this program calculates the present volume of	alue of all future cash flows with trenal rate of return (IRR, also calle non-zero initial investment and up culates the periodic IRR. If there a	ne ————————————————————————————————————
	negative as well as positive cash flows, flows.  If more than 44 positive cash flows are er ignored. There will be no indication, how have been entered. Likewise, if more than are entered, erroneous results will occur. Zero should be entered for periods with	ntered, all cash flows over 44 will wever, that more than 44 cash flow 122 positive and negative cash flow.	be ws
Operating Limits a	When more than 22 cash flows are involve user is asked to enter the largest cash fl	ed (all of which must be positive), t	

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

The answer produced is the periodic rate of return. If the cash flow periods are

techniques being used. This value is then used to scale all other cash flows, and depending on these values, accuracy may be reduced. Consequently, the resulting periodic rate of return should be considered accurate to within  $\pm .01\%$  (.0001 decimal). This largest cash flow must be entered again in sequence in step 4. If a cash flow larger than the value entered for CF MAX is keyed in at

step 4, erroneous results may occur.

	State	Zin Code
	Oldic	Lip Code
am Descriptio	n, Equations, Variables	
	other than annual (monthly, quarterly) the answer should be multip number of periods per year to determine the annual internal rate	
	In many instances another program may be more suitable for calcular all cash flows are equal and equally spaced, or if all cash flows excare equal and equally spaced, DIRECT REDUCTION LOANS (I better choice. If the cash flows occur in groups of uneven amo GROUPS (BD-02) may be more suitable.	cept the last BD-04) is a
	This program was designed for optimum operation when the interes solved for is between 0 and 100%. The program will often solve rates outside this range, but occasionally may halt prematurely with the display. This is an error condition generated by an intermediate cand indicates that the program cannot solve that particular proble	for interest ERROR in calculation,
	The calculated answer may be verified by using DISCOUNTED CA ANALYSIS—NET PRESENT VALUE (BD-03), to calculate the value. The NPV should be close to 0.	
	Note:  When the sign of the cash flows is reversed more than once, more interest rate is considered correct in the mathematical sense, program may find one of the answers, it has no way of finding or other possibilities.	While this
ting Limits and	d Warnings	

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

Sketch(es)							ļ 							:		
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Sample Problem(s)	PRINCIPAL EQUATIONS	
	Unless otherwise stated, all interest rates (i, APR, IRR, NOM, EFF, CR, YLD,	
	etc.) are expressed in decimal form in the equations which follow. Only symbols not defined in the program descriptions are defined here.	
	Program Number	
	1. Internal Rate of Return	
	Solve for IRR in:	
	$INV = \sum_{j=1}^{n} \frac{CF_{j}}{(1 + IRR)^{j}}$	
	j=1 (1 · IXX)	
	where:	
	n = number of cash flows	
	$CF_j = j^{th}$ cash flow	
Solution(s)		
AND AND AND AND AND AND AND AND AND AND		
Reference(s)		
1000000		

Sketch(es)		1			
	<del></del>				<del>i</del>
	i		i :		* 1
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4	i i				
<del></del>		+			<del></del>
			,		
		!			
	Example 1:				
	-		000 '. '		
				nent and to be sold in ten	<del></del>
in the second second second			after tax" cash flov	vs shown below. What is	
	the expected yie	eld or IRR?			
	End of Year	Cash Flow	End of Year	Cash Flow	
Sample Problem(s)		640,400	<del>                                     </del>		
	1	\$46,423	6	\$ 23,199	
	2	40,710	7	21,612	
	3	36,638	8	20,037	
	4	34,097	9	18,460	The second secon
	5	32,485	10	311,406 (property	
		•	1	sold)	
	Keystokes:		Outputs:		
	-		•		
	250000 A 4642				
	36638 🖸 34097	C 32485 C			
VICE CO. (AMIC SEC. ). Manual Sec. (AMIC SEC. ).	23199 C 21612	2 C 20037 C			
	18460 C 31140		→ 13.98	(annual IRR is 13.98%)	
	_			(	
	T				
	Example 2:				
	Property requirir	ng a \$30,000 inves	tment will be sold a	the end of 2 years. If the	
				below, what is the IRR?	
		•		· ·	
	End of Month	Cash Flow	End of Month	Cash Flow	
	1	Cash Flow	End of Month	Cash Flow \$ 201	
olution(s)	1 2	\$ 16 50	13 14	\$ 201 195	
Solution(s)	1	\$ 16 50 175	13 14 15	\$ 201 195 178	
olution(s)	1 2	\$ 16 50 175 181	13 14 15 16	\$ 201 195 178 197	
Solution(s)	1 2 3 4 5	\$ 16 50 175	13 14 15 16 17	\$ 201 195 178 197 210	
Solution(s)	1 2 3 4 5 6 7	\$ 16 50 175 181 143 147	13 14 15 16 17 18	\$ 201 195 178 197 210 220 206	
olution(s)	1 2 3 4 5 6 7 8	\$ 16 50 175 181 143 147 151	13 14 15 16 17 18 19 20	\$ 201 195 178 197 210 220 206 194	
Solution(s)	1 2 3 4 5 6 7 8 9	\$ 16 50 175 181 143 147 151 176 184	13 14 15 16 17 18 19 20 21	\$ 201 195 178 197 210 220 206 194 187	
Solution(s)	1 2 3 4 5 6 7 8 9	\$ 16 50 175 181 143 147 151 176 184 193	13 14 15 16 17 18 19 20 21	\$ 201 195 178 197 210 220 206 194 187 190	
Solution(s)	1 2 3 4 5 6 7 8 9	\$ 16 50 175 181 143 147 151 176 184	13 14 15 16 17 18 19 20 21	\$ 201 195 178 197 210 220 206 194 187 190 201	
Solution(s)	1 2 3 4 5 6 7 8 9 10	\$ 16 50 175 181 143 147 151 176 184 193 157	13 14 15 16 17 18 19 20 21 22 23	\$ 201 195 178 197 210 220 206 194 187 190 201	
Solution(s)	1 2 3 4 5 6 7 8 9 10 11	\$ 16 50 175 181 143 147 151 176 184 193 157	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property	
Solution(s)	1 2 3 4 5 6 7 8 9 10	\$ 16 50 175 181 143 147 151 176 184 193 157	13 14 15 16 17 18 19 20 21 22 23	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property	
colution(s)	1 2 3 4 5 6 7 8 9 10 11 12 <b>Keystrokes:</b>	\$ 16 50 175 181 143 147 151 176 184 193 157	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property	
Solution(s)	1 2 3 4 4 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000	\$ 16 50 175 181 143 147 151 176 184 193 157 190	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property	
colution(s)	1 2 3 4 4 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 A 35000 16 C 50 C 175	\$ 16 50 175 181 143 147 151 176 184 193 157 190	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property	
Solution(s)	1 2 3 4 4 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000	\$ 16 50 175 181 143 147 151 176 184 193 157 190	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property	
	1 2 3 4 4 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 A 35000 16 C 50 C 175	\$ 16 50 175 181 143 147 151 176 184 193 157 190	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property sold)	
	1 2 3 4 4 5 6 7 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000 16 <b>C</b> 50 <b>C</b> 175 143 <b>C</b> 147 <b>C</b> 1 184 <b>C</b> 193 <b>C</b> 1	\$ 16 50 175 181 143 147 151 176 184 193 157 190 B 6 181 G 51 C 176 G	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property	
	1 2 3 4 4 5 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000 16 <b>C</b> 50 <b>C</b> 175 143 <b>C</b> 147 <b>C</b> 1 184 <b>C</b> 193 <b>C</b> 1 201 <b>C</b> 195 <b>C</b> 1	\$ 16 50 175 181 143 147 151 176 184 193 157 190 B 6 181 6 51 6 176 6 57 6 190 6 -	13 14 15 16 17 18 19 20 21 22 23 24	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property sold)	
	1 2 3 4 4 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000 16 <b>C</b> 50 <b>C</b> 175 143 <b>C</b> 147 <b>C</b> 1 184 <b>C</b> 193 <b>C</b> 1 201 <b>C</b> 195 <b>C</b> 1 210 <b>C</b> 220 <b>C</b> 2	\$ 16 50 175 181 143 147 151 176 184 193 157 190 B 6 C 181 C 51 C 176 C 57 C 190 C — 78 C 197 C	13 14 15 16 17 18 19 20 21 22 23 24  Outputs:	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property sold)	
	1 2 3 4 4 5 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000 16 <b>C</b> 50 <b>C</b> 175 143 <b>C</b> 147 <b>C</b> 1 184 <b>C</b> 193 <b>C</b> 1 201 <b>C</b> 195 <b>C</b> 1 210 <b>C</b> 220 <b>C</b> 2 187 <b>C</b> 190 <b>C</b> 2	\$ 16 50 175 181 143 147 151 176 184 193 157 190 B 6 C 181 C 51 C 176 C 57 C 190 C — 78 C 197 C 006 C 194 C	13 14 15 16 17 18 19 20 21 22 23 24  Outputs:  → 12.00	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property sold) (12 cash flows input)	
	1 2 3 4 4 5 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000 16 <b>C</b> 50 <b>C</b> 175 143 <b>C</b> 147 <b>C</b> 1 184 <b>C</b> 193 <b>C</b> 1 201 <b>C</b> 195 <b>C</b> 1 210 <b>C</b> 220 <b>C</b> 2 187 <b>C</b> 190 <b>C</b> 2	\$ 16 50 175 181 143 147 151 176 184 193 157 190 B 6 C 181 C 51 C 176 C 57 C 190 C — 78 C 197 C	13 14 15 16 17 18 19 20 21 22 23 24   Outputs:  → 12.00  → 24.00 → 1.15	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property sold) (12 cash flows input)	
	1 2 3 4 4 5 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000 16 <b>C</b> 50 <b>C</b> 175 143 <b>C</b> 147 <b>C</b> 1 184 <b>C</b> 193 <b>C</b> 1 201 <b>C</b> 195 <b>C</b> 1 210 <b>C</b> 220 <b>C</b> 2 187 <b>C</b> 190 <b>C</b> 2	\$ 16 50 175 181 143 147 151 176 184 193 157 190 B 6 C 181 C 51 C 176 C 57 C 190 C — 78 C 197 C 006 C 194 C	13 14 15 16 17 18 19 20 21 22 23 24   Outputs:  → 12.00  → 24.00 → 1.15	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property sold) (12 cash flows input)	
Reference (s)	1 2 3 4 4 5 5 6 6 7 8 9 10 11 12 <b>Keystrokes:</b> 30000 <b>A</b> 35000 16 <b>C</b> 50 <b>C</b> 175 143 <b>C</b> 147 <b>C</b> 1 184 <b>C</b> 193 <b>C</b> 1 201 <b>C</b> 195 <b>C</b> 1 210 <b>C</b> 220 <b>C</b> 2 187 <b>C</b> 190 <b>C</b> 2	\$ 16 50 175 181 143 147 151 176 184 193 157 190 B 6 C 181 C 51 C 176 C 57 C 190 C — 78 C 197 C 006 C 194 C	13 14 15 16 17 18 19 20 21 22 23 24  Outputs:  → 12.00  → 24.00  → 1.15 → 13.79	\$ 201 195 178 197 210 220 206 194 187 190 201 35,000 (property sold) (12 cash flows input)	

### **User Instructions**

<b>4</b> 1	INTERNAL RATE OF RETURN	5
IN/	V _ CF MAX _ CF IRR	/

EP	INSTRUCTION	ONS			INPUT DATA/UNITS	KEY	s	OUTPUT DATA/UNITS
				į				
STE	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTP	UT NITS			
1	Load side 1 and side 2.							
2	Input initial investment.	INV	A	IN/	v —			
3	If there are > 22 cash flows, key			<b></b>				
	in the largest cash flow.	CF MAX	8	CF M	1AX			
4	Beginning with the first period,					· · · · · · · · · · · · · · · · · · ·		
	key in all cash flows in sequence,							
	pressing C after each value.	CF	C	# of (	CFs			
5	- <del></del>							
	rate of return		D	IRR	(%)			
		··		<u> </u>				
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								-
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	* * * * * * * * * * * * * * * * * * * *			· · · · · i	-			
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						4 11	1	
			· · · · ·					

## 97 Program Listing I

STEP 1	YEV ENTRY	KEY CODE	COMMENTS	CTER "	EV ENTRY	VEV 000-	00445470
991	KEY ENTRY *LBLA	KEY CODE	COMMENTS	STEP KE 7 057	EY ENTRY RCLI	KEY CODE 36 46	COMMENTS
002		16- <b>5</b> 3	Clear registers	<b>658</b>	1	35 46 01	LBL fa sets up I for
002		16-51		059	ê	ëë	count down and keeps
004		16-53		868	í	ē1	track of original
<i>001</i>		35 15	TNV - D	061	X	-35	# of cash flows by
005 006		16 22 00	INV → R <sub>E</sub>	062	STOI	35 46	storing N.N.
007		16 22 01	Clear flags	063	RTN	24	İ
<i>001</i>		24		964	*LBLe	21 16 15	
009		21 12	Input largest cash	865	F0?	16 23 00	+
010		21 12 02	flow if #CF <sub>s</sub> >22	066	GTOØ	22 00	Unpack double
611 611		-35	S	<b>0</b> 67	INT	16 34	stored cash flows
Ø12		35 00		<b>8</b> 68	EEX	-23	
012 013		36 15		869	5	95	
813 814		-41		070	÷	-24	
015		-24		871	RTH	24	
916		35 15	INV/2CMAX→R <sub>F</sub>	871	*LBL0	21 <b>86</b>	
			] ****				
017 010		16-63		073	FRC	16 44	
018		16 21 00	Flag O indicates	074	RTN	24	1
019		<b>0</b> 2	>22 cash flows	075	*LBLD	21 14	Set-up I
020		-24		076	€SBa	23 16 11	N N
821		24		077	RCLI	36 4 <u>6</u>	
022		21 13		078	EEX	-23	
023		16 26 46	If FO, pack data	679	2	<b>0</b> 2	1
024		16 23 00	in registers	080	÷	-24	I
925		23 16 13	]	081	STOI	<i>35 46</i>	N.N→I
<b>0</b> 26		35-55 45		682	1	61	
027		-41		<b>0</b> 83	•	-62	
<b>0</b> 28		36 46	Dispaly # of cash	084	8	66	1
029		16 23 01	flows (add if >22CF		1	Ø1	$ 1 + i_0 \rightarrow R_D$
636		-55		086	STOD	35 14	
031		24		087	*LBL4	21 04	ļ .
<b>0</b> 32		21 16 13		988	CF <b>e</b>	16 22 00	1
033		62		089	Ũ	Øĕ	1
834		03		898	ST00	35 <i>0</i> 6	
<i>03</i> 5		36 46		091	∗LBL5	21 05	•
<i>0</i> 36		16-32	23rd cash flow?	092	RCLI	36 46	]
037		22 00		<b>0</b> 93	INT	16 34	1
<i>0</i> 38		Û1		094	F1?	16 23 01	Get j
<b>0</b> 39	STOI	35 46	Reset I	095	GSBd	23 16 14	
040	+	-55		096	RCL i	<i>36 45</i>	ļ
841	CLX	-51	Drop stack and	097	F1?	16 23 01	1
842	EEX	-23	clear x	098	<i>GSBe</i>	23 16 15	Unpack CF <sub>j</sub>
043	5	<b>0</b> 5		099	ST+0	35-55 00	j
044	ST÷0	<i>35-24 00</i>	2CMAX/10 <sup>5</sup> →R <sub>0</sub>	100	X	-35	1
845	SF1	16 21 01		101	+	-55	$f(i)$ in $R_0$
846	*LBL0	21 00		102	RCLD	36 14	] I
847		-31		103	ST÷0	35-24 00	
048		Ø1		164	÷	-24	1
849		-45		105	DSZI	16 25 46	1
<i>050</i>		-41	Scalo cach flow	186	GT05	22 05	1
051		36 00	Scale cash flow	107	F1?	16 23 01	
<b>05</b> 2		-24	If CF <sub>j</sub> ,j>22, drop	108	GTOO	22 66	
<b>05</b> 3		16 23 01	, 0	109	*LBL6	21 06	1
<b>0</b> 54		16 34	fractional part	110	RCLO	36 <b>0</b> 0	
055		24	of CF	111	RCLE	36 15	
<b>056</b>		21 16 11		112	-	-45	
L		· ·		SIEHS	16	- Y-2	10
<sup>0</sup> Used	<sup>1</sup> Used	l <sup>2</sup> Used	<sup>3</sup> Used <sup>4</sup> Used	<sup>5</sup> Used	<sup>6</sup> Used	/ Used	<sup>8</sup> Used <sup>9</sup> Used

1				HE	315 I EHS				
<sup>0</sup> Used	<sup>1</sup> Used	<sup>2</sup> Used	3 Used	4 Used	<sup>5</sup> Used	<sup>6</sup> Used	<sup>7</sup> Used	<sup>8</sup> Used	<sup>9</sup> Used
so Used	S1 Used	Used	S3 U <b>sed</b>	S4 Used	S5 Used	S6 U <b>sed</b>	S7 Used	S8 Used	S9 U <b>sed</b>
A Use	d B	`Used	C Us	sed	D 1 +	i <sub>0</sub>	Used	I	Used

## 97 Program Listing II

0755				COMMENTS	STEP	KEY ENTRY	KEY CODE	COMMENTS
STEP	113	YENTRY X‡Y	KEY CODE _ -41	COMMENTS		RET ETT.	1	
	114	÷	-24		170			;
	115	RCLD	36 14		.,,			
	116	X	-35	$\frac{f}{f}$ (1 + i)			-7	į
	117	RCLD	36 14	f'\'''				
	118	X≠Y	-41					
	119	+	-55	1,2				
	128	STOD	35 14	(1 + i) next				
	121	LSTX	16-63					
	122	ABS	16 31					
	123	EEX	-23					
	124	CHS	-22		180			
	125	5	<b>0</b> 5	f (i)/f'(i)				
	126	X>Y?	16-34					
	127	GT07	22 <b>0</b> 7	←DONE!				1
	128	6SBa	23 16 11	DONE:				
	129	GT04	22 04					
		*LBL0	21 00					
	131	F0?	16 23 06					
	132	GT06	22 06					
	133	SF0	16 21 00					
	134	GSBb	23 16 12		190			
	135	6T05	22 05					
		*LBLb	21 16 12					
	137	2	82	Loop back for				
	138	2	02	lower 22 CFs				
	139	RCLI	36 46	5				
	140	+	-55	Reset I to lower				
	141	ST0I	35 46	Reset 1 to lower				
	142	CLX	-51	22 CF <sub>s</sub>				
	143	+	-55					'
	144	RTN.	24		200			
		*LBLd	21 16 14		F			
	146	2	02	V11 00 : € £1 - = 0	<b></b>			
	147	2	<b>0</b> 2	Add 22 if flag 0	<u> </u>			
	148		16 23 00	clear				
	149	CLX	-51					
	150	+	-55					i l
	151	RTN	24					i l
		*LBL7	21 07	Described from a market		· · · · · · · · · · · · · · · · · · ·		
	153	RCLD	36 14	Reset R <sub>I</sub> for another	<u> </u>	**************************************		
	154	1	01	pressing of [D]	210			
	155	-	-45	]				
	156	STOD	35 14					
	157	EEX	-23	R <sub>T</sub> must contain				
	158	2	02	•				
	159	x	-35	integer here				
	160	RCLI	<i>36</i> 46					]
	161	LSTX	16-63	ĺ				
	162	X	-35					j l
	163	STOI	<i>35 46</i>					]
	164	X <b>≠</b> Y	-41		220			j
	165	RTN	24					<b>,</b>
	166	R/S	51					1
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5 USED	6 USED	7 USED	8	9	3	$\begin{bmatrix} 2 & \square & \square \\ 3 & \square & \square \end{bmatrix}$	,,,,,	n 2

Program Title DE	PRECIATION SCHEDULES	erm van saar i saarnee al eermee versteermaan ee 'n 'n 'n 'n 'n 'n 'n 'n 'n 'n 'n 'n 'n	
Contributor's Name	HEWLETT-PACKARD COMPANY Corvallis Division		
City	1000 N.E. Circle Boulevard Corvallis, OR 97330	tate	Zip Code

Program Description,	Equations, Variables	
	Three methods of depreciation are commonly used: straight-line, sum-of-the-years'-digits, and declining balance. This program evaluates the depreciation schedules for these three methods, and calculates the crossover point between straight line and declining balance depreciation. For the schedules, the output is the annual depreciation amount (DEP), remaining depreciable amount (RDV), remaining book value (RBV), and the total depreciation to date (TOT DEP), as well as an increment for the next year's schedule.	
	An option is available to output the depreciation schedule beginning at a specified year. Pressing  sets and clears the print flag. Successive use of  will alternately display 1.00 and 0.00, indicating that the print mode is on or off respectively.	
	Values for the last year of an asset with fractional years life (i.e., the 21 <sup>st</sup> year's values for an asset with 20.5 years life) are calculated correctly. However, all other values represent a full year's depreciation. For this reason only integer values (whole number, 1.0, 2.0, 17.0 etc.) may be entered for YR (the ▶ key). The program makes no checks on this value and generates invalid results if other than whole numbers are entered.	
	Straight Line Depreciation	
	The annual depreciation allowance using this method is determined by dividing the cost or other basis of valuation (starting book value) less its estimated salvage value by its useful life expectancy. This program develops the starting book value (SBV), salvage value (SAL), life expectancy (LIFE), and first year of the schedule (YR). (The schedule may be started at any point in the useful life.)	
	Fractional years life must be entered as an integer plus a fraction. Thus a life of 12 years 3 months would be keyed in as 12.25 for LIFE.	
Operating Limits	Sum of the Years' Digits Depreciation	· · · · · · · · · · · · · · · · · · ·
	The sum-of-the-years' digits method is an accelerated form of depreciation, allowing more depreciation in the early years of an asset's life than allowed under the straight line method. This program generates the schedule output, given the starting book value (SBV), the salvage value (SAL), expected useful life in years (LIFE), and beginning year (YR) for the schedule. (The schedule may be started at any point in the useful life.)	
	Fractional years asset life must be entered as an integer plus a fraction. Thus a life of 12 years 3 months would be keyed in as 12.25 for LIFE.	

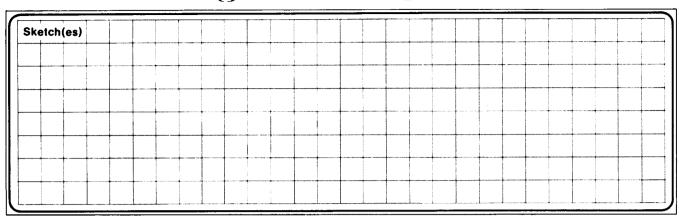
This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

Program Title		2 17 SECRETARY AND AND AND AND AND AND AND AND AND AND
Contributor's Name		
		ode
Program Description,	Equations, Variables	
	Variable Rate Declining Balance Depreciation	
	The variable rate declining balance method is another form of accelerated depreciation; as such it provides for more depreciation in earlier years and decreasing depreciation in later years. The program generates the depreciation schedule given the starting book value (SBV), salvage value (SAL), useful life expectancy (LIFE), the declining rate factor (FACT), and the first year of the desired schedule (YR). The schedule may be started at any point in the useful life.	
	The "variable rate" is indicated as either a factor or percent with equal-frequency in the business community. Thus, "1.5 declining balance factor" and "150% declining balance" have the same meaning. The number to be keyed in for FACT ( ) in this program, should be in factor form, that is 1.25, 1.5, 2, and not 125, 150 or 200.	
	This method of depreciation is unique in that it may generate depreciation greater than the depreciable value for some assets, while it may not generate sufficient depreciation for others. The crossover calculation (	
-	Fractional years life must be entered as an integer and a decimal. Thus, a life of 12 years 3 months would be keyed in as 12.25.	
	Crossover Point	
Operating Limits :	As indicated in the description above, the declining balance method of depreciation may not fully depreciate an asset in the asset's lifetime. In these circumstances there is an optimum point in the useful life where a switch from the declining balance method to the straight line method should be made. This is the "crossover point", the first year in which the depreciation by the straight line method is greater than if depreciation were continued using declining balance method. (In accordance with Internal Revenue Service Publication 534, the straight line depreciation is determined by dividing the remaining	
	depreciable value by the remaining useful life.)	

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.

Program Title		
***		
Contributor's Name		
Address		
City	StateZip Cod	de
Program Description,	Equations, Variables	
* * * * * * * * * * * * * * * * * * *	Given the starting book value (SBV), salvage value (SAL), useful life expec-	
Note that the second se	tancy (LIFE), and declining balance factor (FACT), this routine calculates the last year that the declining balance method should be used, and the remaining	
to all a final substantial and a second of the second of t	life and remaining book value after this "last year" so that a switch to straight	·
	line depreciation can be made. As in the previous routine, the factor (FACT) should be entered in factor form (1.25, 1.5, 2.0), not as a percent (125, 150,	
	200).	
	The crossover routine (	
	1. Use 1 D to determine the "crossover point" and associated values.	
	2. Use <b>[]</b> C to generate a declining balance depreciation schedule for the early years up to and including the year indicated as being the 'last year'. Since	
	the same input values are used, only a value for YR ( ) need be keyed in before pressing [ ].	
- Productive Control (Control Control	3. Now use <b>1</b> A to generate a straight line depreciation schedule for the remaining years. The remaining book value at the end of the last "declining	
	balance year" is keyed in for starting book value (A), and the remaining	
Management of the control of the con	life is keyed in for the asset's life ( ). There is no need to enter the salvage value as it has been retained throughout this process.	
	For this portion of the depreciation schedule, the value for "total deprecia-	
	tion to date'' will be in error by an amount equal to the amount depreciated during the declining balance calculations.	
	during the deciming balance calculations.	
Operating Limits and V	Varninge	
Operating chine and t	variungs	
i		

This program has been verified only with respect to the numerical example given in *Program Description II*. User accepts and uses this program material AT HIS OWN RISK, in reliance solely upon his own inspection of the program material and without reliance upon any representation or description concerning the program material.



Sample Problem(s)	Depreciation Schedules	And the Analysis of the Control of t
	where:	
	K = value for YR	
	$TOTDEP_K$ = total depreciation for years 1 through K. W = integer portion of LIFE	
	F = decimal portion of LIFE	
	(i.e., for a LIFE of 12.25 years $W = 12$ and $F = .25$ )	
	Straight Line Schedule	-
	$DEP_{K} = \frac{SBV - SAL}{LIFE}$	
		1 Auditor Maria Ma
	$DEP_{K}$ (last year) = $\left(\frac{SBV - SAL}{LIFE}\right) \cdot F$	
- balanger black at the second	<b>( /</b>	
	$TOTDEP_{K} = (K) \cdot \left( \frac{SBV - SAL}{LIFE} \right)$	
	•	
Solution(s)	$RDV_K = (LIFE - K) \cdot \left(\frac{SBV - SAL}{LIFE}\right)$	
	( 2.1.2 )	2 to 10 to 100 t
	<b>***</b>	Andreado Montrolas de Servicios de Antrola
	$RBV_K = RDV_K + SAL$	

	Reference (s)
l	

Sketch(es																						
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to a manner or .																		,				

Sample Problem(s) Sum-of-the-Years'-Digits Schedule  $SOYD = \frac{(W+1)(W+2F)}{2}$   $DEP_K = \left(\frac{LIFE+1-K}{SOYD}\right) \cdot (SBV-SAL)$ 

 $TOTDEP_{K} = \left[1 - \frac{(W - K + 1) \times (W - K + 2F)}{2 \times (SOYD)}\right] \cdot (SBV - SAL)$ 

 $RDV_{K} = \left[\frac{(W - K + 1) \times (W - K + 2F)}{2 \times (SOYD)}\right] \cdot (SBV - SAL)$ 

 $RBV_K = RDV_K + SAL$ 

Variable Rate Declining Balance Schedule

Solution(s)

 $DEP_K = SBV \cdot \left(1 - \frac{FACT}{LIFE}\right)^{K-1} \cdot \left(\frac{FACT}{LIFE}\right)$ 

 $TOTDEP_{K} = SBV \cdot \left[ 1 - \left( 1 - \frac{FACT}{LIFE} \right)^{K} \right]$ 

 $RDV_{K} = (SBV - SAL) - TOTDEP_{K}$  $RBV_{K} = RDV_{K} + SAL$ 

Crossover Point—Declining Balance to Straight Line

Reference (s)  $SBV \left(1 - \frac{FACT}{LIFE}\right)^{K-1} \cdot \left(\frac{FACT}{LIFE}\right) > \frac{(SBV - SAL) - TOT DEP_{K-1}}{L + 1 - K}$ 

where  $TOTDEP_{K-1}$  is determined as shown above.

The largest integer value for K which maintains the above relationship is the ''last year'' to use the Declining Balance depreciation method.

Sketch(es)										1,000					
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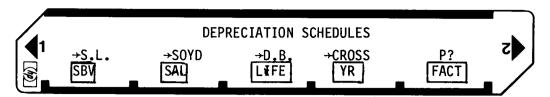
ample Problem(s).	Example 1:		
	For a starting book value of	of \$375,000, a salvage value of \$30,000 are enerate the 1 <sup>st</sup> year's depreciation schedule	id an
		s. Assume a declining balance factor of 1.5.	
		and generate the data for that year.	THE RESERVE OF THE PROPERTY OF
	Keystrokes:	Outputs:	Mark Later is reported in confidence and confidence con
	375000 STO A 30000 STO	В	Allege programmes and the second
	40 STO C 1 STO D		
	Straight Line		
	0 A	1.00 (1st year)	Will be with a second a second control of the second control
A LABOR WORK	R/S —	——→ 8625.00 (1st year's	THE STATE OF THE S
		depreciation)	
	R/S	→ 336375.00 (remaining depre-	
	_	ciable value)	
	R/S	→ 366375.00 (remaining book	sacraniament make in the second
		value)	A MARINE CONTRACTOR CO
	R/S	→ 8625.00 (total depreciation	
		to date)	
olution(s)	Now jump ahead to the 15th	year.	
	Keystrokes:	Outputs:	
	15 STO D 7 A	15.00 (15 <sup>th</sup> year)	Williams I will be a second or secon
	R/S		
		depreciation)	
<del>*************************************</del>	R/S	215625.00 (remaining depre-	a no for additional measures (season of control of the season of the sea
		ciable value)	SOURCE A COMPANIENCE A COMPANIENCE AND A COMPANI
	R/S	245625.00 (remaining book	
THE RESERVE OF THE PARTY OF THE		value)	All Salarin Laboratoria (1994)
	R/S	129375.00 (total depreciation	
		after 15 years)	
	SOYD		<u> </u>
	1 STO D	1.00 (1st year)	
eference (s)	R/S —	16829.27 (1st year's	
		depreciation)	
***************************************	R/S	328170.73 (remaining depre-	p 1 1 4 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
	<del></del>	ciable value)	
Manufacture 1 and the second of the second o	R/S	→ 358170.73 (remaining book	
		value)	

Sketch(es)		- ,	The second of th	
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	11 W 1 1 2 W 1 M	e e e e e e	nounce of the second of the se	en en en en en en en en en en en en en e
and the second s				1981 1 <del>di</del> di <del>decenie e control control des manageme</del> t.
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e management of the second of				· · · · · · · · · · · · · · · · · · ·
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Sample Problem(s)	R/S	→ 16829.27	(total depreciation	West for a common of the commo
***************************************			to date)	8 11 1 8 8 11 11 11 11 11 11 11 11 11 11
# m - m	Jump ahead to the 15th year.			
	15 STO D f B		(15 <sup>th</sup> year)	
WELFARE FILE FOR A STATE OF THE	R/S	→ 10939.02	(15th year's	Moderation and the second of t
		. 126727 90	depreciation) (remaining depre-	
E SP STATEM EL . LOS EL . IN MET LANGUAGO MOST EN MALS ANCHES A	R/S	130/3/.80	ciable value)	#1 # 1 1 1 1 W
	R/S -	166737.80	(remaining book	
	_		value)	
10.500 to 00.000 to 11.000 to 10.000	R/S	→ 208262.20	(total depreciation	THE RESERVE OF THE PERSON NAMED IN
. 10			1st through 15th	I
			year)	W 1 1 1 1 1 1
	Declining Balance			The second secon
	1 STO D 1.5 STO E F C		(1st year)	
	R/S	→ 14062.50	(1st year's	The second secon
		220027 50	depreciation)	
	R/S	→ 330937.30	(remaining depreciable value)	
Solution(s)	R/S	→ 360937.50	(remaining book	
		. 500,51,50	value)	
	R/S	14062.50	(total depreciation	
			to date)	- · -
	Keystrokes:	Outputs:		
The state of the s		Outputs:		No. of the last of
Water Committee	Now jump to the 15 <sup>th</sup> year.		math	The state of the s
	15 STO D ( C		(15th year)	
	R/S	→ 8235.18	(15th year's depreciation)	
the Month and the Control of the Con	R/S	<b>181369.51</b>	(remaining depre-	W** **********************************
	_	101003101	ciable value)	
	R/S	<b>211369.51</b>	(remaining book	
Reference (s)			value)	`
	_	1/2/20 10	20 x 1 1 2 2 2	
	R/S	→ 163630.49	(total depreciation	
• • • • • • • • • • • • • • • • • • • •			1 <sup>st</sup> through 15 <sup>th</sup> year)	
			year)	

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ketch(es)			
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ample Problem(s)	Example 2:			ACASTA MANAGEMENT SECTOR SECTO
-	Having just performed the pre	evious calculation, deter	rmine the crossover point	
	and the associated remaining	g life and remaining bo	ook value. Generate the	
	depreciation data for the decli			
	straight line method to generate		for the year following the	
	declining balance "last year.	,,		
	Keystrokes:	Outputs:		No. of the American Co. Collection of Management Co.
		_	Accessed to ma	AND THE ORDER OF THE PARTY OF THE STATE OF THE STATE OF
		18.00	(last year to use	
	<del></del>	22.00	declining balance)	
The second secon	R/S		(asset's remaining life after 18	
and the second s				
	_	100471 01	years)	
	R/S	→ 1884/1.01	(remaining book value after 18 <sup>th</sup>	
		19.00	year) (18 <sup>th</sup> year)	AMERICAN METERS SERVICE CONTRACTOR FOR PROPERTY.
	18 STO D 1 C		(18th year's	
	R/S	1343.03	•	
	_	150471 01	depreciation)	
olution(s)	R/S	1384/1.01	(remaining depreciable value)	
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		- 199471 01	(remaining book	
MARINE MARINE AND AND AND AND AND AND AND AND AND AND	R/S	1004/1.01	value)	A 100 100 100 100 100 100 100 100 100 10
**************************************		- 186528 99	(total depreciation	
	R/S	100320.77	1st through 18th	
			year)	THE PERSON OF TH
**************************************	188471.01 STO A 22 STO	a	year)	The state of the s
The second secon			(1st year)	Marcon i mar an anno anno an anno anno anno anno a
	1 STO D 1 A		(19th year's	
	R/S	1203.23	depreciation)	- North Control Management of a comment agreement of
	<b>.</b>		depreciation)	
	Note:	_		
	Although 1 was keyed in for Y		aight line depreciation—	
	this is the 19th year of the as	set's life.		,
eference(s)	R/S	<b>──→</b> 151267.78	(remaining depre-	
(-,	<del></del>		ciable value)	
	R/S	→ 181267.78	(remaining book	
	<del></del>		value)	
		etc.		

### **User Instructions**



ΈP		INSTRUCTI	ONS			INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNIT
$\exists$	STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPU DATA/UN	IT IITS		
	1	Load side 1 and side 2						<u></u>
一	2	Optional: Select print mode		08	1.00 or	0.00		
$\dashv$	3	Key in all of the following:						
$\dashv$		Starting book value	SBV	STO A	SBV			
寸		Salvage value	SAL	S10 B	SAL			
$\dashv$		Life of the asset	LIFE	STO C	LIFE			
$\dashv$	4	For depreciation schedules,						
$\dashv$		key in:						
$\dashv$		Year for which depreciation				$\neg   \longrightarrow  $		
$\dashv$		is to be calculated.	YR	STO D	YR			
$\dashv$	5	To calculate straight line						
$\dashv$		depreciation schedule		0 A	YR	$\dashv \dashv \dashv$		
$\dashv$				R/S	DEP	<del>,                                    </del>		
$\dashv$				R S	RDV			•
$\dashv$				R-S	RBV			
$\dashv$				RS	TOT D			
				R-S	YR +			
$\dashv$				etc.	<b></b>	<u>'</u>		
$\dashv$		For new case go to steps 3 and	-	etc.	<u> </u>			
		4 and change appropriate		<b>-</b>				
	$\vdash$			ļ	<u> </u>			
$\dashv$	<u> </u>	inputs.	<del></del>	<u> </u>	<del>!                                    </del>			
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## **User Instructions**



EP		INSTRUCTION	ONS		INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS	
[	STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTP DATA/U	UT NITS			
	6 Calculate the SOYD schedule			08	YR			[]	
$\dashv$				R/S	DEF	-			
$\dashv$ $\dagger$				R/S	RD	/			
				R/S	RB\	,			
7				R/S	тот с	)EP			
7				R/S	YR +	- 1			
_				etc.					
11		For new case go to steps 3 and		-					
		4 and change appropriate							
1		inputs.			Ī				
$\dashv$	7	Calculate the declining balance							
7		schedule (the appropriate				1			
1		factor must be entered).	FACT	STO E	FAC	т			
7				00	YF				
<b>-</b>				R/S	DE	Ρ			
				R/S	RD	v			
1				R/S	RB	v			
1				R/S	тот	DEP			
1				R/S	YR -	+ 1			
				etc.					-
7		For new case go to steps 3 and				1			
11		4 and change appropriate							
11		inputs.							
<b>-</b>	8	To find crossover point the			1				
7		declining balance factor must							
7		be stored.	FACT	STO E	FAC	т			
71	9	Calculate last year to use de-		1	1				
Ti		clining balance method.		00	LAST	YEAR			
	10	Calculate remaining life.		R/S	REM	LIFE	i i		
	11	Calculate remaining book				1			
1		value.	<del>.</del>	R/S	RB	V			
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9, Program Listing I

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1	STEP K	EY ENTRY	KEY CODE	COMMENTS	STEF		EY ENTRY	KEY CODE	COMMENTS	
	981		21 16 11	Straight Line	i	<b>0</b> 57		-45		
	902	F0?	16 23 00	Scraight Line		<b>0</b> 58	X<0?			
'	003		16-11	k	1	<b>8</b> 59	GT03	22 63		
ļ	884	RCLD	36 14	k	1	868	GSB2			
	005		23 09		Į.	061	RCL7	36 87		
	<b>00</b> 6	RCLA	36 11	SBV-SAL _	1	862	÷	-24		
	<b>0</b> 07	RCLB	36 12	SBV-SAL LIFE →R <sub>I</sub>		063	ST04	<i>35 04</i>		
i	008	_	-45		1	064	RCL8	36 <b>6</b> 8		
	809	RCLC	36 13			865	X	-35		
	010	÷	-24		1	066	*LBL3	21 03		
	011	STOI	35 46	DEP		067	ST06	35 <b>0</b> 6	DDV	
	012	GSB9	23 09			<b>068</b>	GSB9	23 <b>0</b> 9	RDVk	
	013	RCLC	36 13			869	RCLE	36 12		
	814	RCLD	36 14		1	070	+	-55		
	015	-	-45	(LIFE-YR)DEP=RDV		871	GSB9	23 09	RBV <sub>k</sub> =RDV <sub>k</sub> +SAL	
	016	RCLI	36 <b>4</b> 6	· K		<b>8</b> 72	1	01	K K K K SAL	
	<b>017</b>	X	-35			073	RCL4	36 84		
-	618	GSB9	23 <b>0</b> 5		I	074	-	-45		
- [	<b>0</b> 10	RCLB	23 <b>6</b> 3 36 12		i	075	RCL8	36 <b>0</b> 8	1	
-	013 020	**************************************	-55			<b>8</b> 76	X	- <b>3</b> 5		
	020 021	GSB9	-33 23 <b>0</b> 9	RBV <sub>k</sub>		877	GSB9	23 <b>0</b> 5	TOT DEP <sub>k</sub>	
-	821 822	RCLI	23 <b>6</b> 5 36 <b>4</b> 6	<b>K</b>	1	<b>6</b> 78	1	23 <b>83</b> 81	K	
	022 023	RCLD		(SBV-SAL) VR=TOT		<b>0</b> 79	GSBD	23 14		
	023 024		36 14 -75	1 1 TEC / 'N- 101	ł	089	RCLC	25 1 <del>4</del> 36 13	,	
- [	024 025	x GSB9	-35 27 AG	CLIFE / DEP	Ī	<b>8</b> 81	RCLD	36 13 36 14	k-LIFE?	
			23 <b>0</b> 9			882	XZY?	36 14 16-35	· <del>-</del> ·	
	<b>026</b>	í cepn	01 97 14		1	883	GTO6	22 16 12		
ļ	<b>927</b>	GSBD BCLC	23 14 76 17		1	003 084	RTN	24 16 12 24		
- 1	928 929	RCLC	36 13 36 14		1	885	*LBL2	21 <b>8</b> 2		
N	029 070	RCLD	36 14	k≤LIFE?		986 986				
1	030 071	X≚Y?	16-35		1		ENT†	-21 15 44	/ m	
	<b>031</b>		22 16 11		1	<b>0</b> 87	FRC	16 44 -31	(1+W)(2F+W)	
	<i>032</i>	RTN	24	COVD	1	<b>088</b>	ENTT	-21 -55	2	
-	033		21 16 12	SOYD	1	089 000	+ ••	<b>-55</b>		
	<b>034</b>	F0?	16 23 00		1	898	X≠Y	-41 15 74	= SOYD	
-	<b>035</b>	SPC	16-11		1	<b>0</b> 91	INT	16 34		
	<b>036</b>	RCLD	36 14	k	1	<b>0</b> 92	÷	-55		
	037	6SB9	23 09	.,	t	<i>893</i>	LSTX	16-63		ĺ
-	<b>03</b> 8	RCLA	36 11		1	094	. 1	Ø1		1
	039	RCLB	36 12		1	<b>895</b>	+	-5 <i>5</i>		
	040	-	-45		1	<i>096</i>	X	-35		
	<b>841</b>	STO8	35 <b>0</b> 8		ŀ	<i>097</i>	2	62		
	842	RCLC	36 13		1	098	÷	-24		
	043	GSB2	23 02	/ L TEE+3 - L/	ł	<b>0</b> 99	RTH	24	Declining Balar	nce
-	844	ST07	35 07	$\left(\frac{\text{LIFE+1-k}}{\text{SOYD}}\right)$ (SBV-SAL)	)t	100	*LBLc	21 16 13		1
1	945	RCLC	36 13	( 3010 )	ł	101	FØ?	16 23 00		j
	<b>846</b>	1	01	·	ŀ	102	SPC	16-11		- [
ļ	<b>04</b> 7	+	-55		ł	103	RCLD	36 14		- 1
	<b>84</b> 8	RCLD	<i>36 14</i>		1	104	GSB9	23 05	k	
	<b>04</b> 9	-	-45		ł	105	GSB4	23 04		
-	<b>9</b> 59	RCL7	36 07		ł	106	RCLD	36 14		
	<b>0</b> 51	÷	-24		ł	107	1	01		-
	052	RCL8	36 08		t	108	-	-45		1
	<b>05</b> 3	Х	-35	DFP.	1	109	YX	31		- 1
	054	GSB9	23 <b>0</b> 5	DEP <sub>k</sub>	1	110	RCLA	36 11		- 1
	<b>05</b> 5	RCLC	36 13		Ì	111	X	-35		1
	<b>0</b> 56	RCLD	36 14	REGIS	<u>.</u> 5. <u>.</u>	112	RCL8	36 <b>0</b> 8		$\dashv$
0		1	2	12	5	Jo	5	7	8 9	
L				Used	ĭUsed		RDV <sub>k</sub>	Used	Used TOT D	EP
S	i0	S1	S2	S3 S4	S5	- 19	S6	S7	S8 S9	
L		<u> </u>								
1	SBV	E	SAL	<sup>C</sup> LIFE	D	YR		E FACTOR	SBV-SAL/LIF	F
L								. 710 1 011	JUY-JAL/ LTI	

## 97 Program Listing II

66			, ,				·	VEV 0000	COMM	:NTC
	ENTRY	KEY CODE	<del>,                                     </del>	COMMENTS	STEP		Y ENTRY	KEY CODE	COMME	1419
113	X CTOI	-35 75 46			}	169	R/S	. 51		
114 115	STOI GSB9	35 46 23 <b>0</b> 9	DEP <sub>k</sub>		}	170 171	RTH ≉LBL1	24 21 01		1
115	1	23 05 01			Ì	172	PRTX	-14		
117	RCL7	36 <b>0</b> 7	}		1	173	RTN	24		
118	RCLD	36 14			<b>†</b>	174	*LBLd	21 16 14		
119	Y×	31			İ	175	ũ	ŪŪ	Crossover	point
120	-	-45			[	176	STOD	35 14		1
121	RCLA	36 11	(SBV-S	AL)-TOT DEP	. [	177	GSB4	23 04		Î
122	X	-35	•	•	Κ.	178	*LBL8	21 08		
123	STO9	35 09				179	RCL7	36 07		
124	RCLA	36 11				180	1	01		
125	RCLB	36 12			-	181	esbo	23 14		
126	-	-45 30.00			}	182	1	01 45		
127	RCL9	36 09 - <b>4</b> 5			ŀ	183	 	-45 31	İ	
128 129	esb9	- <b>4</b> 5 23 <b>0</b> 9	$RDV_k$		ł	184 185	Y* RCLA	36 11	!	
130	RCLB	25 67 36 12	K		<u> </u>	186	KULH X	-35	İ	
131	#	-55			Ì	187	RCL8	36 08		
132	GSB9	23 09	DDV		ţ	188	λ	-35		
133	RCL9	36 <b>0</b> 9	RBV k		į	189	RCL7	<i>36 07</i>		1
134	6889	23 09	TOT DE	· p	[	190	RCLD	36 14		]
135	1	Ø1	IOI DL	-' k		191	1	Ø1		
136	GSBD	23 14			1	192	-	-45		
137	RCLC	36 13			1	193	γx	31		
138	RCLD	36 14	W-1 7 F	-0	ŀ	194	RCLA	36 11		
139	X≚Y?	16-35	K≤LIFE	<u>:</u>	}	195	X 551.5	-35		
140	GTOC	22 16 13			- }	196	RCLB	36 12 45		
141	RTN	24			ł	197	- ezee	-45 25. 80		
	<b>≭</b> LBLD RCLD	21 14 36 14	To add	l to registe	r	198 199	STO9 RCLC	35 <b>0</b> 9 36 13		
143 144	KULU +	-55		D		208	RULU 1	30 13 Ø1		
145	STOD	35 14			1	201	+	- <b>5</b> 5		,
146	RTN	24			1	202	RCLD	36 14		
	∗LBL4	21 04				203	-	-45		
148	1	Øi	<b>5407</b> (1	**************************************	[	204	÷	-24		
149	RCLE	36 15	FACT/I	_IFE→R <sub>8</sub>	[	205	XZY	-4 i		
150	RCLC	36 13			-	206	X>Y?	16-34	-	
151	÷	-24	1 5/0	T/I TEE \D	,	207	GT08	22 08		
152	ST08	35 <b>0</b> 8	1-FAC	Γ/LIFE→R <sub>7</sub>	-	208	RCLD	36 14		
153	-	-45 75 07			}	209	1	01 45		
154	STO7	<b>35 0</b> 7			ł	210	-	- <b>45</b>	Last year	
155	RTN	24 21 16 15			ŀ	211	GSB9	23 <b>0</b> 9 <b>36</b> 13		
156 157	∗LBLe F0?	21 16 15 16 23 <b>00</b>	Print	/pause	1	212 213	RCLC X≠Y	35 13 -41		
157	6T00	16 23 <b>66</b> 22 <b>6</b> 6		•	1	213	Λ+ I -	-45		
159	SFØ	16 21 00			1	215	GSB9	23 09	Remaining	life
160	1	01				216	RCL9	36 <b>0</b> 9		
161	RTÑ	24				217	RCLB	36 12		
	*LBL8	21 00			-	218	+	-55	DDV	
163	e	ŨÕ			1	219	GT09	22 89	RBV	
164	CF0	16 22 00			-	220	R/S	51		
165	RTN	24			ł					
166	*LBL9	21 <b>0</b> 9			ľ					
167	F8?							<u> </u>	<u> </u>	
168	GT01	22 61	LAB	ELS			FLAGS		SET STATUS	
Α	В	C		D Used E		0	Print?		TRIG	DISP
a C	Ь	VD C DE	C DAI		SCHED?	1		ON OFF		FIX ☑
a St. Line	SC		C BAL			2			DEG ☑ GRAD □	SCI 🗆
<sup>0</sup> Used		sed <sup>2</sup> S0	YD	usea	<sup>1</sup> Used			$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	RAD 🗆	ENG <sub>2</sub>
5	6	7		<sup>8</sup> Used <sup>9</sup>	Used	3		3 🗆 🗹		n_2
L				<u></u>						

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