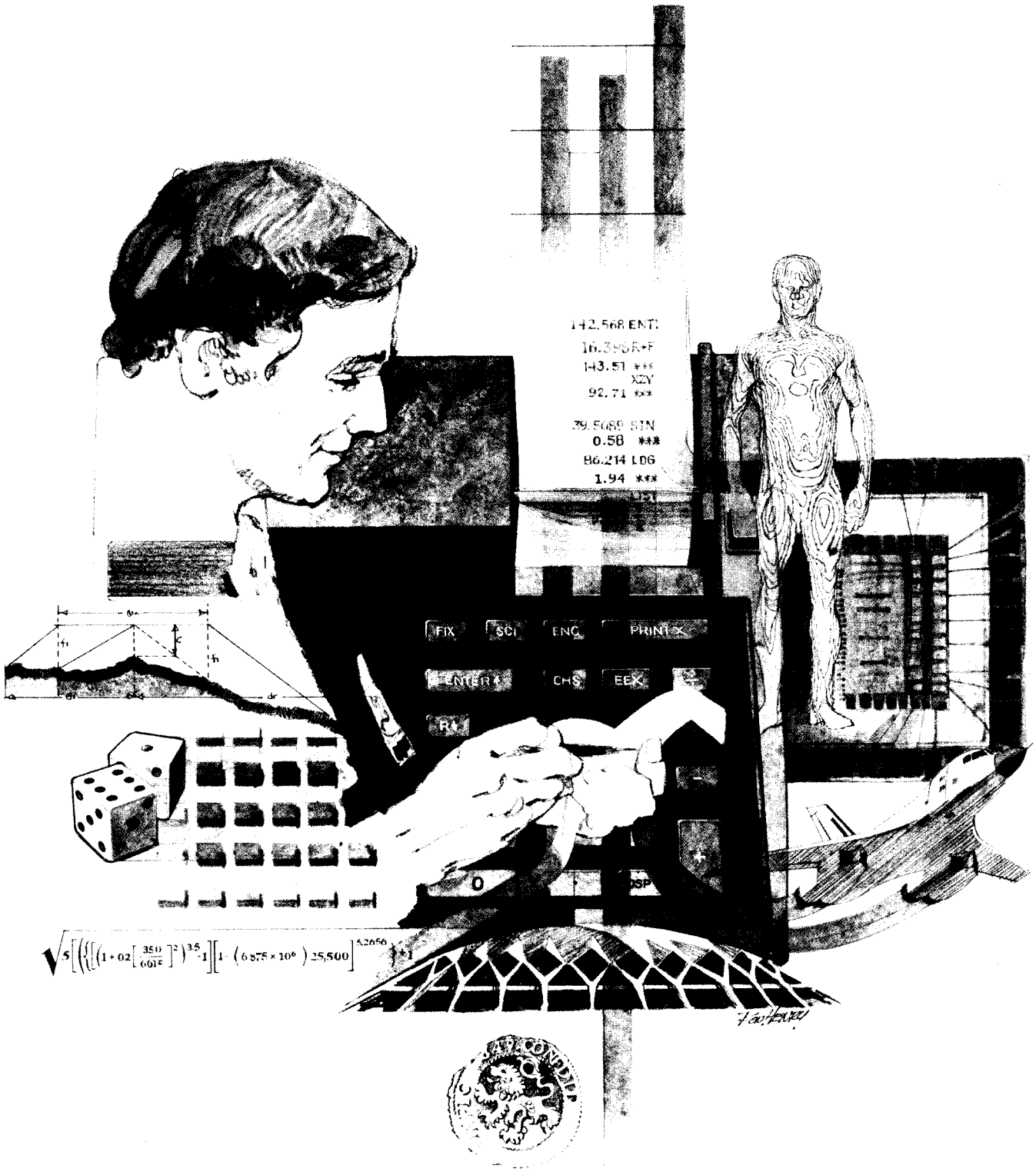
HEWLETT-PACKARD

HP-67/HP-97

Users' Library Solutions

Home Construction Estimating



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

Program Description I

Program Title CONCRETE VOLUME

Contributor's Name Hewlett-Packard, Corvallis Division

Address 1000 N. E. Circle Blvd.

City Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables Given dimensions of an area of concrete to be poured in feet and/or inches computes the cubic yard volume of concrete required maintains a running sum of all concrete to be required when dimensions are complex or sub-divided.

Operating Limits and Warnings

Program Description II

Sketch(es)

Sample Problem(s) Given a footing for a building with the following dimensions:

20" wide 15" deep 78'6" long
20" wide 15" deep 54'6" long
20" wide 9" deep 64' long
24" wide 12" deep 39'3" long

Calculate the total cubic yards required

Given a slab of concrete with the following dimensions

4" deep 10'6" wide 106'10" long

Calculate the total cubic yards required

Solution(s)

```
.20[A] .15[B] 78.06[C] [E]  →  6.06 cu. yds.
       54.06[C] [E]  →  4.21 cu. yds.
  .09[B] 64   [C] [E]  →  2.96 cu. yds.
.24[A] .12[B] 39.03[C] [E]  →  2.91 cu. yds.
                       [D]  →  16.13 Total cu. yds.

[f][A].04[A]10.06[B]106.10[C] [E]  →  13.85 Total cu. yds.
```

Reference(s) THIS PROGRAM IS A TRANSLATION OF THE HP-65 USERS' LIBRARY PROGRAM #01816A SUBMITTED BY NEIL STONE.

User Instructions

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	Insert card				
2	Input				
	Depth	fff.ii	A		YY.YYY
	Width	fff.ii	B		YY.YY
	Length	fff.ii	C		YY.YY
3	Calculate		E		cu. yds.
4	Repeat step 2&3 for changes only for all				
	areas with different dimensions.				
5	Press D for sum total of cubic yards needed		D		Σ Cu. yds.
6	To initialize for new total		F	A	
	NOTE: It is only necessary to enter				
	only those dimensions which				
	are different from previous				
	dimensions in repeat				
	calculations.				

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Convert depth to yards from foot and inches and store in Register 1
002	ENT↑	-21	
003	FRC	16 44	
004	.	-62	
005	1	01	
006	2	02	
007	÷	-24	
008	X≷Y	-41	
009	INT	16 34	
010	+	-55	
011	3	03	
012	÷	-24	
013	STO1	35 01	
014	RTN	24	
015	*LBLB	21 12	Convert width to yards from feet and inches and store in Register 2
016	ENT↑	-21	
017	FRC	16 44	
018	.	-62	
019	1	01	
020	2	02	
021	÷	-24	
022	X≷Y	-41	
023	INT	16 34	
024	+	-55	
025	3	03	
026	÷	-24	
027	STO2	35 02	
028	RTN	24	
029	*LBLC	21 13	Convert length to yards from feet and inches and store in Register 3
030	ENT↑	-21	
031	FRC	16 44	
032	.	-62	
033	1	01	
034	2	02	
035	÷	-24	
036	X≷Y	-41	
037	INT	16 34	
038	+	-55	
039	3	03	
040	÷	-24	
041	STO3	35 03	
042	RTN	24	
043	*LBLE	21 15	Calculate cubic yards and add to total in Register 4
044	RCL1	36 01	
045	RCL2	36 02	
046	RCL3	36 03	
047	×	-35	
048	×	-35	
049	ST+4	35-55 04	
050	RTN	24	
051	*LBLD	21 14	Display contents of Register 4
052	RCL4	36 04	
053	RTN	24	
054	*LBLa	21 16 11	
055	CLRG	16-53	Initialize
056	RTN	24	

STEP	KEY ENTRY	KEY CODE	COMMENTS
	057 R/S	51	
060			
070			
080			
090			
100			
110			

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0	1 D	2 W	3 L	4 Σ	5	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title LINEAR TO BOARD FEET CONVERSION AND COSTING

Contributor's Name Hewlett-Packard, Corvallis Division

Address 1000 N. E. Circle Blvd.

City Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables

This program will convert linear feet to board feet for any size lumber as specified, and will compute a cost based on a specified unit cost. Conversion may be done repeatedly with several sizes of lumber, with total board feet and cost accumulated. A waste factor may be used with these totals if desired.

Multiplicative Board Feet Factor: $F = \frac{a \times b}{12}$

where a and b are the two dimensions of the lumber

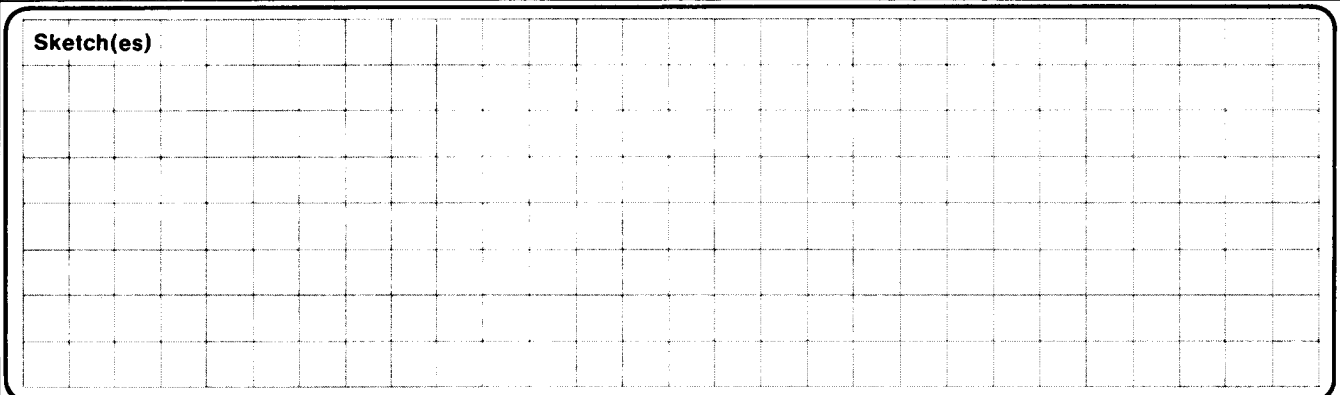
$\text{Cost} = \text{units} \times \frac{\text{cost}}{\text{unit}}$

Totals are displayed with no decimal component, as that would imply an accuracy not present in the original input.

Operating Limits and Warnings This program does not check for negative input.

Program Description II

Sketch(es)



Sample Problem(s)

You are costing a building project that includes the following quantities of lumber, with sizes and costs as specified.

Size	Cost/BF	Quantity
2x4	$0.265	3256 LF
2x6	.257	2665
2x12	.27	339
1x5 pine	.46	850

Compute the cost and quantity sub-totals and totals. Incorporate a waste factor of 25% for all lumber.

Solution(s)

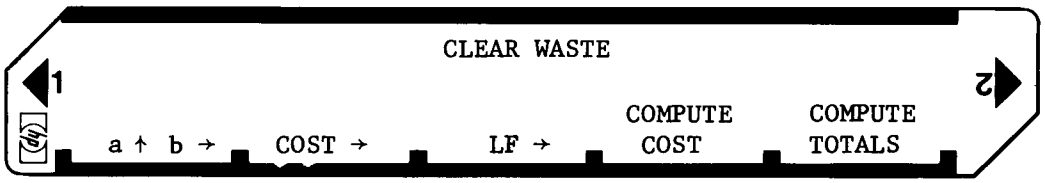
[f][A] 25[f] [B]	→	1.25 Waste Factor
2[ENT ↑] 4[A] .265[B] 3256[C]	→	2713 Board ft.
[D]	→	719 Cost
2[ENT ↑] 6[A] .257[B] 2665[C]	→	3331 Board ft.
[D]	→	856 Board ft.
2[ENT ↑] 12[A] .27[B] 339[C]	→	848 Board ft.
[D]	→	229 Cost
1[ENT ↑] 5[A] .46[B] 850[C]	→	443 Board ft.
[D]	→	204 Cost

Reference(s)

[E]	7335 Total Board feet
[R/S]	2008 Total cost

THIS PROGRAM IS A TRANSLATION OF THE HP-65 USERS' LIBRARY PROGRAM #01583A SUBMITTED BY JAN ERIK MOLLO-CHRISTENSEN

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	For new series of conversions or in case of			
	erroneous input in C or D Sets waste factor		f A	1
	to 1.			
3	Enter dimensions of lumber	a	↑	
	(example: 2x4 a=2 b=4)	b	A	
	(error: repeat w/correct data)			
4	Enter Unit Cost in dollars (23¢ = .23)	cost	B	
	(error: repeat w/correct data)			
5	Enter Linear Feet, convert to BF	LF	C	B.F.
	(error will disturb D and E)			
6	Compute cost		D	Cost
7	Return to Step 5 for conversion of			
	additional LF of same dimensions.			
or				
7	Return to Step 3 for conversion of			
	different size lumber			
or				
7	Compute totals		E	total BF
			R/S	total cost
	This step may be executed at any time			
	during a series of conversions without			
	disturbing anything.			
8	To enter a waste factor for computations.	%	f B	
	This step must be done prior to Steps 5			
	and 6, but can be executed for each size			
	lumber.			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Computes BF factor
002	×	-35	
003	1	01	
004	2	02	
005	÷	-24	
006	STO1	35 01	
007	DSP2	-63 02	
008	RTN	24	
009	*LBLB	21 12	Stores unit cost
010	STO2	35 02	
011	RTN	24	
012	*LBLC	21 13	LF to BF
013	RCL1	36 01	
014	×	-35	
015	RCL5	36 05	
016	×	-35	
017	ST+3	35-55 03	Accumulates
018	DSP0	-63 00	
019	RTN	24	
020	*LBLD	21 14	Computes cost
021	RCL2	36 02	
022	×	-35	
023	ST+4	35-55 04	Accumulates
024	RTN	24	
025	*LBLE	21 15	
026	DSP0	-63 00	
027	RCL3	36 03	Total BF
028	R/S	51	
029	RCL4	36 04	Total cost
030	RTN	24	
031	*LBLa	21 16 11	Initialize
032	DSP2	-63 02	
033	CLRG	16-53	
034	1	01	
035	STO5	35 05	
036	RTN	24	
037	*LBLb	21 16 12	
038	DSP2	-63 02	Enter waste factor
039	1	01	
040	0	00	
041	0	00	
042	÷	-24	
043	1	01	
044	+	-55	
045	STO5	35 05	
046	RTN	24	
047	R/S	51	

STEP	KEY ENTRY	KEY CODE	COMMENTS
060			
070			
080			
090			
100			
110			

STEP	KEY ENTRY	KEY CODE
050		

SET STATUS

FLAGS			TRIG	DISP	
	ON	OFF			
0	☐	☒	DEG ☒	FIX ☒	
1	☐	☒	GRAD ☐	SCI ☐	
2	☐	☒	RAD ☐	ENG ☐	
3	☐	☒		n 2	

REGISTERS

0	1 BF factor	2 unit cost	3 cum. BF	4 cum. cost	5 waste factor	6	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title	FRAMING BOARD FEET
Contributor's Name	Hewlett-Packard, Corvallis Division
Address	1000 N. E. Circle Blvd.
City	Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables

Finds Board Feet in Standardized Dwelling. For 8, 2x4 boards 8 ft. long. The number of board ft. is $\frac{8x2x4x8}{12} = 42\ 2/3$. This formula is reduced as much as possible for each item before it is incorporated into the program. The program assumes the following sizes of boards: Girder, 3-2x6xL_1; Sill, 1-2x6x perimeter; rafters, 2x6 (see below); collar beams (1/3 as many as rafters), 2x6x1/2 width; joists, 2x8xwidth (see below); header, 1-2x8xL_1; Ridge board, 1-2x8xL_2; Bridging, 1-1x4x6 times L_1; Plates, 1-2x4x3 times (perimeter plus intervals); studs, 2x4x8' (see below); gable studs, 2x4 (see below).

16" spacing is assumed for rafters, joists and studs.

Rafter length, including waste, for 1/4 pitch is 1.27 of width (considers eave).

Wall studs for entire building (includes corners, doors, etc.) is assumed to be one stud per linear foot. The length of the gable studs, for 1/4 pitch, is assumed to be 1/4 of the width. The waste from one end is used for the other end.

Operating Limits and Warnings

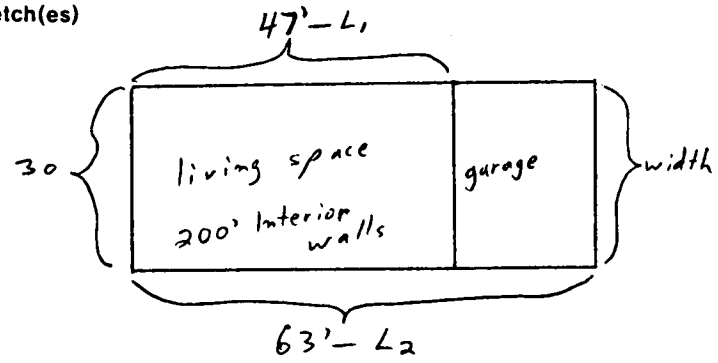
Dwelling assumed to have: One story, one-foot eaves, 1/4 pitch, rectangular configuration, and above sizes.

The program does not consider that lumber comes in lengths of multiples of 2 ft.

This is an estimate only. Other methods may differ slightly. For one thing, methods of determing waste differ.

Program Description II

Sketch(es)



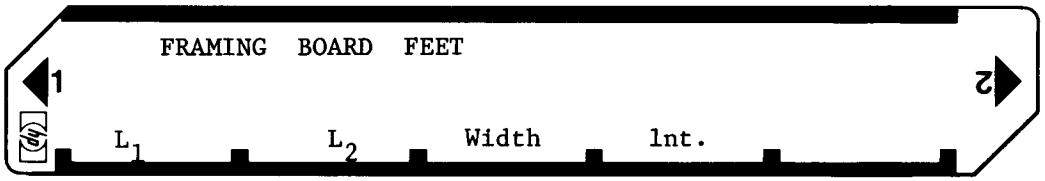
Sample Problem(s) Estimate the board feet in the frame of the above dwelling.

Solution(s) 47[A] 63[B] 30[C] 200[D] → 9289.34

Answer: 9,289.34 BF

Reference(s) THIS PROGRAM IS A TRANSLATION OF THE HP-65 USERS' LIBRARY PROGRAM #04577A SUBMITTED BY CHET LANGIN.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	Enter L_1		A	
3	Enter L_2		B	
4	Enter Width		C	
5	Enter linear feet of interior walls for new		D	Board Feet
	problem, go to 2			
	Please note:			
	L_1 is the length excluding garage, if any			
	L_2 includes garage, if any			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	Finds Board Feet for:
002	STO4	35 04	
003	6	06	
004	.	-62	
005	3	03	Girder, header and bridging
006	3	03	
007	×	-35	
008	RTN	24	
009	*LBLB	21 12	
010	STO5	35 05	
011	1	01	
012	.	-62	
013	3	03	Ridge board
014	3	03	
015	×	-35	
016	+	-55	
017	RTN	24	
018	*LBLC	21 13	
019	STO6	35 06	
020	RCL5	36 05	
021	+	-55	Sill
022	2	02	
023	×	-35	
024	STO7	35 07	
025	+	-55	
026	RCL6	36 06	
027	1	01	
028	.	-62	Rafters
029	2	02	
030	7	07	
031	×	-35	
032	RCL5	36 05	
033	GSBE	23 15	
034	STO8	35 08	
035	×	-35	
036	+	-55	
037	RCL6	36 06	
038	3	03	Collar beams
039	÷	-24	
040	RCL6	36 06	
041	2	02	
042	÷	-24	
043	×	-35	
044	+	-55	
045	RCL4	36 04	
046	GSBE	23 15	Joists
047	RCL8	36 08	
048	+	-55	
049	RCL6	36 06	
050	2	02	
051	+	-55	
052	×	-35	
053	1	01	
054	.	-62	
055	3	03	
056	3	03	
057	×	-35	
058	+	-55	
059	RCL6	36 06	
060	GSBE	23 15	
061	RCL6	36 06	Gable studs
062	4	04	
063	÷	-24	
064	×	-35	
065	.	-62	
066	6	06	
067	7	07	
068	×	-35	
069	+	-55	
070	RTN	24	
071	*LBLD	21 14	
072	RCL7	36 07	Plates
073	+	-55	
074	STO8	35 08	
075	2	02	
076	×	-35	
077	+	-55	
078	RCL8	36 08	Studs
079	5	05	
080	.	-62	
081	3	03	
082	3	03	
083	×	-35	
084	+	-55	
085	RTN	24	Finds number of pieces of rafters, joists, and gable studs
086	*LBLE	21 15	
087	.	-62	
088	7	07	
089	5	05	
090	×	-35	
091	2	02	
092	+	-55	
093	INT	16 34	
094	RTN	24	
095	R/S	51	

100

110

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0	1	2	3	4 L_1	5 L_2	6 Width	7 Perimeter	8 Used	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title	LUMBER ESTIMATE
Contributor's Name	Hewlett-Packard, Corvallis Division
Address	1000 N. E. Circle Blvd.
City	Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables

ESTIMATES MATERIAL COST, LABOR COST AND TOTAL COST OF ROUGH CARPENTRY. USER MUST SUPPLY LOCAL LUMBER COSTS AND LOCAL LABOR RATE. ALSO DETERMINES NUMBER OF STUDS, AND JOISTS. MAY BE USED IN CONJUNCTION WITH OTHER ESTIMATE PROGRAMS FOR ESTIMATING THE COSTS OF ALL THE ASPECTS OF A STRUCTURE.

A BOARD FOOT REPRESENTS THE VOLUME 1" x 12" x 12".

BF = (WIDTH IN INCHES X THICKNESS IN INCHES X LENGTH IN FEET) ÷ 12

"SPACING" IS THE DISTANCE FROM THE CENTER OF A STUD, JOIST OR RAFTER TO THE CENTER OF THE ADJACENT STUD, JOIST OR RAFTER. "PIECES" REFERS TO THE NUMBER OF STUDS, JOISTS OR RAFTERS.

PCS = [LENGTH X (12/SPACING IN INCHES)] + 1

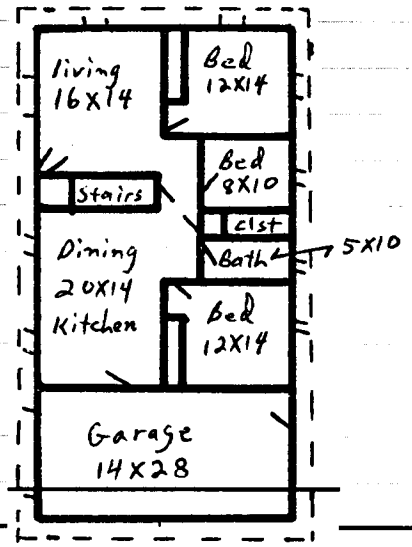
Operating Limits and Warnings

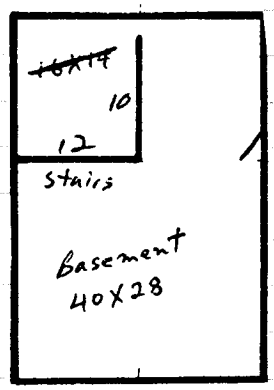
COSTS ARE ROUNDED TO THE NEAREST DOLLAR. LABOR HOURS ARE ROUNDED INTERNALLY TO THE NEAREST 1/2 HOUR. THE LABOR RATE MUST BE DELETED FROM THE PROGRAM AND THE LOCAL LABOR RATE PROGRAMMED IN. ANY ERRORS MUST BE MANUALLY SUBTRACTED FROM THE INVOLVED REGISTERS. Does not include nails.

Program Description II

Sketch(es)

Sample Problem(s) ESTIMATE THE COST OF ROUGH LUMBER FOR THE DWELLING WITH THE FOLLOWING DATA:





54 x 28 = 1,512 sq. ft.

40 x 28 = 1,120 sq. ft.

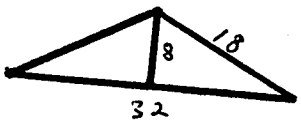
Circumference = 164 ft.

First floor interior walls = 177 ft.

Basement interior walls = 22 ft.

Interior walls = 199 ft.

Exterior height = 8 ft.; Interior height = 7 ft.



Plain gable roof

Pitch = 1/4

Eaves = 2 ft.

Reference(s) Thomas, Paul I., How to Estimate Building Losses and Construction Costs, 2nd Ed., Prentice-Hall, Inc., 1971, Chapter 9.

National Construction Estimator, 23rd Ed., 1975, Craftsman Book Co.

THIS PROGRAM IS A MODIFICATION OF THE USERS' LIBRARY PROGRAM #04056A SUBMITTED BY CHET LANGIN.

Program Description II

Sketch(es)

Sample Problem(s)	BF	Cost	MAT. Fac./Hrs.	LAB.	Total
Girder 2 x 6 x40-3		283.29	20/		
Sill 2 x 6x164-1		283.29	20/		
Floor Joists 2x8x16-		312.80	22/		
Joist Header 2x8x80-1		312.80	20/		
Bridging 1x4x240-1		251.45	80/		
Sole Plate 2x4x363-1		279.30	20/		
Wall studs 2x4x8-		279.30	25/		
Top plates 2x4x 726-		279.30	20/		
Gable Studs 2x4x8-		279.30	25/		
Ceiling Joists 2x8x16-		312.80	25/		
Rafters 2x6x18-		283.29	30/		
Ridge Board 2x8x54-1		312.80	30/		
Collar Beams 2x6x14-20		283.29	30/		

Solution(s) Girder is 3 boards running length of basement. Sill is 1 board around the perimeter. Floor joists are 2 ft. longer than width. Joist header is twice length of basement. Bridging is 3 times length of basement times two sides. Sole plate is length of all walls--ext. and int. Top Plates are twice length of all walls. Ceiling joists same as floor joists. Solve triangle for length of rafters. Ridge board is length of structure. Collar Beams are 1/2 width for each 2 or 3 rafters. Sizes of lumber vary for different structures. Board lengths such as rafters, must be rounded up to be divisible by 2.

Reference(s) Costs are for 1,000 BF. The factors are the number of hours it takes on the average for a union carpenter to do 1,000 BF. The labor rate for this example is $13.21/hr.

Program Description 11

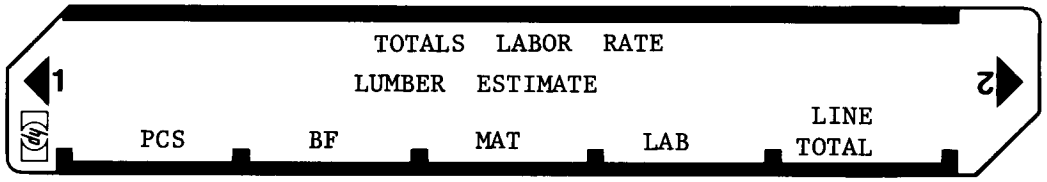
SOLUTION:

[f][CLREG]13.21		BF	Mat	HRS	Lab	Tot
[f][B]						
1440[B], 283.29[C], 20[D],[R/S][E] . . .	Girder	120	34	2 1/2	33	67
1968 [B], 283.29[C], 20[D][R/S],[E]	Sill	164	46	3 1/2	46	92
40[ENT↑], 16[A], 2 X . . . 62 pieces						
15872[B], 312.8[C], 22[D],[R/S], [E] . .	Floor joists	1323	414	29	383	797
1280[B], 312.8[C], 20[D], [R/S], [E]. . .	Joist Header	107	33	2	26	59
960[B], 251.45[C], 80[D],[R/S],[E]. . . .	Bridging	80	20	6 1/2	86	106
2904[B], 279.3[C], 20[D],[R/S],[E]. . . .	Sole Plate	242	68	5	66	134
54[ENT↑], 16[A], 2 X . . . 84 pieces						
28[ENT↑], 16[A], 2 X . . . 44 pieces						
*plus 227 = 355 pieces						
22720[B], 279.3[C], 25[D], [R/S],[E]. . .	Studs	1893	529	47 1/2	627	1156
5808 [B], 279.3[C], 20[D] [R/S] [E]	Top Plates	484	135	9 1/2	125	260
32[ENT↑] 16[A]	25 pieces**					
1600[B] 279.3[C], 25[D], [R/S] [E]	Gable Studs	133	37	3 1/2	46	83
40[ENT↑], 16[A], 2 X . . . 62 pieces						
15872 [B], 312.8 [C], 25[D],[R/S], [E].	Ceiling J.	1323	414	33	436	850
54[ENT↑], 16[A], 2 X . . . 84 pieces						
18144[B], 283.29[C], 30[D], [R/S], [E]. .	Rafters	1512	428	45 1/2	601	1029
864[B], 312.8[C], 30[D], [R/S], [E] . .	Ridge Board	72	23	2	26	49
3360[B], 283.29[C], 30[D], [R/S] [E]. .	Col. Beams	280	79	8 1/2	112	191
[f][A].	Totals	7733	2260		2613	4873

*Use formula to determine number of studs on exterior walls, then add one stud for each foot of interior walls, one stud for each corner of building, and 2 studs for each exterior opening (doors and windows).

** For gable studs: The number of studs is not doubled because the waste from one end of the structure is used for the other end.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	ENTER PROGRAM				
2	INITIALIZE CARD				
		LABOR RATE	f	B	LABOR RATE
3	REPEAT 3-8 FOR EACH ITEM				
	(OPTIONAL: ENTER LENGTH	LENGTH	ENT ↑		
	ENTER SPACING)	SPACING	A		PCS
4	ENTER WIDTH X THICKNESS X LENGTH				
	X PIECES	WTLP	B		BF
5	ENTER UNIT COST PER 1,000 BF	COST	C		MAT.
6	ENTER LABOR FACTOR PER 1,000 BF	FACTOR	D		HOURS
7	FIND LABOR COST		R/S		LAB.
8	FIND LINE TOTAL		E		TOTAL
9	FOR TOTALS		f	A	
	BF TOTAL				BF
	MAT TOTAL				MAT
	LAB TOTAL				LAB
	MAT AND LAB TOTAL				TOTAL
10	ENTER NEXT CARD				
	OR				
	FOR NEW PROBLEM, GO TO 2				

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBLA	21 11	
002	X≠Y	-41	
003	GSB0	23 00	Find number of pieces
004	X≠Y	-41	
005	1	01	
006	2	02	
007	X≠Y	-41	
008	÷	-24	
009	x	-35	
010	1	01	
011	.	-62	
012	4	04	Internally Round Up
013	+	-55	
014	GSB0	23 00	
015	RTN	24	
016	*LBL0	21 00	
017	.	-62	
018	5	05	Internal Rounding
019	+	-55	
020	INT	16 34	
021	RTN	24	
022	*LBLB	21 12	
023	1	01	Finds and stores BF
024	2	02	
025	÷	-24	
026	GSB0	23 00	
027	STO4	35 04	
028	ST+1	35-55 01	
029	RTN	24	
030	*LBLC	21 13	
031	RCL4	36 04	Finds and stores Mat.
032	x	-35	
033	EEX	-23	
034	3	03	
035	÷	-24	
036	GSB0	23 00	
037	STO5	35 05	
038	ST+2	35-55 02	
039	RTN	24	
040	*LBLD	21 14	
041	RCL4	36 04	Finds hours
042	x	-35	
043	EEX	-23	
044	3	03	
045	÷	-24	
046	2	02	Internally Rounds to nearest 1/2 hr.
047	x	-35	
048	GSB0	23 00	
049	2	02	
050	÷	-24	
051	R/S	51	Finds and stores labor cost
052	RCL0	36 00	
053	x	-35	
054	GSB0	23 00	
055	STO6	35 06	
056	ST+3	35-55 03	
057	RTN	24	
058	*LBLE	21 15	
059	RCL5	36 05	Adds line total
060	RCL6	36 06	
061	+	-55	
062	RTN	24	
063	*LBLa	21 16 11	
064	RCL1	36 01	
065	RCL2	36 02	Totals
066	ENT↑	-21	
067	ENT↑	-21	
068	RCL3	36 03	
069	+	-55	
070	RCL3	36 03	
071	X≠Y	-41	
072	PRST	16-14	
073	RTN	24	
074	*LBLb	21 16 12	
075	STO0	35 00	Store labor rate
076	RTN	24	
077	R/S	51	
080			
090			
100			
110			

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0 Labor Rate	1 Total BF	2 Total MAT.	3 Total Labor	4 BF	5 MAT.	6 LABOR	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

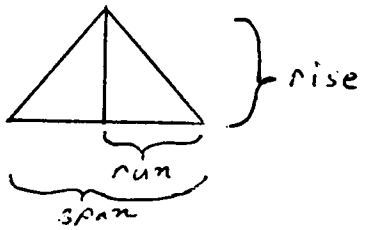
A	B	C	D	E	I

Program Description I

Program Title SHINGLE ESTIMATE

Contributor's Name Hewlett-Packard, Corvallis Division
Address 1000 N. E. Circle Blvd.
City Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables GIVEN CEILING AREA AND PITCH OF ROOF, FINDS ROOF AREA AND NUMBER OF SQUARES. ROUNDS INTERNALLY TO 1/3 SQUARE. GIVEN LOCAL COSTS AND LABOR RATES, FINDS MATERIAL COSTS, LABOR COSTS AND TOTAL COSTS. INTENDED TO BE USED IN CONJUNCTION WITH OTHER ESTIMATE PROGRAMS, BUT CAN BE USED INDEPENDENTLY.



PITCH = RISE/SPAN

TANGENT = PITCH X 2

ROOF AREA = SECANT TIMES CEILING AREA

ONE SQUARE = ONE HUNDRED SQUARE FEET

THREE BUNDLES = ONE SQUARE (SHINGLES ARE SOLD BY THE BUNDLE)

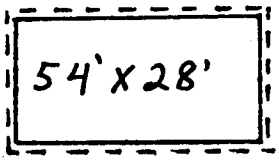
CAN ALSO BE USED TO DETERMINE RAFTER LENGTH:

RAFTER = SECANT TIMES RUN (ROUNDS TO NEAREST ONE FOOT)

Operating Limits and Warnings ROUNDS INTERNALLY TO NEAREST $1, 1/2 HOUR, AND 1/3 SQUARE. WASTE MUST BE ADDED MANUALLY. CANNOT BE USED FOR BUILT-UP ROOFS. SHOULD NOT BE USED FOR ROLL ROOFING. THE LABOR RATE MUST BE ENTERED. ANY ERRORS MUST BE MANUALLY SUBTRACTED FROM THE INVOLVED REGISTERS.

Program Description II

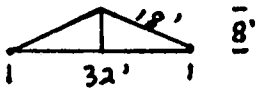
Sketch(es) Dwelling size:



2' Eaves

plain gable roof

pitch = 1/4



Ceiling Area = 58'X 32' = 1,856

Sample Problem(s) FOR THE DWELLING WITH THE ABOVE DIMENSIONS, FIND RAFTER LENGTH, ROOF AREA, NUMBER OF SQUARES, MATERIAL COST, LABOR COST, TOTAL COST OF ROOF, AND, CONTINUING FROM LUMBER ESTIMATE (1054D). FIND TOTAL COST AND TOTAL MATERIAL AND LABOR COSTS FOR THE ROUGH LUMBER AND ROOF.

SOLUTION: ENTER LUMBER ESTIMATE (1054D) AND FIND THE COSTS AS OUTLINED IN PROGRAM DESCRIPTION II OF THAT PROGRAM SUBMITTAL. (7,733 BF, $2,260 Material, $2,613 Labor, and $4,873 Total.) THE LABOR RATE IS $11.90/HR. FOR THIS EXAMPLE.

11.90 [f][B]	
1856 [ENT↑], 1[ENT↑], 4[A]	ROOF AREA = 2,075 SQ. FT.
1.1 X . . .	ADD 10% WASTE = 2,282.5 SQ. FT.
[B] . . .	SQUARES = 23.00
24.45 (COST PER SQUARE)[C]. . .	MATERIAL = $562
2 (LABOR FACTOR) [D] . . .	HOURS = 46.00
[R/S] . . .	LABOR = $547
[E] . . .	TOTAL = $1,109

[f][A] . . .TOTALS INCLUDING ROUGH LUMBER: BF AND SQ. FT = 9,808 (USED LATER TO DETERMINE LBS. OF NAILS), MAT = $2,822, LAB = $3,160, TOTAL COST OF ROOF AND ROUGH LUMBER = $5,982.

RAFTER LENGTH = 16 (Run) [ENT↑] 1 [ENT↑] 4 [A] . . . 18 FT.

Reference(s) THOMAS, PAUL I., HOT TO ESTIMATE BUILDING LOSSES AND CONSTRUCTION COSTS, 2nd. Ed., PRENTICE-HALL, INC., 1971, CHAPT. 13. NATIONAL CONSTRUCTION ESTIMATOR, 1975, 23rd Ed., CRAFTSMAN BOOK CO., 542 STEVENS AVENUE, SOLANA BEACH, CA. 92075. THIS PROGRAM IS A MODIFICATION OF THE USERS' LIBRARY PROGRAM #04303A SUBMITTED BY CHET LANGIN.

User Instructions

TOTALS LABOR RATE

SHINGLE ESTIMATE

AREA | SQU | MAT | LABOR | LINE TOTAL

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	Enter program				
2	(Optional: Initialize series)		f	CL REG	
3	Enter labor rate for roofing	Rate	f	B	
4	Enter ceiling area	Area	ENT ↑		
5	Enter pitch	Pitch	ENT ↑	A	Area
6	Add Waste	%	X		
7	Find No. of squares		B		Squares
8	Enter unit cost per square	Cost	C		Mat.
9	Enter labor factor per square	Factor	D		Hrs.
10	Find labor cost		R/S		Lab.
11	Find cost of roof		E		Cost
12	Set for series total		f	A	
	Total BF and/or sq. ft.				BF/SF
	Total material				MAT.
	Total labor				Lab.
	Total cost of series				Total
	Enter next card				
	or				
	For new problem, go to 2				

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0	21 00	
002	.	-62	
003	5	05	
004	+	-55	Rounds internally
005	INT	16 34	
006	RTN	24	
007	*LBLA	21 11	
008	R↑	16-31	
009	R↑	16-31	Secant times ceiling area
010	X≠Y	-41	
011	R↓	-31	
012	GSB0	23 00	
013	ENT↑	-21	
014	R↑	16-31	
015	R↑	16-31	
016	2	02	
017	÷	-24	
018	÷	-24	
019	TAN⁻¹	16 43	
020	COS	42	
021	÷	-24	
022	GSB0	23 00	
023	ST+1	35-55 01	
024	RTN	24	
025	*LBLB	21 12	
026	.	-62	
027	.0	00	Rounds to nearest 1/3 square
028	3	03	
029	×	-35	
030	.	-62	
031	5	05	
032	+	-55	
033	GSB0	23 00	
034	3	03	
035	÷	-24	
036	STO4	35 04	
037	RTN	24	
038	*LBLC	21 13	
039	RCL4	36 04	Find Mat.
040	×	-35	
041	GSB0	23 00	
042	ST+2	35-55 02	
043	STO5	35 05	
044	RTN	24	
045	*LBLD	21 14	
046	RCL4	36 04	Find nearest 1/2 hour
047	×	-35	
048	2	02	
049	×	-35	
050	GSB0	23 00	
051	2	02	
052	÷	-24	
053	R/S	51	
054	RCL0	36 00	Find LAB.
055	×	-35	
056	GSB0	23 00	
057	ST+3	35-55 03	
058	STO6	35 06	
059	RTN	24	
060	*LBLE	21 15	Find line and column totals
061	RCL5	36 05	
062	RCL6	36 06	
063	+	-55	
064	RTN	24	
065	*LBLa	21 16 11	
066	RCL1	36 01	Totals
067	RCL2	36 02	
068	ENT↑	-21	
069	ENT↑	-21	
070	RCL3	36 03	
071	+	-55	
072	RCL3	36 03	
073	X≠Y	-41	
074	FRST	16-14	
075	RTN	24	
076	*LBLb	21 16 12	Store labor rate
077	STO0	35 00	
078	RTN	24	
079	R/S	51	
090			
100			
110			

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0 Labor Rate	1 Sq. ft.	2 Mat. Total	3 LAB Total	4 Sqrs.	5 Mat.	6 Lab	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title WALL AND CEILING AREAS ESTIMATE

Contributor's Name Hewlett-Packard, Corvallis Division

Address 1000 N. E. Circle Blvd.

City Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables Given dimensions of building and rooms and size of openings, finds ceiling area, wall area, total gross area, net wall area and total net area of each room and for the entire structure.

length times width = ceiling area

2 times length plus width times height = wall area

gross area less openings = net area

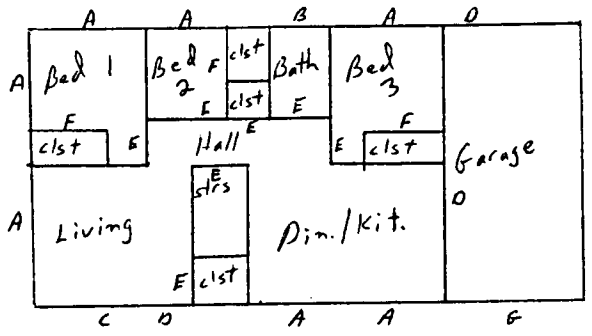
Operating Limits and Warnings May only be used for rectangular rooms.

Program Description 11

Sketch(es)

Not to scale

Windows:
7A - 2'10"x4'8" = 13
1B - 2'2"x3'4" = 7
1C - 4'6"x4' = 18



Doors:
4D - 3'x6'8" = 20
7E - 3'x6'8" = 20
3F - 6'x6'8" = 40
1G - 9'x7' = 63
Int. height = 7' (bath = 6')
Ext. height = 8'

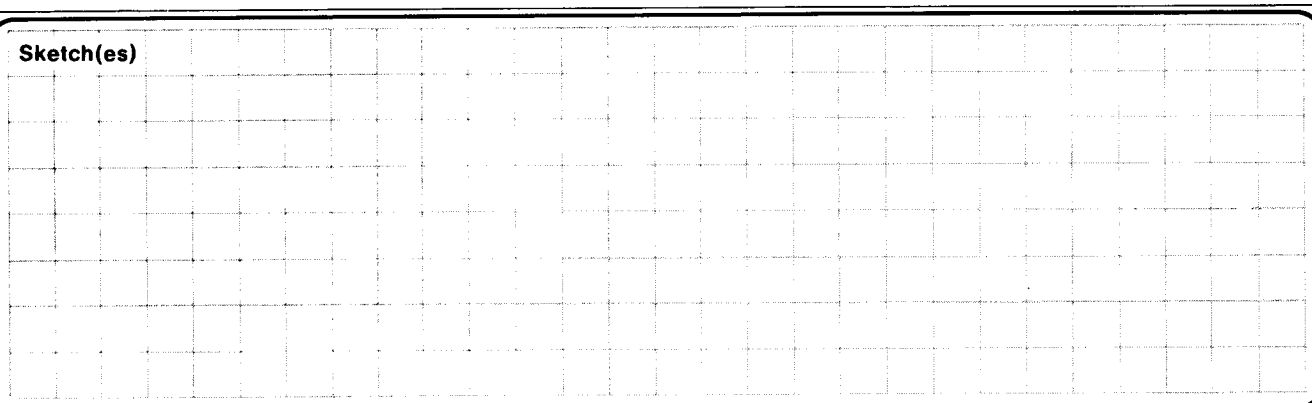
Sample Problem(s) For the dwelling illustrated above, after finding the cost for the framing in the program "LUMBER ESTIMATE" and the cost of the roof in the program "SHINGLE ESTIMATE," find the areas of the walls and ceilings without disturbing the essential registers in the "ESTIMATE" series. SOLUTION:

ROOM	SIZE	CEIL.	WALL	TOTAL	OPEN	WALL	TOTAL
BED1	12x14	168	364	532	86	278	446
CLST	8x3	(24)	154	(178)	40	114	(138)
BED2	8x10	80	252	332	73	179	259
CLST	3x7	21	140	161	40	100	121
CLST	3x3	9	84	93	20	64	73
BATH	5x10	50	180	230	27	153	203
BED3	12x14	168	364	532	86	278	446
CLST	8x3	(24)	154	(178)	40	114	(138)
LIV.	16x14	224	420	644	99	321	545
STRS.	4x10	40	196	236	20	176	216
CLST	4x4	16	112	128	20	92	108
HALL	16x4	64	280	344	204	76	140
D/K	20x14	280	476	756	102	374	654
GRG	14x28	392	588	980	103	485	877
S/T		1512	3764	5276	960	2804	4316
ext.	54x28	(1512)	1312	(2824)	219	1093	(2605)
tot.		1512	5076	6588	1179	3897	5409

Reference(s) THIS PROGRAM IS A MODIFICATION OF THE USERS' LIBRARY PROGRAM #04247A SUBMITTED BY CHET LANGIN.

Program Description II

Sketch(es)



Sample Problem(s) Solution cont. The keystrokes are as follows:

[f][E]

7[A]

12[ENTER], 14[B]168, [C]364, [E]532, 86[D]278, [E]446,

8[ENTER], 3[B]24, [R/S], [C]154, [E]178, 40[D]114, [E]138,

8[ENTER], 10[B]80, [C]252, [E]332, 73[D]179, [E]259,

3[ENTER], 7[B]21, [C]140, [E]161, 40[D]100, [E]121,

3[ENTER], 3[B]9, [C]84, [E]93, 20[D]64, [E]73,

6[A],

5[ENTER], 10[B]50, [C]180, [E]230, 27[D]153, [E]203,

7[A],

12[ENTER], 14[B]168, [C]364, [E]532, 86[D] 278, [E] 446,

8[ENTER], 3[B]24, [R/S], [C]154, [E]178, 40[D]114, [E]138,

16[ENTER], 14[B]224, [C]420, [E]644, 99[D]321, [E]545,

Solution(s) 4[ENTER], 10[B]40, [C]196, [E]236, 20[D]176, [E]216,

4[ENTER], 4[B]16, [C]112, [E]128, 20[D]92, [E]108,

16[ENTER], 4[B]64, [C]280, [E]344, 204[D]76, [E]140,

20 [ENTER], 14[B]280, [C]476, [E]756, 102[D]374, [E]654,

14 [ENTER], 28[B]392, [C]588, [E]980, 103[D]485, [E]877,

[f][A], 1512, 3764, 5276, 960, 2804, 4316,

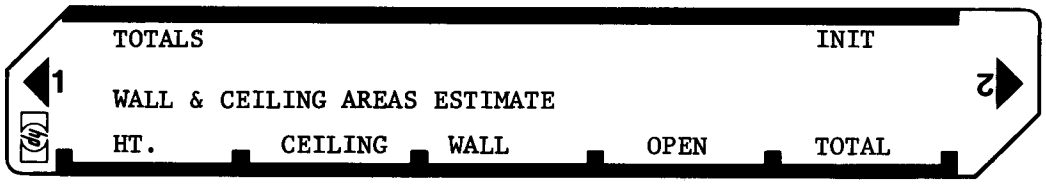
8[A],

54[ENTER], 28[B]1512, [R/S], [C]1312, [E]2824, 219[D]1093, [E]2605,

[f][A]1512, 5076, 6588, 1179, 3897, 5409.

Reference(s) User may now continue with next program in the series, becuase the essential registers have NOT been changed.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	Initialize		f E	
3	Repeat 3-11 for each height			
4	Enter wall height	h	A	
5	Repeat 5-11 for all rooms of same height			
6	Enter length	l	ENTER	
7	Enter width	w	B	ceiling area
	(Optional: subtract ceiling area from			
	register if this area is included in another			
	computation.)		R/S	
8	Find gross wall area		C	gross wall area
9	Find gross ceiling and wall area		E	gross area
10	Enter area of openings	area	D	net wall area
	(Important: All openings for room must be			
	entered at once.)			
11	Find net ceiling and wall area		E	net area
12	For totals		f A	
	Total ceiling area			
	Total gross wall area			
	Total gross area			
	Total openings			
	Total net wall area			
	Total net area			
	Enter next card of series,			
	OR			
	For new problem, go to 2			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL e	21 16 15	
002	0	00	Initialize
003	STO 6	35 06	
004	STO 7	35 07	
005	STO 8	35 08	
006	RTN	24	
007	*LBL A	21 11	
008	STO 9	35 09	Store height
009	RTN	24	
010	*LBL 5	21 12	
011	STO 4	35 04	Finds and stores
012	R↓	-31	ceiling area
013	STO 5	35 05	
014	R↑	16-31	
015	×	-35	
016	ST+7	35-55 07	
017	RTN	24	
018	ST-7	35-45 07	Subtracts ceiling
019	R/S	51	area from storage
020	*LBL C	21 13	Finds and stores
021	RCL 4	36 04	wall area
022	RCL 5	36 05	
023	+	-55	
024	2	02	
025	×	-35	
026	RCL 9	36 09	
027	×	-35	
028	ST+8	35-55 08	
029	RTN	24	
030	*LBL E	21 15	Adds wall and
031	+	-55	ceiling areas
032	RTN	24	
033	*LBL D	21 14	
034	ST+6	35-55 06	Finds net wall area
035	-	-45	
036	RCL 4	36 04	
037	RCL 5	36 05	
038	×	-35	
039	-	-45	
040	RTN	24	
041	*LBL E	21 15	
042	RCL 4	36 04	Finds net area
043	RCL 5	36 05	
044	×	-35	
045	+	-55	
046	RTN	24	
047	*LBL a	21 16 11	
048	RCL 7	36 07	Totals
049	PRTX	-14	
050	RCL 8	36 08	
051	PRTX	-14	
052	+	-55	
053	PRTX	-14	
054	RCL 6	36 06	
055	PRTX	-14	
056	RCL 8	36 08	
057	-	-45	
058	CHS	-22	
059	PRTX	-14	
060	RCL 7	36 07	
061	+	-55	
062	PRTX	-14	
063	RTN	24	
064	R/S	51	

070 080 090 100 110

SET STATUS

FLAGS	ON	OFF	TRIG	DISP
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0	1	2	3	4	5	6	7	8	9
				L	W	Open tot	Ceil tot	Wall tot	Ht
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title WALLPAPER ESTIMATE

Contributor's Name Hewlett-Packard, Corvallis Division

Address 1000 N.E. Circle Blvd.

City Corvallis **State** OR **Zip Code** 97330

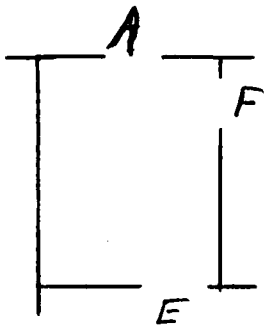
Program Description, Equations, Variables Given areas to be papered, size of rolls, cost of roll, finds number of rolls, material cost, number of hours, labor cost and total cost. Intended to be used with other estimate programs, but may be used separately.

Operating Limits and Warnings Local labor rate must be entered. Prices rounded to dollars. Hours rounded to nearest one-half.

Program Description II

Sketch(es) Bedroom #2:
8'X 10'X 7'

Window A = 2'10" X 4'8" = 13 S.F.
Door E = 3'0" X 6'8" = 20 S.F.
Door F = 6'0" X 6'8" = 40 S.F.
Total Openings = 73 S.F.



Areas:
Ceiling = 80 S.F.
Gross Wall = 252 S.F.
Net Wall = 179 S.F.
Gross Total = 332 S.F.
Net Total = 259 S.F.

Sample Problem(s) Continuing the construction estimate of the house illustrated in Program Description II of Lumber Estimate (1054D), Wall and Ceiling Areas Estimate (1056D), and Shingle Estimate (1055D), find the material cost of wallpapering the walls and ceiling of Bedroom #2. Also, find the labor hours, the labor cost, the total cost for wallpaper, and the total cost for the framing, shingles and wallpaper. As determined in the other programs, the total board feet and square feet of lumber and shingles is 9,808 (used later to determine pounds of nails.) The cost of the lumber and shingles, as previously determined, is: $2,789 for material, $3,160 for labor, and $5,949 total. The areas of the room was determined, with the areas of the other rooms of the house, with the use of program 1056D. Use 30 square feet of wallpaper per roll. Use $3.25 rolls on the ceiling and $6.50 rolls on the walls. Use a labor rate of 3 rolls per hour and $11.83 per hour.

Solution(s) Keystrokes: 11.83[f][B], 80[ENT ↑], 30[A]→ 3 (rolls for ceiling), 3.25 B → 10 (cost of ceiling paper), 3[C] → 1 (hour), [D] → 12 (cost of ceiling labor), [E] → 22 (cost of ceiling), 179[ENT ↑], 30[A]6 (rolls for walls), 6.5[B]39 (cost of wall paper), 3[C] → 2 (hours), [D]24 (cost of wall labor), [E] → 63 (cost for wall), [f], [A] → 9808 (board feet of lumber and square feet of shingles left undisturbed), 2838 (material cost for lumber, shingles and paper), 3196 (labor cost for lumber, shingles and paper), 6034 (total cost for lumber, shingles and paper.)

Reference(s) THIS PROGRAM IS A MODIFICATION OF THE USERS' LIBRARY PROGRAM #04427A SUBMITTED BY CHET LANGIN.

User Instructions

TOTALS LABOR RATE

1 WALLPEPER ESTIMATE 2

ROLLS | MAT. | LABOR HR. | LABOR COST | TOTAL

STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	Enter program				
2	(Optional: Initialize series		f	CL REG	
3	Enter labor rate for wall papering	Rate	f	B	Rate
4	Enter net area	Area	ENT ↑		
5	Enter coverage per roll	Coverage	A		# Rolls
6	Enter cost per roll	Cost	B		Total Cost
7	Enter rolls per hour	Rolls	C		Hours
8	Find labor cost		D		Labor
9	Find labor plus material cost		E		Cost
10	Repeat 3-9 as necessary				
11	Series total		f	A	
	Total BF and/or SF				BF/SF
	Total material				Mat.
	Total labor				Lab.
	Total cost of series				Total
12	Enter next card				
	or				
	For new problem, go to 2				

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0	21 00	
002	.	-62	Rounds internally
003	5	05	
004	+	-55	
005	INT	16 34	
006	RTN	24	
007	*LBLA	21 11	
008	X≷Y	-41	Finds # rolls
009	GSB0	23 00	
010	X≷Y	-41	
011	÷	-24	
012	.	-62	Rounds up
013	4	04	
014	9	09	
015	+	-55	
016	GSB0	23 00	
017	STO4	35 04	
018	RTN	24	
019	*LBLB	21 12	
020	RCL4	36 04	Finds and stores material cost
021	×	-35	
022	GSB0	23 00	
023	ST+2	35-55 02	
024	STO6	35 06	
025	RTN	24	
026	*LBLC	21 13	
027	RCL4	36 04	Finds and rounds labor to 1/2 hour
028	X≷Y	-41	
029	÷	-24	
030	2	02	
031	×	-35	
032	GSB0	23 00	
033	2	02	
034	÷	-24	
035	RTN	24	
036	*LBLD	21 14	
037	RCL0	36 00	Local labor rate
038	×	-35	
039	GSB0	23 00	
040	STO7	35 07	Finds and stores labor cost
041	ST+3	35-55 03	
042	RTN	24	
043	*LBLE	21 15	Finds labor and material total
044	RCL6	36 06	
045	RCL7	36 07	
046	+	-55	
047	RTN	24	
048	*LBLa	21 16 11	
049	RCL1	36 01	Totals
050	RCL2	36 02	
051	ENT↑	-21	
052	ENT↑	-21	
053	RCL3	36 03	
054	+	-55	
055	RCL3	36 03	
056	X≷Y	-41	
057	PRST	16-14	
058	RTN	24	
059	*LBL6	21 16 12	Store labor rate
060	STO0	35 00	
061	RTN	24	
062	R/S	51	

070 080 090 100 110

SET STATUS

FLAGS	ON	OFF	TRIG	DISP
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0 Labor Rate	1 BF/SF	2 Mat. Total	3 Labor Total	4 Rolls	5	6 Mat.	7	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title DRYWALL AND INSULATION ESTIMATE

Contributor's Name Hewlett-Packard, Corvallis Division

Address 1000 N. E. Circle Blvd.

City Corvallis **State** OR **Zip Code** 97330

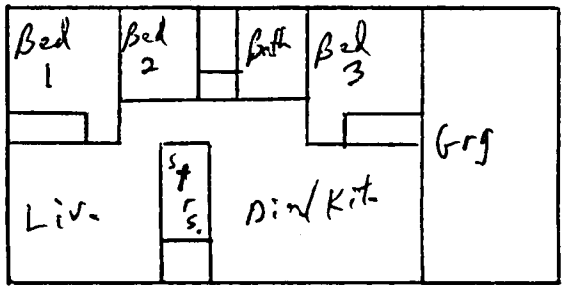
Program Description, Equations, Variables Given area, item cost, and labor factor, finds material cost, labor hours, labor cost, and total cost for drywall and insulation. Intended for use with other estimate programs, but may be used separately.

Operating Limits and Warnings Local carpenter rate and painter rate must be entered. Rounds money to nearest one dollar. Rounds labor to nearest one-half hour.

Program Description II

Sketch(es)

Note: Areas found using Wall and Ceiling areas Estimate (04247A)



Gross area = 4296 S.F.
Openings = 857 S.F.
Net area = 3439 S.F.
Basement = 176 S.F.
Drywall 3615 S.F.
Wall Ins. 932 S.F.
Ceil. Ins. 1120 S.F.

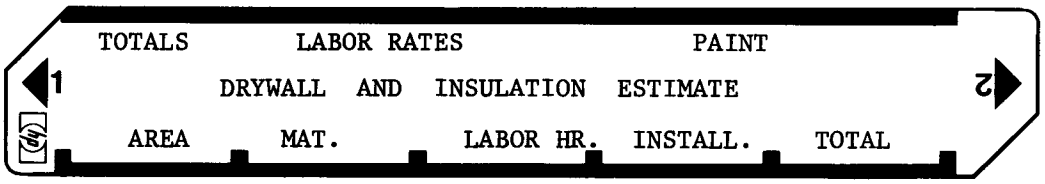
Sample Problem(s) Continue estimating the construction of the illustrated house. It was found in Lumber Estimate, Shingle Estimate, and Wallpaper Estimate that the cost for those items was $6,034. Figure the cost of the drywall and insulation, adding it to the previous items, and breaking the figure up into labor and material. Use a cost of $8.70 per hundred square feet for drywall. Use a labor factor of 1.5 hours per hundred square feet at a carpenter's rate for installation. Use a factor of 1.2 hours at a painter's rate for the joint system. Use a factor of .4 hours at a painter's rate for texturing. Use a cost of $11.00 per hundred square feet for wall insulation and a cost of $20.40 for the ceiling. Use labor rates of 1.5 hours per hundred square feet for stapling the wall insulation and 1 hour for loose ceiling insulation. The painter's rate is $11.28 and the carpenter's rate is $13.21.

Solution(s) Keystrokes: 11.28 [ENT ↑] 13.21 [f][B], 3615[A], 8.7[B] → 315 (drywall cost), 1.5[C] →54 (hours), [D] → 713 (labor cost), [E] →1028 (total cost), 1.2[C] → 43.5 (joint system hours), [f][D] →491 (cost), .4[C] →14.5 (texturing hours), [f][D]→ 164 (texturing cost), 932[A], 11[B] →103 (wall insulation material cost), 1.5[C] → 14 (hours), [D] →185 (labor cost, wall insulation), [E] →288 (total wall insulation cost), 1120[A], 20.4[B] →228 (ceiling material cost), 1[C] →11 (hours), [D]145 (ceiling labor cost, [E] →373 (total ceiling insulation cost), [f], A-15475 (grand total BF/SF), 3484 (grand total material cost), 4894 (grand total labor cost), 8378 (grand total cost for lumber, shingles, wallpaper, drywall and insulation).

Reference(s) Thomas, Paul I, How to Estimate Building Losses and Construction Costs, 2nd Ed., Prentice-Hall, Inc., 1971.

This program is a modification of the Users' Library program # 04457A submitted by Chet Langin.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	Enter program				
2	(Optional: Initialize series)		f	CL REG	
3	Enter labor rates: Paiter's rate	P. Rate	ENT↑		
	Carpenter's rate	C. Rate	f	B	P. Rate
4	Enter area	Area	A		
5	Enter cost per 100 S. F.	Cost	B		Cost
6	Enter labor factor per 100 S. F.	Hours	C		Hours
7	Find labor cost		D		Cost
8	Find material plus labor cost		E		Total
	(Optional: Enter labor factor for joint				
	system	Hours	C		Hours
	Find joint system cost		f	D	Cost
	Entering texturing labor factor	Hours	C		Hours
	Find texturing cost		f	D	Cost
	IMPORTANT--DO NOT TOTAL (KEY "E") AFTER				
	FINDING JOINT SYSTEM OR TEXTURING COST. IT				
	WOULD NOT FOWL UP THE SERIES, BUT THE ANSWER				
	WOULD BE MEANINGLESS.				
9	Repeat 2-8 as necessary				
10	Set for totals		f	A	
	Total BF/SF				BF/SF
	Total Material				Material
	Total labor				Labor
	Grand Total				Total
11	Go to next program				
	or				
	For new problem, go to 2				

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0	21 00	
002	.	-62	Rounds to internally
003	5	05	
004	+	-55	
005	INT	16 34	
006	RTN	24	
007	*LBLA	21 11	
008	STO4	35 04	Stores area
009	ST+1	35-55 01	
010	RTN	24	
011	*LBLB	21 12	
012	RCL4	36 04	Finds and store material cost
013	EEX	-23	
014	2	02	
015	÷	-24	
016	×	-35	
017	GSB0	23 00	
018	ST+2	35-55 02	
019	STO6	35 06	
020	RTN	24	
021	*LBLC	21 13	
022	RCL4	36 04	Finds and rounds labor hours
023	EEX	-23	
024	2	02	
025	÷	-24	
026	×	-35	
027	2	02	
028	×	-35	
029	GSB0	23 00	
030	2	02	
031	÷	-24	
032	RTN	24	
033	*LBLD	21 14	
034	RCL0	36 00	Carpenter rate
035	*LBL2	21 02	Finds and stores labor cost
036	×	-35	
037	GSB0	23 00	
038	STO7	35 07	
039	ST+3	35-55 03	
040	RTN	24	
041	*LBLa	21 16 14	Painter rate
042	RCL8	36 08	
043	GTO2	22 02	
044	*LBLE	21 15	Totals item
045	RCL6	36 06	
046	RCL7	36 07	
047	+	-55	
048	RTN	24	
049	*LBLa	21 16 11	
050	RCL1	36 01	Totals
051	RCL2	36 02	
052	ENT↑	-21	
053	ENT↑	-21	
054	RCL3	36 03	
055	+	-55	
056	RCL3	36 03	
057	X⇄Y	-41	
058	FRST	16-14	
059	RTN	24	
060	*LBLb	21 16 12	
061	STO0	35 00	Store labor rates
062	X⇄Y	-41	
063	STO8	35 08	
064	RTN	24	
065	R/S	51	

070 080 090 100 110

SET STATUS

FLAGS	ON	OFF	TRIG	DISP
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n ____

REGISTERS

0 Carpenter Rate	1 BF/SF Total	2 Mat. Total	3 Lab. Total	4 Area	5	6 Mat.	7 Lab.	8 Painter Rate	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title SHEATHING AND SUBFLOOR ESTIMATE

Contributor's Name Hewlett-Packard, Corvallis Division
Address 1000 N. E. Circle Blvd.
City Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables Given area to be covered, size of plywood, item cost and labor factor, finds gross area, material cost, labor hours, labor cost, and total cost. Intended for use with other estimate programs, but may be used separately.

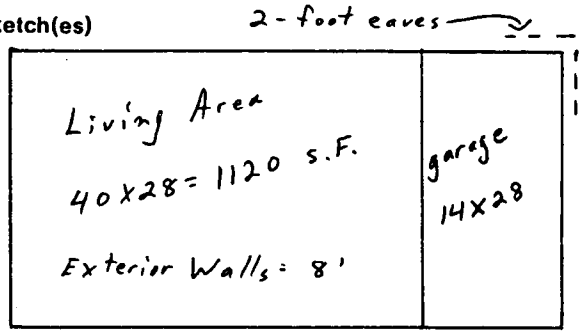
To find the gross area, divide the area to be covered by the size of the plywood (usually 32 square feet). Round the answer up to the nearest integer and multiply the integer by the size of the plywood (usu. 32). The gross area is used for the material cost and for determining the labor hours.

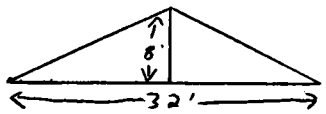
The labor factor is the number of hours it takes for a thousand square feet of plywood.

Operating Limits and Warnings Works only for plywood sheathing and subflooring. For boards, use Lumber Estimate. Rounds to the nearest one dollar and 1/2 hour. Local labor rate must be entered. Any errors must be manually subtracted from the involved registers.

Program Description 11

Sketch(es)





plain gable roof
pitch 1/4

Net subfloor area = 1120 S.F.
Net roof area = 2075 S.F.
Net ext. Wall area = 1093 S.F.

Sample Problem(s) Continue the construction estimate of the dwelling illustrated in Lumber Estimate, Shingle Estimate, Wallpaper Estimate, Drywall and Insulation Estimate and Wall and Ceiling Areas Estimate. The total cost from these programs is $8,378. For sheathing and subflooring, find the material cost, labor hours, labor cost, and item totals and add this to the $8,378.

Please note: The roof area of 2,075 square feet was determined in Shingle Estimate, and the exterior wall area of 1,093 was determined in Wall and Ceiling Areas Estimate.

Use labor factors of 14 for the roof, 13 for the walls and 12 for the floor. Use costs of $320 per thousand square feet for the roof plywood, $200 for the wall, and $265 for the floor. Use a labor rate of $13.21.

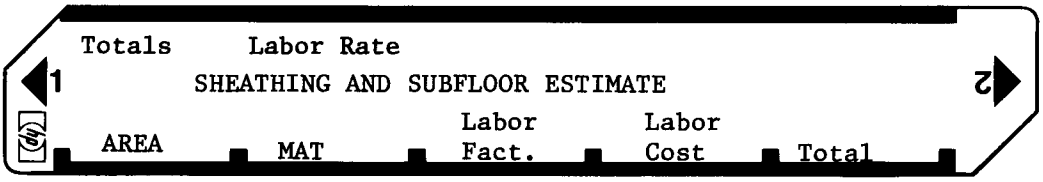
Solution(s) 13.21[f][B], 2075[ENT ↑] 32[A] →2080 (gross roof area), 320[B] →666 (roof mat. cost), 14[C] →29 (hours), [D] →383 (roof labor cost), [E] →1049 (total roof cost), 1093[ENT ↑], 32[A] →1120 (gross wall area), 200[B] →224 (wall mat. cost), 13[C] →14 1/2 (hours), [D] →192 (wall labor cost), [E] →416 (total wall cost), 1120 [ENT ↑], 32[A] →1120 (gross floor area), 265[B] →297 (floor mat. cost), 12[C] →13 1/2 (hours), [D] →178 (floor labor cost), [E] →475 (total floor cost), [f], [A] →19795 (grand total BF/SF), 4671 (grand total mat. cost), 5647 (grand total labor cost), 10318 (grand total cost for lumber, shingles, 5647 (grand total labor cost), 10318 (grand total cost for lumber, shingles, wallpaper, drywall, insulation, sheathing and subfloor).

Reference(s)

National Construction Estimator, 23rd Ed., 1975, Craftsman Book Co., Solano Beach, Calif.

How to Estimate Building Losses and Construction Costs, 2nd Ed., 1971, Prentice-Hall. This program is a translation of the HP-65 Users' Library program #04478A submitted by Chet Langin.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS		OUTPUT DATA/UNITS
1	Enter program				
2	(Optional: Initialize series)		f	CL REG	
3	Enter labor rate	Rate	f	B	Rate
4	Enter net area	Area	ENT↑		
5	Enter plywood area	Area	A		Gross Area
6	Enter cost per 1,000 S. F.	Cost	B		Mat. Cost
7	Enter labor factor	Factor	C		Hours
8	Find labor cost		D		Lab. Cost
9	Find line total		E		Total
10	Repeat 3-9, as needed				
11	For totals		f	A	
	Board feet/square feet totals				BF/SF
	Mat. total				Mat.
	Lab. total				Lab.
	Grand total				Total
12	Go to next program				
	or				
	For new problem, go to 2				

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0	21 00	
002	.	-62	
003	5	05	
004	+	-55	
005	INT	16 34	
006	RTN	24	
007	*LBLA	21 11	
008	STO5	35 05	
009	X≠Y	-41	
010	GSB0	23 00	
011	X≠Y	-41	
012	÷	-24	
013	.	-62	
014	4	04	
015	9	09	
016	+	-55	
017	GSB0	23 00	
018	RCL5	36 05	
019	×	-35	
020	ST+1	35-55 01	
021	STO4	35 04	Stores gross area
022	RTN	24	
023	*LBLB	21 12	
024	RCL4	36 04	Finds material cost
025	EEX	-23	
026	3	03	
027	÷	-24	
028	×	-35	
029	GSB0	23 00	
030	ST+2	35-55 02	
031	STO6	35 06	
032	RTN	24	
033	*LBLC	21 13	
034	RCL4	36 04	Finds labor hours
035	EEX	-23	
036	3	03	
037	÷	-24	
038	×	-35	
039	2	02	
040	×	-35	
041	GSB0	23 00	
042	2	02	
043	÷	-24	
044	RTN	24	
045	*LBLD	21 14	
046	RCL0	36 00	Carpenter's rate
047	×	-35	
048	GSB0	23 00	Finds labor cost
049	STO7	35 07	
050	ST+3	35-55 03	
051	RTN	24	
052	*LBLE	21 15	
053	RCL6	36 06	Finds item cost
054	RCL7	36 07	
055	+	-55	
056	RTN	24	
057	*LBLa	21 16 11	
058	RCL1	36 01	Totals
059	RCL2	36 02	
060	ENT↑	-21	
061	ENT↑	-21	
062	RCL3	36 03	
063	+	-55	
064	RCL3	36 03	
065	X≠Y	-41	
066	PRST	16-14	
067	RTN	24	
068	*LBLb	21 16 12	Labor rate
069	STO0	35 00	
070	RTN	24	
071	R/S	51	

080 090 100 110

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0 Labor Rate	1 BF/SF Total	2 Material Total	3 Labor Total	4 Area	5 Factor	6 Material	7 Labor	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title PAINTING ESTIMATE

Contributor's Name Hewlett-Packard, Corvallis Division
Address 1000 N. E. Circle Blvd.
City Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables Given area to be painted, cost per gallon coverage per gallon, and labor factor, finds material cost, labor hours, labor cost and total cost. Intended for use with other estimate programs, but may be used separately.

The labor factor is the number of square feet that can be painted in one hour.

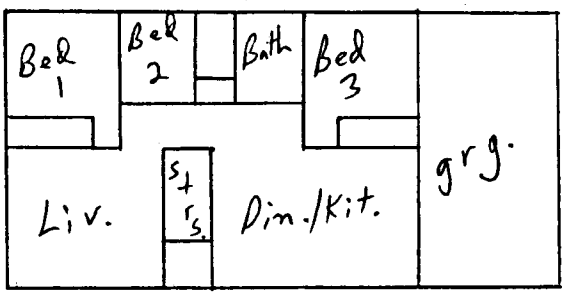
Either the gross area method, net area method or gross plus method may be used. The gross area method includes the square foot area of an entire wall, inclusive of windows and doors.
The net area method excludes windows and doors from the wall area, then considers them separately.

The gross plus method includes windows and doors, but then considers additional items.

Operating Limits and Warnings Figures rounded to nearest one dollar and 1/2 hour. Local labor rate must be entered. Errors must be manually subtracted from the involved registers.

Program Description 11

Sketch(es)



Exterior Gross Area = 1312 S.F.
Interior Gross Area = 5276 S.F.
Less Bed 2 = 332 S.F.
Less Bath ceiling = 50 S.F.
Add basement = 176 S.F.
Total Interior To Be Painted: 5070 S.F.

Sample Problem(s) Continue the construction estimate of the dwelling illustrated in Lumber Estimate, Shingle Estimate, Wallpaper Estimate, Drywall and Insulation Estimate, Wall and Ceiling Areas Estimate and Sheathing and Subfloor Estimate. The total cost from these programs is $10,318. For the painting, find the material cost labor hours, labor cost, and total cost and add this to the $10,318. Use the gross area method.

Please note: The areas near the sketch were determined from the Wall and Ceiling Area Estimate.

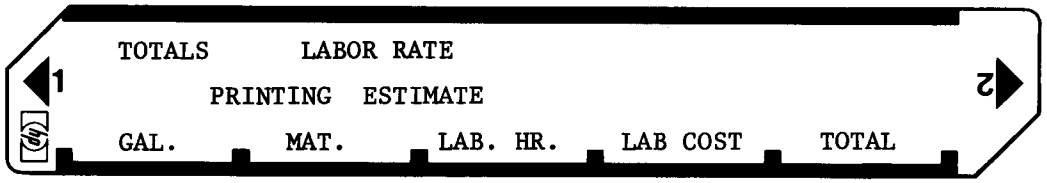
Use labor factors of 150 for the interior and 125 for the exterior. Use spread rates of 400 square feet per gallon for the exterior and 450 for the interior. Use costs of $10 per gallon exterior and $9.50 interior. Double the above areas for 2 coats. Use a labor rate of $11.28 per hour.

Solution(s) 11.28[f][B], 2624[ENT ↑], 400[A] →7, 10[B]→70, 125[C]→(hours),[D]→237 (ext. labor cost), [E] →307 (total ext. cost), 10140[ENT ↑], 450[A] →23 (gallons) 9.5[B] →219 (cost of int. paint), 150[C] →67 1/2 (hours), [D] →761 (int. labor cost), [E]980 (total int. cost), [f][A] →19795 (total Board Feet/Square Feet--used later to determine lbs. of nails), 4960 (total material cost), 6645 (total labor cost), 11605 (grand total cost for lumber, shingles, wallpaper, drywall, insulation, sheathing, subflooring, and painting.)

Reference(s) National Construction Estimator, 1975, Craftsman Book Co.
How to Estimate Building Losses and Construction Costs, Prentice-Hall.

This program is a modification of the Users' Library program #04477A submitted by Chet Langin.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	(Optional: Initialize series)		f CL REG	
3	Enter labor rate for painting	Rate	f B	Rate
4	Enter Area	Area	ENT↑	
5	Enter coverage per gallon	Coverage	A	# Gals.
6	Enter Cost per gallon	Cost	B	Mat.
7	Enter labor factor	Labor Factor	C	Hours
8	Find labor cost		D	Lab.
9	Find Line total		E	Total
10	Repeat 2 - 9 as needed			
11	Totals		f A	
	Total BF/SF			Total
	Total Mat.			Mat.
	Total Lab.			Lab.
	Grand total			Total
12	Go to next program			
	or			
	For new problem, go to 2			

97 Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0	21 00	
002	.	-62	
003	5	05	
004	+	-55	
005	INT	16 34	
006	RTN	24	
007	*LBLA	21 11	
008	X≠Y	-41	
009	STO4	35 04	
010	X≠Y	-41	
011	÷	-24	
012	.	-62	
013	4	04	
014	9	09	
015	+	-55	
016	GSB0	23 00	
017	STO5	35 05	
018	RTN	24	
019	*LBL8	21 12	
020	RCL5	36 05	
021	×	-35	
022	GSB0	23 00	
023	ST+2	35-55 02	
024	STO6	35 06	
025	RTN	24	
026	*LBLC	21 13	
027	RCL4	36 04	
028	X≠Y	-41	
029	÷	-24	
030	2	02	
031	×	-35	
032	GSB0	23 00	
033	2	02	
034	÷	-24	
035	RTN	24	
036	*LBLD	21 14	
037	RCL0	36 00	
038	×	-35	
039	GSB0	23 00	
040	STO7	35 07	
041	ST+3	35-55 03	
042	RTN	24	
043	*LBLE	21 15	
044	RCL6	36 06	
045	RCL7	36 07	
046	+	-55	
047	RTN	24	
048	*LBLa	21 16 11	
049	RCL1	36 01	
050	RCL2	36 02	
051	ENT↑	-21	
052	ENT↑	-21	
053	RCL3	36 03	
054	+	-55	
055	RCL3	36 03	
056	X≠Y	-41	
057	PRST	16-14	
058	RTN	24	
059	*LBLb	21 16 12	
060	STO0	35 00	Labor rate
061	X≠Y	-41	
062	STO8	35 08	
063	RTN	24	
064	R/S	51	

Rounds internally

Stores area

Finds gallons

Finds mat. cost

Finds labor hours

Painter rate

Finds labor cost

Finds line total

Totals

SET STATUS

FLAGS	ON	OFF	TRIG		DISP	
0	☐	☒	DEG	☒	FIX	☒
1	☐	☒	GRAD	☐	SCI	☐
2	☐	☒	RAD	☐	ENG	☐
3	☐	☒			n 2	

REGISTERS

0 Labor Rate	1 SF/AF Total	2 Mat. Total	3 Lab. Total	4 Area	5 Gal.	6 Mat.	7 Lab.	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

Program Description I

Program Title WOOD FLOOR ESTIMATE

Contributor's Name Hewlett-Packard, Corvallis Division

Address 1000 N. E. Circle Blvd.

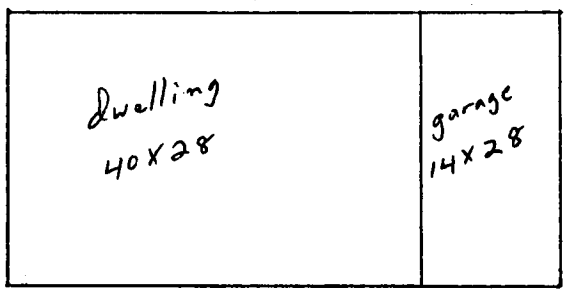
City Corvallis **State** OR **Zip Code** 97330

Program Description, Equations, Variables Given net area, gross area, material unit cost and labor factor, finds material cost, labor hours, labor cost and item total. Also totals columns for material cost, labor cost and total cost when used with other estimate programs.

Operating Limits and Warnings Rounds to nearest one dollar and 1/2 hour. Local labor rate must be entered. Errors must be manually subtracted from the involved registers.

Program Description 11

Sketch(es)



Net area 1120 Sq. Ft.
33⅓% waste 373
Gross area 1493 Sq. Ft.

Sample Problem(s) Continue the construction estimate of the dwelling illustrated in Lumber Estimate, Shingle Estimate, Wallpaper Estimate, Drywall and Insulation Estimate, Wall and Ceiling Areas Estimate, Sheathing and Subfloor Estimate, and Painting Estimate. The total cost from these programs is $11,605. For the flooring, find the material cost, labor hours, labor cost, and total cost and add this to the $11,605. Do it in four steps: One, flooring; two, sanding; three, filler; and four, seal and finish.

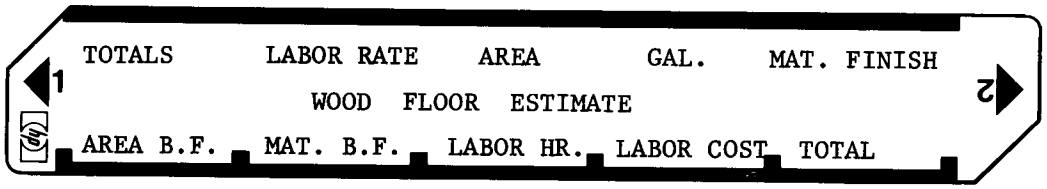
Use a waste factor of 33 1/3 % for 1x3 boards. Use a labor factor of 32 hours per 1,000 board feet (in this case, the same as square feet). Use a cost of $1,120 per 1,000 board feet. Use labor factors of 100 square feet per hour for sanding, 180 for filler, and 450 for seal and finish. Use spread rates of 500 square feet per gallon for filler and 400 for seal and finish. Use a cost of $7.50 per gallon for the filler and $11.00 for the seal and finish. Use a labor rate of $13.34 per hour.

Solution(s) Keystrokes: 13.34[f][B], 1493[A], 1120[B] →1672 (material cost for wood), 32[C] → 48 (hours), [D] →640 (labor cost), [E]2312 (total installation cost), 1120 [f][C], 100[C] → 11 (sanding hours), [D] →147 (sanding labor hours), 500[f][D] → 3 (gallons of filler), 7.5[f][E] →23 (cost of filler), 180[C] →6 (hours), [D] →80 (filler labor cost), [E] →103 (total filler cost),2240[f][C],400[f][D]→6(gallons of finish), 11[f][E] →66 (cost of finish), 450[C] →5 (hours), [D] →67 (finish labor cost), [E] → 133 (total finish cost), [f][A] →21288 (accumulative BF/SF), 6721 (accumulative material cost), 7579 (accumulative labor cost), 14300 (accumulative cost for lumber, shingles, wallpaper, drywall, insulation sheathing, subfloor, painting and flooring.

Reference(s) How to Estimate Building Losses and Construction Costs, 2nd Ed., by Paul I. Thomas, Prentice-Hall.

THIS PROGRAM IS A MODIFICATION OF THE USERS' LIBRARY PROGRAM #04580A SUBMITTED BY CHET LANGIN.

User Instructions



STEP	INSTRUCTIONS	INPUT DATA/UNITS	KEYS	OUTPUT DATA/UNITS
1	Enter program			
2	(Optional: Initialize series)		f CL REG	
3	Enter labor rate for hardwood floor worker	Rate	f B	Rate
4	Enter Gross area	Area	A	
5	Enter cost per 1,000 BF	Cost	B	Cost
6	Enter labor factor	Factor	C	Hours
7	Find labor cost		D	Cost
8	Find line total		E	Total
	(Optional: For prefinished floors, skip			
	9-15 and go to 16			
9	Enter net area	Area	f C	
	(Optional: For seal and finish, double net			
	area before entering)			
10	Enter coverage per gallon 10 + 11	S. F.	f D	# Gals.
	(Optional: For sanding, skip)			
11	Enter cost per gallon	Cost	f E	Cost
12	Enter labor factor	Factor	C	Hours
13	Find labor cost		D	Cost
14	Find line total		E	Total
	(Optional: For sanding, skip 15. Incorrect			
	answer will result for this item, but series			
	will not be disturbed.)			
15	Repeat 9-15, for sanding, filler and seal			
	and finish.			
16	Repeat 1-16, as necessary			
17	For totals		f A	
	BF/SF grand total			BF/SF
	Mat. total			Mat.
	Lab total			Lab.
	Grand total			Total
18	Go to next program			
	or			
	For new problem, go to 2			

Program Listing I

STEP	KEY ENTRY	KEY CODE	COMMENTS
001	*LBL0	21 00	
002	.	-62	
003	5	05	Rounds internally
004	+	-55	
005	INT	16 34	
006	RTN	24	
007	*LBLA	21 11	
008	CF1	16 22 01	
009	STO4	35 04	Stores area and clear flag for flooring
010	ST+1	35-55 01	
011	RTN	24	
012	*LBLB	21 12	
013	RCL4	36 04	
014	EEX	-23	
015	3	03	Finds material cost
016	÷	-24	
017	×	-35	
018	GSB0	23 00	
019	ST+2	35-55 02	
020	STO6	35 06	
021	RTN	24	
022	*LBLC	21 13	
023	F1?	16 23 01	
024	GTO1	22 01	Flooring? No, go to 1; yes, find labor hours
025	RCL4	36 04	
026	EEX	-23	
027	3	03	
028	÷	-24	
029	×	-35	
030	2	02	
031	^	-35	
032	GSB0	23 00	
033	2	02	
034	÷	-24	
035	RTN	24	
036	*LBLD	21 14	
037	RCL0	36 00	Hardwood floor worker rate
038	×	-35	
039	GSB0	23 00	
040	STO7	35 07	Finds + stores labor cost
041	ST+3	35-55 03	
042	RTN	24	
043	*LBLE	21 15	
044	RCL6	36 06	
045	RCL7	36 07	Total
046	+	-55	
047	RTN	24	
048	*LBLa	21 16 11	
049	RCL1	36 01	
050	RCL2	36 02	Totals
051	ENT↑	-21	
052	ENT↑	-21	
053	RCL3	36 03	
054	+	-55	
055	RCL3	36 03	
056	X≷Y	-41	
057	PRST	16-14	
058	RTN	24	
059	*LBLb	21 16 12	
060	STO0	35 00	Labor rate
061	RTN	24	
062	*LBLc	21 16 13	Store area and set flag for finish
063	STO4	35 04	
064	SF1	16 21 01	
065	RTN	24	
066	*LBLd	21 16 14	
067	RCL4	36 04	Find # gallons
068	X≷Y	-41	
069	÷	-24	
070	.	-62	
071	4	04	
072	5	09	
073	↑	-55	
074	GSB0	23 00	
075	STO5	35 05	
076	RTN	24	
077	*LBLe	21 16 15	
078	RCL5	36 05	Find material cost
079	×	-35	
080	GSB0	23 00	
081	ST+2	35-55 02	
082	STO6	35 06	
083	RTN	24	
084	*LBL1	21 01	
085	RCL4	36 04	Finds labor hours
086	X≷Y	-41	
087	÷	-24	
088	2	02	
089	×	-35	
090	GSB0	23 00	
091	2	02	
092	÷	-24	
093	RTN	24	
094	R/S	51	

100

110

SET STATUS

FLAGS			TRIG	DISP
	ON	OFF		
0	☐	☒	DEG ☒	FIX ☒
1	☐	☒	GRAD ☐	SCI ☐
2	☐	☒	RAD ☐	ENG ☐
3	☐	☒		n 2

REGISTERS

0 Labor Rate	1 BF/SF Total	2 Mat.Tot.	3 Lab. Total	4 Area	5 Gal.	6 Mat.	7 Labor	8	9
S0	S1	S2	S3	S4	S5	S6	S7	S8	S9

A	B	C	D	E	I

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HOME CONSTRUCTION

These programs will give the user the ability to estimate the costs of material and labor for basic construction jobs. The assumptions (about design) made by these programs restrict their use to estimating costs for single floor rectangular construction.

CONCRETE VOLUME

LINEAR TO BOARD FEET CONVERSION AND COSTING

FRAMING BOARD FEET

LUMBER ESTIMATE

SHINGLE ESTIMATE

WALL & CEILING AREAS ESTIMATE

WALLPAPER ESTIMATE

DRYWALL AND INSULATION ESTIMATE

SHEATHING AND SUBFLOOR ESTIMATE

PAINTING ESTIMATE

WOOD FLOOR ESTIMATE

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