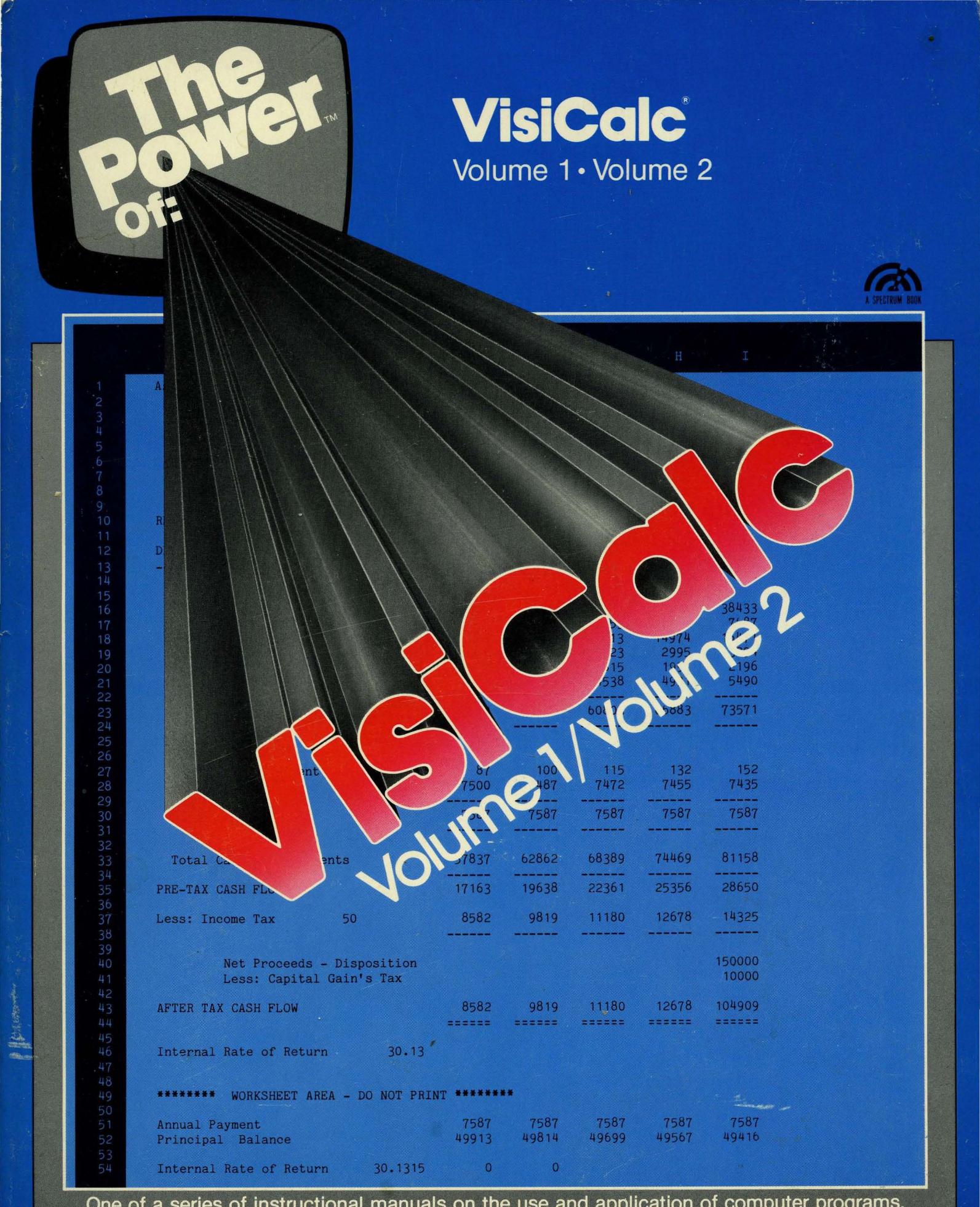
The Power of: VisiCalc®

Volume 1 • Volume 2

A SPECTRUM BOOK



One of a series of instructional manuals on the use and application of computer programs.

The Power™ Of: VisiCalc®

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MIS
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A SPECTRUM BOOK

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The first seven exercises of this book are from the original book The Power Of: ™VisiCalc written by Robert E. Williams and Bruce Taylor. The last 5 exercises are from the original book The Power Of: ™VisiCalc Volume II written by Robert E. Williams and Brian King.

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PREFACE

The Power Of: VisiCalc is a book of exercises designed especially for users and potential users of the VisiCalc computer program. By performing these simple step-by-step exercises, you will rapidly gain an ability to utilize the broad range of VisiCalc capabilities that make it a most powerful software program available for personal size computers.

Better than an instruction book, The Power Of: VisiCalc demonstrates the use of VisiCalc features through specific application samples.

The Power Of: VisiCalc will show you how to expand your use of VisiCalc, no matter what your application. These twelve easy-to-follow exercises are designed to help you understand and use VisiCalc operations. Business owners, accountants, financial analysts, homeowners, manufacturers, engineers, educators, scientists, architects, students, or anyone with a problem that can be solved using a computer, will find The Power Of: VisiCalc an invaluable companion to their VisiCalc program.

No special training is needed to benefit from the exercises in The Power Of: VisiCalc. All instructions are in plain English. The logic of each step is clearly spelled out, so you can later apply the information to your specific needs. The Power Of: VisiCalc will become your most valuable reference book as you expand your use of VisiCalc.

IF YOU OWN, OR ARE THINKING OF OWNING, VisiCalc,
YOU SHOULD OWN THIS BOOK

INTRODUCTION

The exercises in this book have been purposely designed to provide an opportunity to easily follow the logic of VisiCalc functions, and then apply those functions to specific problem-solving situations. Each exercise is self-contained. Each demonstrates some special ability or abilities we have used in solving clients' problems. The discovery of some of these abilities, we feel, is unique to our use, since we have not found anyone else who knows of their existence.

The VisiCalc format is arranged on the computer screen in columns and rows. The VisiCalc format is illustrated in Figure 1. The columns are identified by letter designations, the rows by numbers. Each position where a column and row intersect is a coordinate, or location, like on a street map. The relationships between values in these coordinates are determined by simple instructions entered into the coordinates in the form of algebraic formulas. (Don't get panicky; that just means (a + b) and other similar expressions.) Visualizing the street map image and following the exercises, you will easily and quickly catch on to the power of VisiCalc and how it can work for you.

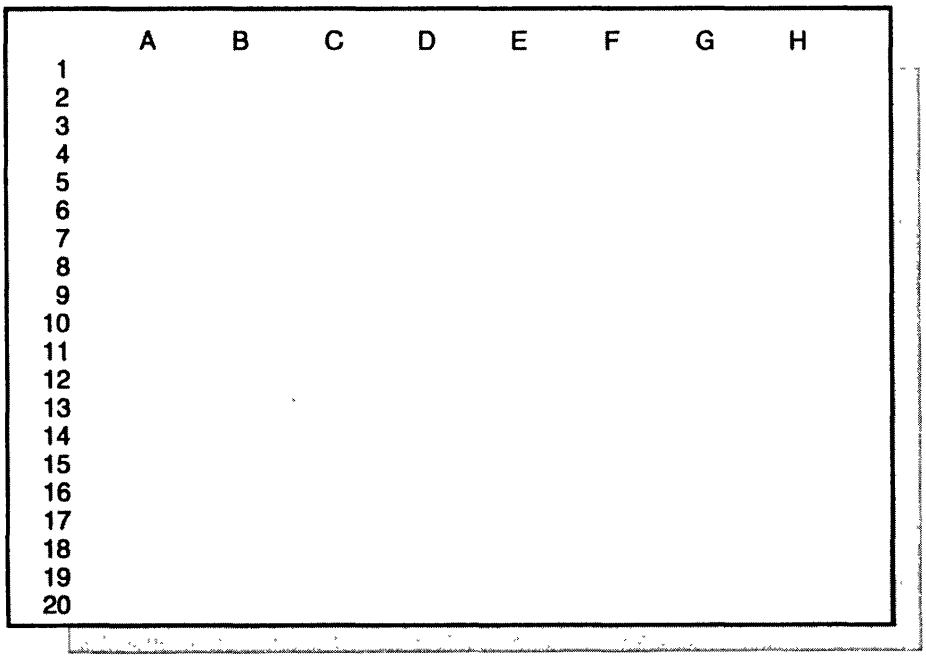


Figure 1.

CONTENTS

CONTENTS

ACCOUNTS RECEIVABLE AGEING REPORT

DESCRIPTION

The VisiCalc ability to move specific blocks of data to disk storage has been employed in this example to shift values from one area of the worksheet for reentry in other worksheet areas for referencing and for use in formulas.

To demonstrate VisiCalc's ability, an Accounts Receivable Ageing Report ledger has been set up. To age the accounts listed, an updating operation is performed once a month. Current accounts and those over 30 days old, along with a blank column immediately to their left, are moved to a storage disk, then reentered on the ledger sheet, repositioned one column to the right. The over 60 day and over 90 day values are moved to a storage disk, then reentered in a WORK AREA for an accumulating function.

OPERATIONS PERFORMED

Setting Up The Format

Entering Mathematical Formulas

Making Ledger Entries

Ledger Updating

Making Monthly Entries

Making Additional Entries

Saving

Printing

FUNCTIONS USED

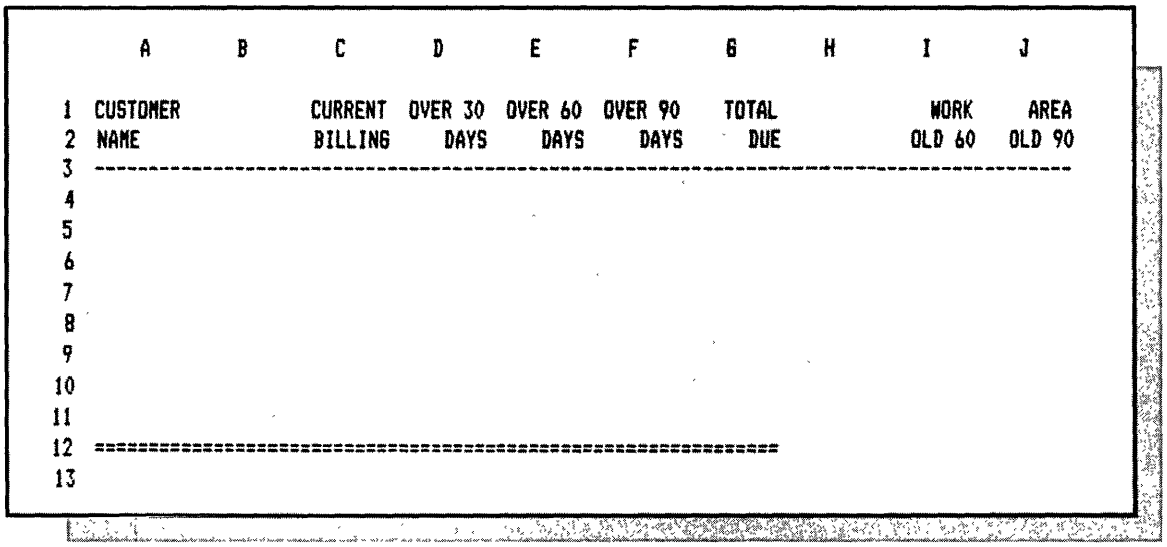
SUM
#

COMMANDS USED

DELETE	R= row
FORMAT	R= justifies right
GLOBAL	$= displays in dollars and cents
INSERT	R= row
REPEAT LABEL	
REPLICATE	copies
STORAGE	#= saves a Data Interchange Format file

SETTING UP THE FORMAT

Using the following directions, set up your ledger sheet by copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.



	A	B	C	D	E	F	G	H	I	J
1	CUSTOMER		CURRENT	OVER 30	OVER 60	OVER 90	TOTAL		WORK	AREA
2	NAME		BILLING	DAYS	DAYS	DAYS	DUE		OLD 60	OLD 90
3	----------									
4										
5										
6										
7										
8										
9										
10										
11										
12	==========									
13										

Figure 1

To format all locations to display value entries in dollars and cents, type:

/G	starts GLOBAL command
F	FORMAT
$	displays in dollars and centers

To enter your column headings, place your cursor where you wish to make the entry and type:

/F	starts FORMAT command
R	justifies right

Type in your column title. Depress your cursor (arrow) key to move to your next location.

Depressing the cursor key in this operation both enters your column title into the location and moves your cursor automatically to your next typing location. Type in the rest of your column headings using the sequence of commands above.

To enter dashed lines on your ledger sheet, place your cursor in the left-most column of the row where you want the line (line A3 in this example). Type:

/—	starts REPEAT LABEL command

—	label to be repeated
RETURN	executes the command

The column your cursor is on will now have a line of dashes across its width. To extend the dashed line in the same row across the remaining columns, leave your cursor where it is and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B3	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
J3	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns you have indicated by your coordinates. To enter a double-dashed line on the ledger sheet, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationships between column and row positions. The formulas and their locations are illustrated in Figure 2.

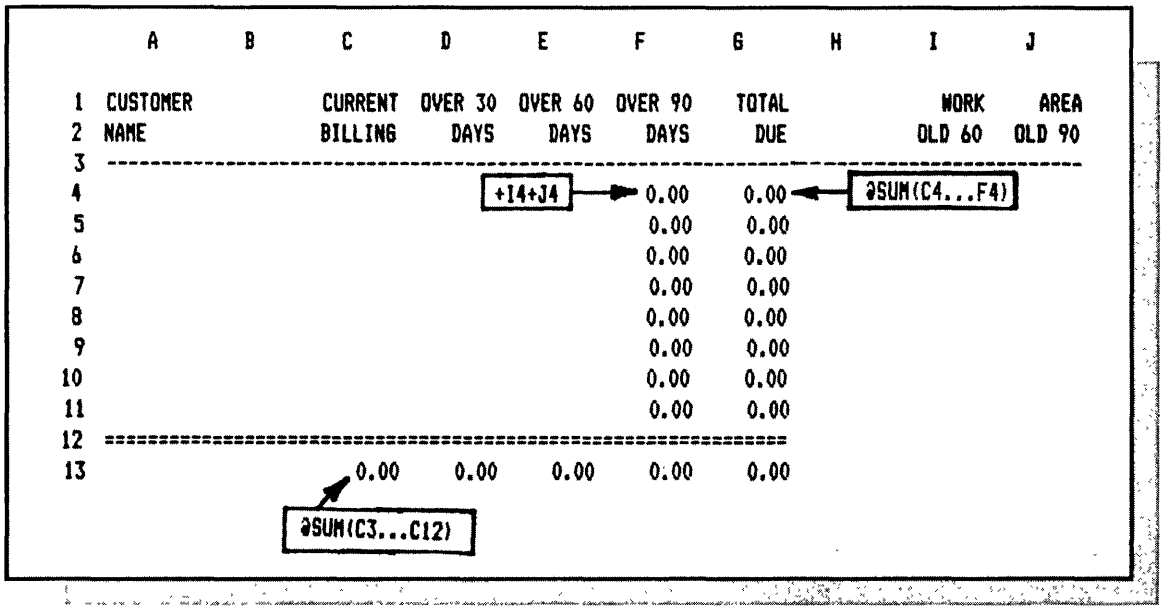


Figure 2

1 EXERCISE

Formula one will add the values in the CURRENT BILLING column.

Place your cursor on C13 and type:

@SUM(	adds values in the list
C3	first coordinate of the column that you wish to add
.	ellipsis . . . indicates from-to
C12)	last coordinate of the column that you wish to add
RETURN	enters the formula

Your next operation is to copy the formula just entered at the bottom of each column you wish to add.

Leave your cursor on C13 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in C13
D13	first coordinate where you wish to copy the formula across columns
.	ellipsis . . . indicates from-to
G13	last coordinate where you wish to copy the formula across columns
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula two will add the values in the two WORK AREA columns, and display the answer in the OVER 90 DAYS column. This value will reflect the accumulated value of accounts receivable held more than 90 days.

Place your cursor on F4 and type:

+	prepares coordinate to accept a numeric expression
I4	coordinate containing Old 60 Work Area
+	adds
J4	coordinate containing Old 90 Work Area
RETURN	enters the formula

Formula three, in the TOTAL DUE column, adds the SUM of the values in each column in the row to the left.

Place your cursor on G4 and type:

@SUM(	adds values in the list
C4	first coordinate of the row that you wish to add
.	ellipsis . . . indicating from-to
F4)	last coordinate of the row that you wish to add
RETURN	enters the formula

It will now be necessary to copy the two formulas just entered into each row in their respective columns (OVER 90 DAYS and TOTAL DUE).

Place your cursor on F4 and type:

/R	starts REPLICATE command
G4	copy all entries across columns F4 to G4
RETURN	prepares to receive additional information
F5	first coordinate where you wish to copy the formulas down columns
.	ellipsis . . . indicating from-to
F11	last coordinate where you wish to copy the formulas down columns

RETURN	executes the command and prepares to receive additional instructions
R R R R	tells the command to copy the coordinate address in the formula relative to its new location

MAKING LEDGER ENTRIES

Your accounts Receivable Ageing Ledger is now set up. Once a month, all you have to do is perform the update process, described in the next section, and make current billing entries. To perform the following series of exercises, type in the entries illustrated in Figure 3. For this example, entries have been selected to illustrate a ledger in operation more than 90 days.

NOTES

Do not type in the OVER 90 DAYS column. The value to be shown in the OVER 90 DAYS column should be typed in the adjacent row of the OLD 90 column in the WORK AREA. It will be displayed in the OVER 90 DAYS column by the formula entered there.

Never enter values in coordinates containing formulas, or the formulas will be erased.

Column B must remain blank for this example.

	A	B	C	D	E	F	G	H	I	J
1	CUSTOMER		CURRENT	OVER 30	OVER 60	OVER 90	TOTAL		WORK	AREA
2	NAME		BILLING	DAYS	DAYS	DAYS	DUE		OLD 60	OLD 90
3	---		---	---	---	---	---		---	---
4	ACME CO.			45.00		0.00	45.00			
5	BELL CO.				25.00	45.00	70.00			45.00
6	KOLL CO.			56.58		0.00	56.58			
7	MAXEL CO.					89.00	89.00			89.00
8	REDDY CO.				35.00	0.00	35.00			
9	AJAX CO.		75.16			15.00	90.16			15.00
10	ZIPLOK		84.00			0.00	84.00			
11	MULTI-CR		3578.00			0.00	3578.00			
12	==========		==========	==========	==========	==========	==========			
13			3737.16	101.58	60.00	149.00	4047.74			

Figure 3

LEDGER UPDATING

To perform the updating process, you will transfer the values in column B (blank) and the CURRENT BILLING and OVER 30 DAYS columns into a disk storage file. You will then move the values in the OVER 60 DAYS and OVER 90 DAYS columns into a separate disk storage file. In the third step, you will reenter the value in column B (blank) and the CURRENT BILLING and OVER 30 DAYS columns repositioned one column to the right. This moves each of the values to the right, into its new ageing column, and clears the CURRENT BILLING column.

The final step in the updating process reenters the values from the OVER 60 DAYS and OVER 90 DAYS columns into the WORK AREA columns OLD 60 and OLD 90. The formula in the over 90 DAYS column adds the sums on each row of these two columns and displays the results in the OVER 90 DAYS column as cumulative totals for each customer listed.

Place your cursor on B4 (the upper-left coordinate of the rectangular ledger sheet area you wish to copy into the stored file).

Type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
S	saves
SIXTYDAY	name of file; do not type spaces between words
RETURN	prepares to receive additional information
D11	lower-right coordinate of the rectangle of value entries to be saved
RETURN	prepares to receive additional instructions
C	saves the values in column format and executes the command

1 EXERCISE

Place your cursor on E4 (the upper-left coordinate of the rectangular ledger sheet area you wish to copy into the stored file) and type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
S	saves
NINETYDAY	name of file; do not type spaces between words
RETURN	prepares to receive additional information
F11	lower-right coordinate of the rectangle of value entries to be saved
RETURN	prepares to receive additional instructions
C	saves the values in column format and executes the command

The third step in the updating operation reenters the values from the SIXTYDAY file on the ledger sheet one column to the right.

Place your cursor on C4 (the upper-left coordinate of the rectangular ledger sheet area where you wish the values to be reentered).

Type:

/S	starts STORAGE command
#	loads a (DIF) Data Interchange Format file
L	loads
SIXTYDAY	name of file; do not type spaces between words
RETURN	prepares to receive additional instructions
C	loads the values in column format and executes the command

The final operation enters the values from the NINETYDAY file into the WORK AREA columns.

Place your cursor on I4 (the upper-left coordinate of the rectangular ledger sheet area where you wish the values to be reentered). Type:

/S	starts STORAGE command
#	loads a (DIF) Data Interchange Format file
L	loads
NINETYDAY	name of file; do not type spaces between words
RETURN	prepares to receive additional instructions
C	loads the values in column format and executes the command

You have now completed your monthly update of existing entries. Your ledger should now look like Figure 4. You are ready to enter the transactions that have accumulated during the month just passed.

	A	B	C	D	E	F	G	H	I	J
1	CUSTOMER		CURRENT	OVER 30	OVER 60	OVER 90	TOTAL		WORK	AREA
2	NAME		BILLING	DAYS	DAYS	DAYS	DUE		OLD 60	OLD 90
3	----------									
4	ACME CO.				45.00	0.00	45.00			0.00
5	BELL CO.					70.00	70.00		25.00	45.00
6	KOLL CO.				56.58	0.00	56.58			0.00
7	MAXEL CO.					89.00	89.00			89.00
8	REDDY CO.					35.00	35.00		35.00	0.00
9	AJAX CO.			75.16		15.00	90.16			15.00
10	ZIPLOK			84.00		0.00	84.00			0.00
11	MULTI-CR			3578.00		0.00	3578.00			0.00
12	==========									
13			0.00	3737.16	101.58	209.00	4047.74			

Figure 4

MAKING MONTHLY ENTRIES

Monthly ledger entries will take one of two forms: payments and current billings.

To make current billing entries, type them directly into the CURRENT BILLINGS column.

To make a payment entry into the OVER 30 DAYS or the OVER 60 DAYS columns, place your cursor on the value you wish to deduct from and type:

#	prepares to use value
—	subtracts

Type in payment value:

RETURN	enters the value

To make a payment entry into the OVER 90 DAYS column, place your cursor on the adjacent row in the WORK AREA column containing a value and type:

#	prepares to use value
—	subtracts

Type in payment value:

RETURN	enters the value

MAKING ADDITIONAL ENTRIES

To add entries, you will have to add new rows. New entries may be made at the end of the existing list, or alphabetically. All SUM functions that add column totals will automatically adjust to include the new rows as long as you insert the rows between the coordinates in the original formula. Formulas performing other functions within the columns expanded, however, will have to be entered into the new entry coordinates in each column where a formula is used. These existing formulas can be copied into the new coordinates individually or by using the REPLICATE COMMAND.

To insert a new row, place your cursor on the row you wish to move down and a blank row inserted.

/I	starts INSERT command
R	inserts row and executes the command

You may now begin entering formulas where necessary, then begin making your new entries.

SAVING

In some instances you may wish to store your work format or completed work onto a disk file for later retrieval.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
FILENAME	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper left coordinate of the worksheet area rectangle you wish to print and type:

/P	starts PRINT command
P	printer

Type in the lower right-hand coordinate address of the worksheet area rectangle you wish to print and type:

RETURN	executes the command

INVOICING FROM INVENTORY

DESCRIPTION

This exercise illustrates the ability of VisiCalc to select values from reference tables and to use those values in problem solving. The exercise also illustrates the calculation of a value from predetermined limits on a graduated scale, and changing a value within a set to include application of discount, sales tax, or some other modifying factor.

To demonstrate VisiCalc's ability, an Invoicing from Inventory worksheet is used. Inventory numerical identification, description and quantity are entered on lines in the invoice. The invoice format then automatically calculates the single price for each item and the total for the quantity ordered, adds the invoice total, applies a discount and sales tax factor and displays a grand total. A sales commission is calculated from the invoice net value and displayed in a salesperson commission report.

OPERATIONS PERFORMED

Setting Up The Format

Entering Mathematical Formulas

Making Additional Entries

Making Additional Entries

Saving

Printing

FUNCTIONS USED

LOOKUP

MAX

MIN

SUM

COMMANDS USED

FORMAT	R = justifies right
FORMAT	$ = displays in dollars and cents
GLOBAL	O = changes order of calculation
GLOBAL	C = adjusts column width
INSERT	R = row
PRINT	
REPEAT LABEL	
REPLICATE	copies
STORAGE	S = saves; L = loads

SETTING UP THE FORMAT

To set up your beginning format, use the following directions, copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.

The VisiCalc worksheet format contains columns nine spaces wide when it is first entered into the computer. Column width may be expanded using the following commands. In this exercise, you will use columns with 14 spaces.

To add spaces to your columns, type:

/G	starts GLOBAL command
C	column width
14	number of spaces per column
RETURN	executes the command

The VisiCalc worksheet format normally calculates values in a column-by-column sequence, starting in the left-most column and continuing to the right. In this exercise, a number of formulas require row-by-row calculation to be in proper sequence. The VisiCalc worksheet may be changed to a top-to-bottom row-by-row calculating sequence with a format change.

To change the order of calculation, type:

/G	starts GLOBAL command
O	order of calculation
R	calculates

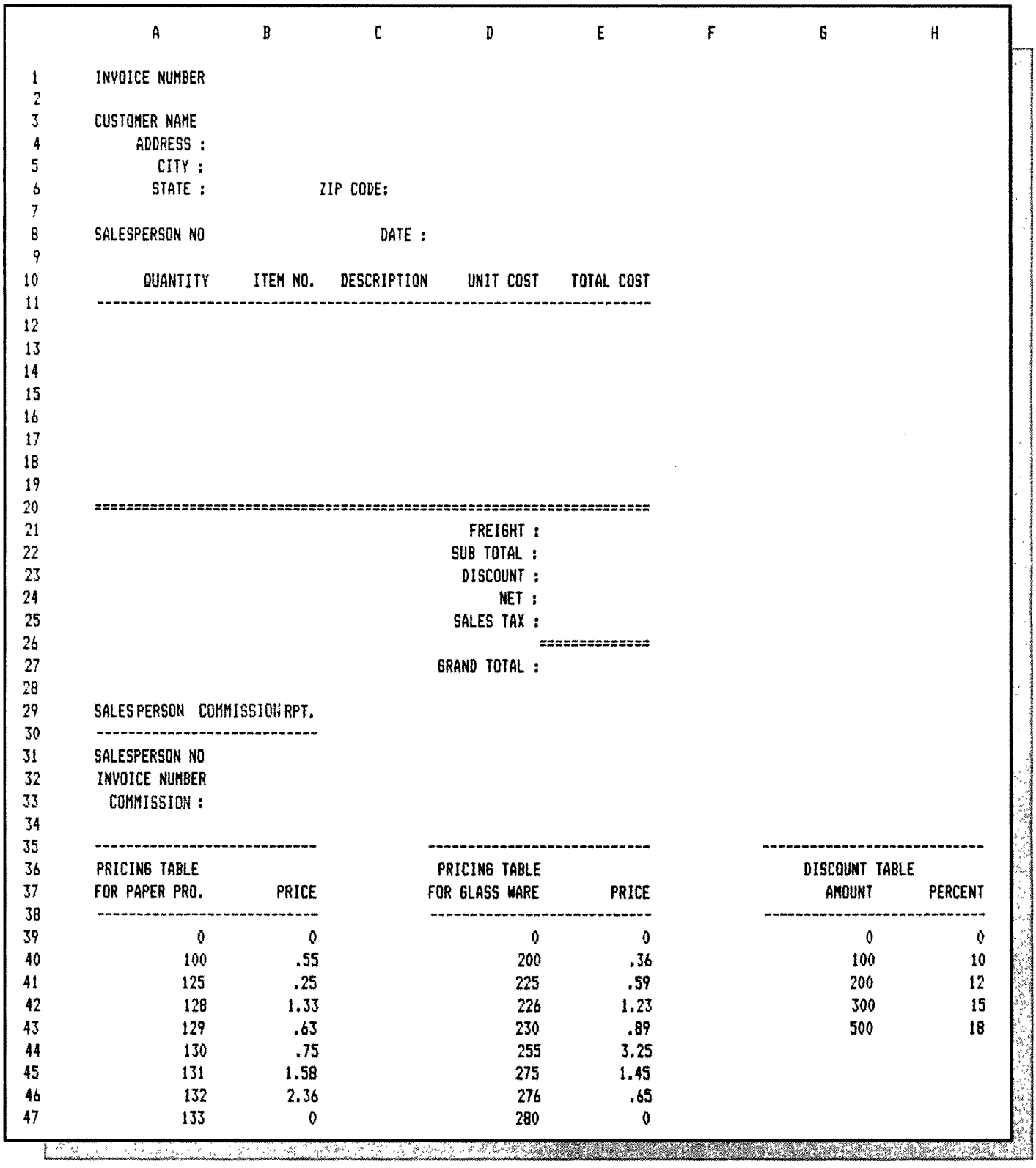
To enter your column headings, place your cursor where you wish to make the entry and type:

/F	starts FORMAT command
R	justifies right

Type in your column title. Depress your cursor (arrow) key to move to your next location.

Depressing the cursor key in this operation both enters your column label into the location and moves your cursor automatically to your next typing location. Type in the rest of your column headings using the sequence of commands above.

To enter dashed lines, place your cursor in the left-most column of the row where you want the line (line All in this example).



	A	B	C	D	E	F	G	H
1	INVOICE NUMBER							
2								
3	CUSTOMER NAME							
4	ADDRESS :							
5	CITY :							
6	STATE :		ZIP CODE:					
7								
8	SALESPERSON NO			DATE :				
9								
10	QUANTITY	ITEM NO.	DESCRIPTION	UNIT COST	TOTAL COST			
11	----------							
12								
13								
14								
15								
16								
17								
18								
19								
20	==========							
21				FREIGHT :				
22				SUB TOTAL :				
23				DISCOUNT :				
24				NET :				
25				SALES TAX :				
26					==========			
27				GRAND TOTAL :				
28								
29	SALES PERSON COMMISSION RPT.							
30	----------							
31	SALESPERSON NO							
32	INVOICE NUMBER							
33	COMMISSION :							
34								
35	----------		----------			----------		
36	PRICING TABLE		PRICING TABLE			DISCOUNT TABLE		
37	FOR PAPER PRO.	PRICE	FOR GLASS WARE	PRICE		AMOUNT	PERCENT	
38	----------		----------			----------		
39	0	0	0	0		0	0	
40	100	.55	200	.36		100	10	
41	125	.25	225	.59		200	12	
42	128	1.33	226	1.23		300	15	
43	129	.63	230	.89		500	18	
44	130	.75	255	3.25				
45	131	1.58	275	1.45				
46	132	2.36	276	.65				
47	133	0	280	0				

Figure 1

Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column your cursor is on will now have a line of dashes across its width. To extend the dashed line in the same row across the remaining columns, type:

/—	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B11	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
E11	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns you have indicated by your coordinates. To enter a double-dashed line on your invoice, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationships between column and row positions. The formulas and their locations are illustrated in Figure 2.

Formula one will search two reference tables for the inventory number (ITEM NO.) listed on the invoice, pick up the price listed in the table to the right of that number and enter it in the UNIT COST column on the invoice. The tables in this exercise have been purposely set up to demonstrate multi-table search capability. Because of the unique features contained in this operation, an extensive description of the logic has been provided.

The LOOKUP function is used to control selection of the appropriate table and to locate the desired value in the selected table. Two LOOKUP functions are used in this example, to search for the desired value in each of two tables.

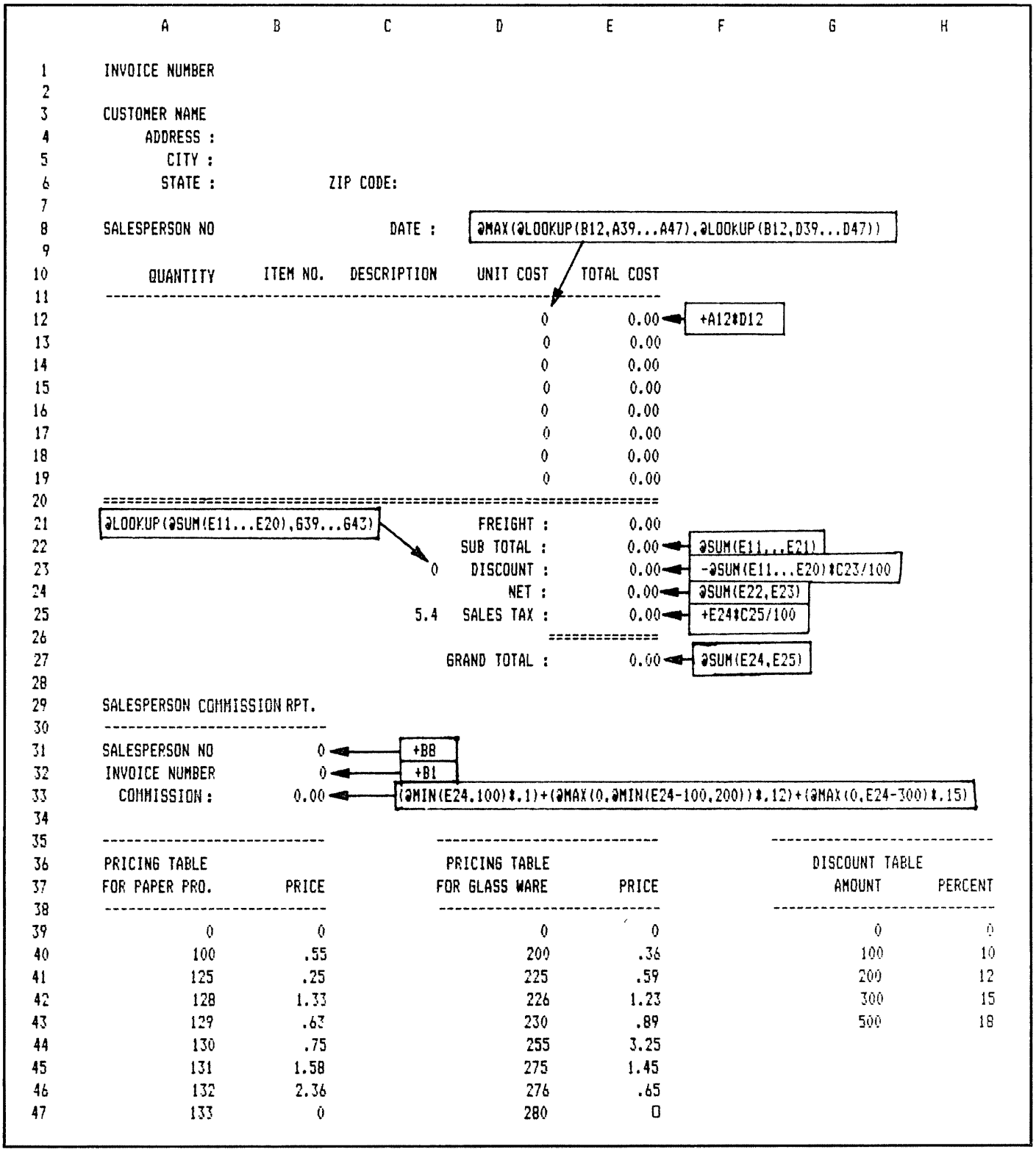

INVOICE NUMBER
CUSTOMER NAME
ADDRESS :
CITY :
STATE :
ZIP CODE:
SALESPERSON NO
DATE :
@MAX(@LOOKUP(B12,A39...A47),@LOOKUP(B12,D39...D47))
QUANTITY
ITEM NO.
DESCRIPTION
UNIT COST
TOTAL COST
+A12*D12
@LOOKUP(@SUM(E11...E20),G39...G43)
FREIGHT :
SUB TOTAL :
@SUM(E11...E21)
DISCOUNT :
-@SUM(E11...E20)*C23/100
NET :
@SUM(E22,E23)
SALES TAX :
+E24*C25/100
GRAND TOTAL :
@SUM(E24,E25)
SALESPERSON COMMISSION RPT.
SALESPERSON NO
+B8
INVOICE NUMBER
+B1
COMMISSION :
(@MIN(E24,100)*.1)+(@MAX(0,@MIN(E24-100,200))*.12)+(@MAX(0,E24-300)*.15)
PRICING TABLE FOR PAPER PRO.
PRICE
PRICING TABLE FOR GLASS WARE
PRICE
DISCOUNT TABLE
AMOUNT
PERCENT

Figure 2

2 EXERCISE

When a LOOKUP function fails to detect a value as large as that it has been asked to search for, it will select the largest value in the table and enter the number to the right of it into the formula. To accommodate the LOOKUP search from the end of one column to the beginning of the next, zero has been listed to the right of the last number in each column. If the LOOKUP number is larger than the last number in a column, it will pick up and enter the value opposite the last number in the formula.

If the LOOKUP value is smaller than the first whole number in a table, it will display ERROR. In this exercise, zero has been listed in the first position of each table to enable the LOOKUP function to pick up and use the number to the right of that first listing when the first whole number is less than the LOOKUP number. The value 0 is listed to the right of these first position entries to supply that value to the formula.

In the table containing the LOOKUP value, the LOOKUP function will pick up and enter the number to the right of that value into the formula. In the table not containing the LOOKUP value, the LOOKUP function will pick up and list zero into the formula. The formula is constructed to select the largest value selected by the LOOKUP functions contained within it.

To enter formula one,
Place your cursor on D12 and type:

@MAX(	selects the maximum value of the following list
@LOOKUP(	starts LOOKUP function
B12,	coordinate containing value to look up
A39	first coordinate in the reference table
.	ellipsis . . . indicating from-to
A47)	last coordinate in the reference table
,	comma-separates values in the list
@LOOKUP(	starts LOOKUP function
B12,	coordinate containing value to look up

D39	first coordinate in the reference table
.	ellipsis . . . indicating from-to
D47))	last coordinate in the reference table
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula two multiples the QUANTITY by UNIT COST and displays it in the TOTAL COST column in dollars and cents format.

Place your cursor on E12 and type:

+A12	coordinate containing quantity
*	multiplies
D12	coordinate containing unit cost
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Your next operation is to copy the formulas just entered at the top of each column into each row in the respective columns.

Place your cursor on D12 and type:

/R	starts REPLICATE command
E12	copies all entries across columns D12 to E12
RETURN	prepares to receive additional information
D13	first coordinate where you wish to copy the formulas down columns
.	ellipsis . . . indicating from-to

D19	last coordinate where you wish to copy the formulas down columns
RETURN	executes the command and prepares to receive additional instructions
R	tells the command to copy the coordinate address in the formula relative to its new location
N N R N N R R	tells the command to copy the coordinate address in the formula in its new location without change

Formula three will add the sum of the values in the TOTAL COST column above the double-dashed line and the FREIGHT value. The answer will be displayed as SUB TOTAL, in dollars and cents format.

Place your cursor on E22 and type:

@SUM(	adds values in the list
E11	first coordinate of the column that you wish to add
.	ellipsis . . . indicating from-to
E21)	last coordinate of the column that you wish to add
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula four determines the discount rate by using a LOOKUP function that will use the sum of the TOTAL COST column to select an appropriate discount rate from the DISCOUNT TABLE (containing a graduated set of values) and display it to the left of DISCOUNT.

Place your cursor on C23 and type:

@LOOKUP(	starts LOOKUP function
@SUM(	adds values in the list
E11	first coordinate of the column that you wish to add

.	ellipsis . . . indicating from-to
E20)	last coordinate of the column that you wish to add
,	comma-separates LOOKUP value from discount table coordinates
G39	first coordinate in the discount table
.	ellipsis . . . indicating from-to
G43)	last coordinate in the discount table
RETURN	enters the formula

Formula five will add the sum of the TOTAL COST column above the double-dashed line, multiply the result by the discount rate and divide the answer by 100 to arrive at a percentage value. The resulting discount allowance will be displayed on the DISCOUNT line in dollars and cents as a negative value.

Place your cursor on E23 and type:

—@SUM(	adds values in the list and displays the result as a negative value
E11	first coordinate of the column that you wish to add
.	ellipsis . . . indicates from-to
E20)	last coordinate of the column that you wish to add
*	multiplies
C23	coordinate containing discount rate
/	divides
100	number used to arrive at percentage value
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula six uses the SUM function to calculate the value of the SUB TOTAL less DISCOUNT. The result will be displayed on the NET line in dollars and cents format.

Place your cursor on E24 and type:

@SUM(	adds values in the list
E22	coordinate containing sub total
,	comma-separates values in the list
E23)	coordinate containing discount
RETURN	enters formula
/F	starts FORMAT command
$	displays in dollars and cents

The next operation enters the sales tax rate.

Place your cursor on C25 and type:

5.4	sales tax rate used in the example
RETURN	enters the value

Formula seven determines sales tax on the net invoiced amount. Multiply the NET value times that rate and divide the result by 100 to arrive at a percentage value. The tax amount will then be displayed on the SALES TAX line in dollars and cents format.

Place your cursor on E25 and type:

+E24	coordinate containing net to be multiplied by sales tax rate
*	multiplies
C25	coordinate containing sales tax rate
/	divides
100	value
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula eight adds the NET and the SALES TAX values. The result will display on the GRAND TOTAL line in dollars and cents format.

Place your cursor on E27 and type:

@SUM(	adds values in the list
E24	coordinate containing net
,	comma-separates values in the list
E25)	coordinate containing sales tax
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formulas nine, ten and eleven will record the invoice and salesman's numbers on the SALES-PERSON COMMISSION RPT., and calculate the salesperson's commission. The commission will be determined by comparing the invoice NET value against a set of graduated values, then multiplying the NET value by the appropriate commission percentages. Commission rates used in this example are: 10 percent on the first $100, 12 percent on the next $200, and 15 percent on amounts over $300. The commission amount will be displayed on the COMMISSION line in dollars and cents format.

To enter formula nine,
Place your cursor on B31 and type:

+B8	enters the value in B8 in B31
RETURN	enters the formula

To enter formula ten,
Place your cursor on B32 and type:

+B1	enters the value in B1 in B32
RETURN	enters the formula

To enter formula eleven,
Place your cursor on B33 and type:

(@MIN(E24,100)	selects the minimum value, the value in E24 or 100
*	multiplies
.10)	sales commission percentage
+	adds

(@MAX(0,@MIN(E24-100,200))	selects the maximum value from the comparison of 0 and the minimum value derived by comparing the value in E24 minus 100, and 200
*	multiplies
.12)	sales commission percentage
+	adds
(@MAX(0,E24-300)	selects the maximum value, 0 or the value in E24 minus 300
*	multiplies
.15)	sales commission percentage
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Your Customer Invoice and Sales Commission Report format is now complete and ready for you to type in invoicing information and sales entries.

To observe the automatic functions of your invoice sheet, type entries into the QUANTITY and ITEM NO. columns. Some sample entries are contained in Figure 3.

	A	B	C	D	E	F	G	H
1	INVOICE NUMBER	123589						
2								
3	CUSTOMER NAME ACME COMPANY							
4	ADDRESS :SW PINE ST							
5	CITY :PORTLAND							
6	STATE :OREGON		ZIP CODE:	97523				
7								
8	SALESPERSON NO	22	DATE :JULY 14,81					
9								
10	QUANTITY	ITEM NO.	DESCRIPTION	UNIT COST	TOTAL COST			
11	----------	----------	----------	----------	----------			
12	12	225		.59	7.08			
13	125	132		2.36	295.00			
14	25	255		3.25	81.25			
15	36	125		.25	9.00			
16	48	129		.63	30.24			
17				0	0.00			
18				0	0.00			
19				0	0.00			
20	==========	==========	==========	==========	==========			
21				FREIGHT :	0.00			
22				SUB TOTAL :	422.57			
23			15	DISCOUNT :	-63.39			
24				NET :	359.18			
25			5.4	SALES TAX :	19.40			
26					==========			
27				GRAND TOTAL :	378.58			
28								
29	SALESPERSON COMMISSION RPT.							
30	----------							
31	SALESPERSON NO	22						
32	INVOICE NUMBER	123589						
33	COMMISSION :	42.88						
34								
35	----------		----------			----------		
36	PRICING TABLE		PRICING TABLE			DISCOUNT TABLE		
37	FOR PAPER PRO.	PRICE	FOR GLASS WARE	PRICE		AMOUNT	PERCENT	
38	----------	----------	----------	----------		----------	----------	
39	0	0	0	0		0	0	
40	100	.55	200	.36		100	10	
41	125	.25	225	.59		200	12	
42	128	1.33	226	1.23		300	15	
43	129	.63	230	.89		500	18	
44	130	.75	255	3.25				
45	131	1.58	275	1.45				
46	132	2.36	276	.65				
47	133	0	280	0				

Figure 3

MAKING ADDITIONAL ENTRIES

To add entries, you will have to add new rows. New entries may be made at the end of the existing list, or alphabetically. All SUM functions that add column totals will automatically adjust to include the new rows as long as you insert the rows between the coordinates in the original formula. Formulas performing other functions within the columns expanded, however, will have to be entered into the new entry coordinates in each column where a formula is used. These existing formulas can be copied into the new coordinates individually or by using the REPLICATE COMMAND.

To insert a new row, place your cursor on the row you wish to move down and a blank row inserted.

/I	starts INSERT command
R	inserts row and executes the command

You may now begin entering formulas where necessary, then begin making your new entries.

SAVING

In some instances you may wish to store your work format or completed work onto a disk file for later retrieval.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
FILENAME	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper left coordinate of the worksheet area rectangle you wish to print and type:

/P	starts PRINT command
P	printer

Type in the lower right-hand coordinate address of the worksheet area rectangle you wish to print and type:

RETURN	executes the command

COST RECOVERY

DESCRIPTION

In this exercise, you will use the VisiCalc ability to select the minimum or maximum of values when compared to a fixed value. The exercise is designed to record a declining balance as entries accumulate against the fixed value. An increasing positive balance is recorded when the fixed value is surpassed.

To demonstrate VisiCalc's abilities, a Cost Recovery worksheet has been set up listing the equipment stocked by an equipment rental company. Each piece of equipment offered for rent has been listed, and the purchase price entered in the ledger. As the company receives rental income from the equipment, the cumulative amount is entered on the ledger sheet once a month. Your ledger format deducts the rental income from the purchase price of the item rented and displays the declining balance until the full cost is recovered. It then enters the above-cost profits as they accumulate. Once a month, an operation is performed to advance the ageing record of the equipment listed, providing a record of how long each piece of equipment has been in service, and to update the ledger.

OPERATIONS PERFORMED

Setting Up The Format

Entering Mathematical Formulas

Making Ledger Entries

Ledger Updating

Making Additional Entries

Saving

Printing

FUNCTIONS USED

ABS

MAX

MIN

SUM

!	recalculates total ledger

COMMANDS USED

BLANK	deletes entry
FORMAT	R = justifies right
FORMAT	I = displays as integer
GLOBAL	$ = displays as dollars and cents
INSERT	R = row
REPEAT LABEL	
REPLICATE	copies
STORAGE	# = saves a Data Interchange Format file

SETTING UP THE FORMAT

To set up your ledger sheet, use the following directions, copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.

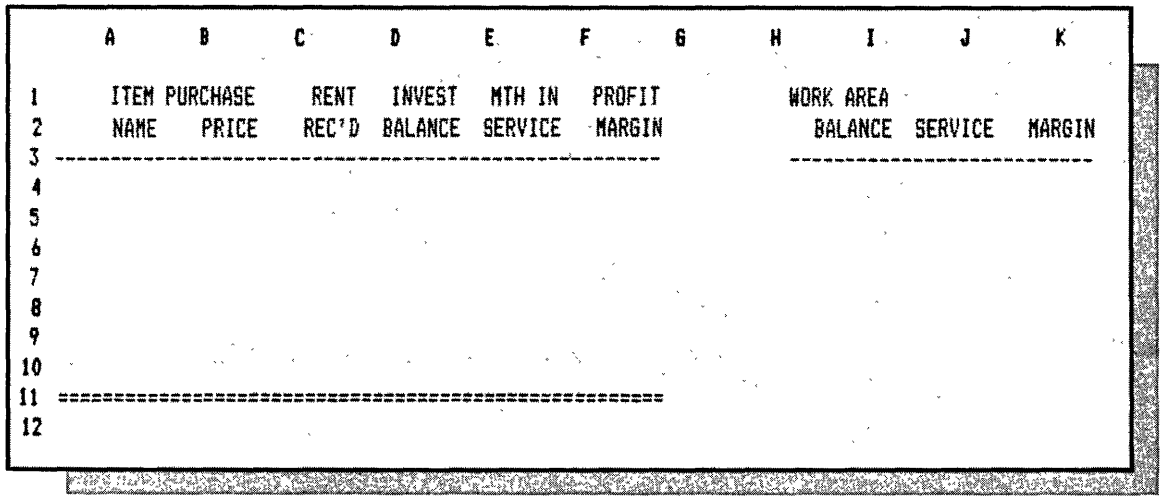


Figure 1

To format all locations to display value entries in dollars and cents, type:

/G	starts GLOBAL command
F	FORMAT
$	dollars and cents

To enter your column headings, place your cursor where you wish to make the entry and type:

/F	starts the FORMAT command
R	justifies right

Type in your column title.
Depress your cursor (arrow) key to move to your next location.

Depressing the cursor key in this operation both enters your column label into the location and moves your cursor automatically to your next typing location. Type in the rest of your column headings, using the sequence of commands above.

To enter dashed lines on your ledger sheet, place your cursor on the left-most column of the row where you want the line (A3 in this example).

Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column your cursor is on will now have a line of dashes across its width. To extend the dashed line in the same row across the remaining columns, leave your cursor where it is, and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B3	first coordinate in the row, from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
K3	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns you have indicated by your coordinates. To enter a double-dashed line on the ledger sheet, repeat the operations above, using the smbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationships between column and row positions. The formulas and their locations are illustrated in Figure 2.

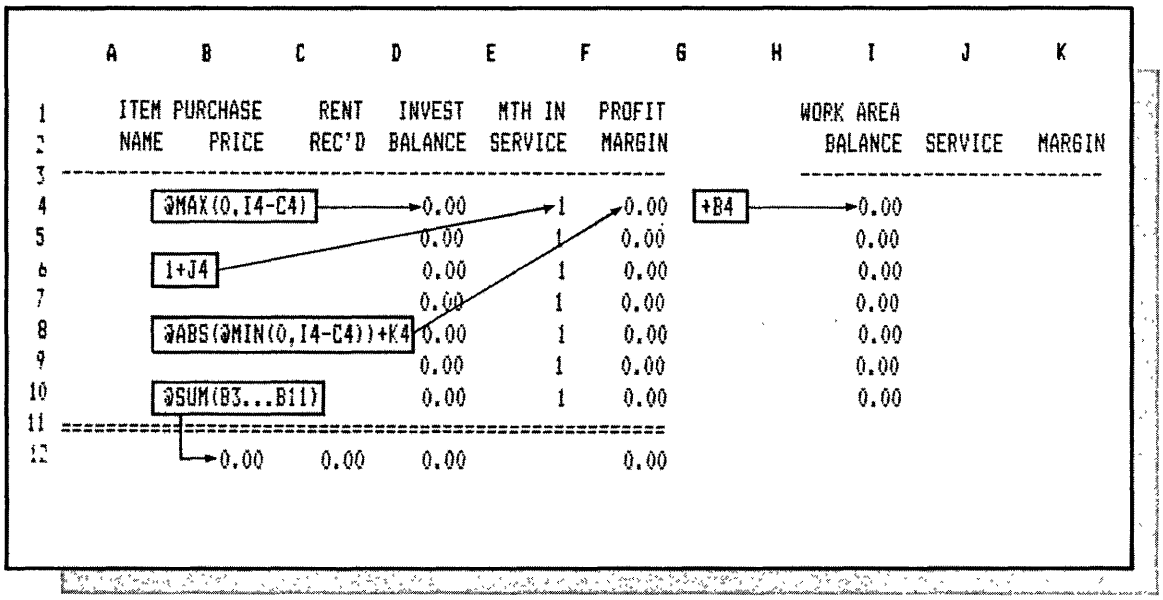


Figure 2

Formula one will provide a means for the INVEST BALANCE column to display the unrecovered purchase cost of each item listed. When the full purchase cost of each piece of equipment is recovered, the INVEST BALANCE column will display 0.00 opposite that item.

Place your cursor on D4 and type:

@MAX(0,I4-C4)	selects the maximum value, 0, or the value in I4-C4
RETURN	enters the formula

Formula two advances the number in the MTHS IN SERVICE column by one each time the updating operation is performed.

Place your cursor on E4 and type:

1+J4	adds 1 to the value in J4
RETURN	enters the formula
/F	starts FORMAT command
I	displays the value as an integer

Formula three displays accumulated gross profits in the PROFIT MARGIN Column when purchase cost of the listed item has been recovered.

Place your cursor on F4 and type:

@ABS	reads the answer to the following calculation as an absolute function
(@MIN(0,I4-C4))	selects the minimum value, 0, or the value in I4-C4
+K4	adds the value in K4 to the answer to the preceding calculation
RETURN	enters the formula

Formula four displays the original purchase price in a WORK AREA column.

Place your cursor on I4 and type:

+B4	enters the value in B4 in I4
RETURN	enters the formula

Your next operation is to copy the formulas just entered at the top of each column into each row in the respective columns.

Place your cursor on D4 and type:

/R	starts REPLICATE command
I4	copies all entries across columns D4 to I4
RETURN	prepares to receive additional information
D5	first coordinate where you wish to copy the formulas down columns

.	ellipsis . . . indicating from-to
D10	last coordinate where you wish to copy the formulas down columns
RETURN	executes the command and prepares to receive additional instructions
R R R R R R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula five uses the SUM function to total the PURCHASE PRICE column including the single and double dashed lines. The single and double dashed lines are put into the formula, so that later, when you insert or delete them, the coordinates in the formula will adjust properly.

Place your cursor on B12 and type:

@SUM(	adds values in the list
B3	first coordinate of the column that you wish to add
.	ellipsis . . . indicates from-to
B11)	last coordinate of the column that you wish to add
RETURN	enters the formula

Your next operation is to copy the formula just entered at the bottom of each column you wish to add.

Leave your cursor on B12 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in B12
C12	first coordinate where you wish to copy the formula across columns
.	ellipsis . . . indicating from-to
F12	last coordinate where you wish to copy the formula across columns

RETURN	executes the command and prepares to receive additional instructions
R	tells the command to copy the coordinate address in the formula
R	relative to its new location

You won't need the SUM formula at the bottom of the MTHS IN SERVICE column, so place your cursor on E12 and type:

/B	starts BLANK command
RETURN	executes the command

MAKING LEDGER ENTRIES

Your Cost Recovery Ledger is now set up so once a month all you have to do is perform the update process, described in the next section, and make current billing entries. To get your ledger operational, type in the entries in the ITEM NAME, PURCHASE PRICE and RENT REC'D columns in Figure 3 exactly as they are shown.

	A	B	C	D	E	F	G	H	I	J	K
1	ITEM	PURCHASE	RENT	INVEST	MTH IN	PROFIT			WORK AREA		
2	NAME	PRICE	REC'D	BALANCE	SERVICE	MARGIN			BALANCE	SERVICE	MARGIN
3	---	---	---	---	---	---			---	---	---
4	HAMMER	25.00	5.00	20.00	1	0.00			25.00		
5	TRAILER	675.00	155.00	520.00	1	0.00			675.00		
6	SHOVEL	55.00	89.00	0.00	1	34.00			55.00		
7	BIKE	255.00	15.00	240.00	1	0.00			255.00		
8	TRUCK	6500.00	250.00	6250.00	1	0.00			6500.00		
9	MOTOR	152.00	225.00	0.00	1	73.00			152.00		
10	AX	89.00	18.00	71.00	1	0.00			89.00		
11	==========	==========	==========	==========	==========	==========					
12		7751.00	757.00	7101.00		107.00					

Figure 3

LEDGER UPDATING

The first operation in the updating process is to transfer the values in the INVEST BALANCE, MTHS IN SERVICE and PROFIT MARGIN columns into a storage file on a disk. The values will be filed under the name MO.TOTALS. You will then recall the file and reenter the values into WORK AREA columns I, J and K.

Place your cursor on D4 (the upper-left coordinate of the rectangular area of your ledger sheet you wish to copy into the storage file).

3 EXERCISE

Type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
S	saves
MO.TOTALS	name of file; do not type spaces between words
RETURN	prepares to receive additional information
F10	lower-right coordinate of the rectangle of value entries to be saved
RETURN	prepares to receive additional instructions
C	saves the values in column format and executes the command

Your next operation will be to recall the stored MO.TOTAL file and position reenter the values in WORK AREA columns I, J and K.

Place your cursor on I4 (the upper-left coordinate of the ledger sheet area where you wish to reenter the stored values).

Type:

/S	starts STORAGE command
#	loads a (DIF) Data Interchange Format file
L	loads
MO.TOTALS	name of file; do not type spaces between words
RETURN	prepares to receive additional instructions
C	reenters the values in column format and executes the command

Now clear the RENT REC'D column.

Place your cursor on C4 and type:

/B	starts BLANK command
RETURN	clears the entry

Next, copy the blank in C4 down the remainder of the RENT REC'D column.

Leave your cursor on C4 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the blank your cursor is on
C5	first coordinate where you wish to copy the blank down the column
.	ellipsis . . . indicating from-to
C10	last coordinate where you wish to copy the blank down the column
RETURN	executes the command

Your ledger sheet should now look exactly like Figure 4.

	A	B	C	D	E	F	G	H	I	J	K
1	ITEM	PURCHASE	RENT	INVEST	MTH IN	PROFIT			WORK AREA		
2	NAME	PRICE	REC'D	BALANCE	SERVICE	MARGIN			BALANCE	SERVICE	MARGIN
3	---	---	---	---	---	---			---	---	---
4	HAMMER	25.00		20.00	2	0.00			20.00	1.00	0.00
5	TRAILER	675.00		520.00	2	0.00			520.00	1.00	0.00
6	SHOVEL	55.00		0.00	2	34.00			0.00	1.00	34.00
7	BIKE	255.00		240.00	2	0.00			240.00	1.00	0.00
8	TRUCK	6500.00		6250.00	2	0.00			6250.00	1.00	0.00
9	MOTOR	152.00		0.00	2	73.00			0.00	1.00	73.00
10	AX	89.00		71.00	2	0.00			71.00	1.00	0.00
11	==========	==========	==========	==========	==========	==========					
12		7751.00	0.00	7101.00		107.00					

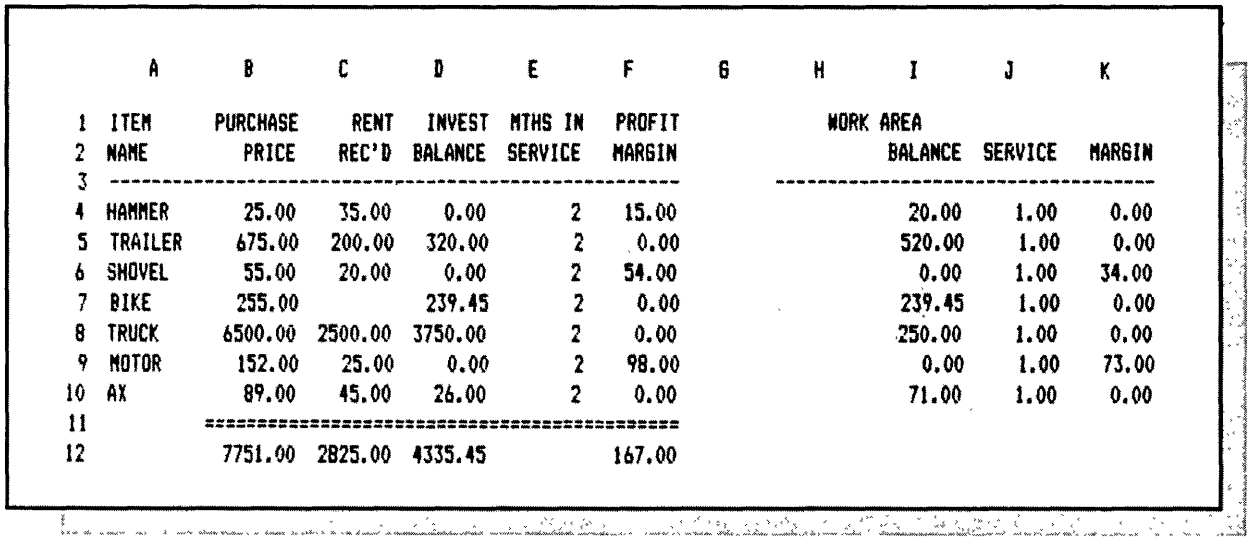
Figure 4

Your ledger is now ready for entry of the rental incomes for the preceding month. Type the entries in Figure 5 into the appropriate spaces in the RENT REC'D column.

When you have completed your RENT REC'D entries, type:

!	recalculate all formulas
!	

3 EXERCISE



	A	B	C	D	E	F	G	H	I	J	K
1	ITEM	PURCHASE	RENT	INVEST	MTHS IN	PROFIT			WORK AREA		
2	NAME	PRICE	REC'D	BALANCE	SERVICE	MARGIN			BALANCE	SERVICE	MARGIN
3											
4	HAMMER	25.00	35.00	0.00	2	15.00			20.00	1.00	0.00
5	TRAILER	675.00	200.00	320.00	2	0.00			520.00	1.00	0.00
6	SHOVEL	55.00	20.00	0.00	2	54.00			0.00	1.00	34.00
7	BIKE	255.00		239.45	2	0.00			239.45	1.00	0.00
8	TRUCK	6500.00	2500.00	3750.00	2	0.00			250.00	1.00	0.00
9	MOTOR	152.00	25.00	0.00	2	98.00			0.00	1.00	73.00
10	AX	89.00	45.00	26.00	2	0.00			71.00	1.00	0.00
11											
12		7751.00	2825.00	4335.45		167.00					

Figure 5

MAKING ADDITIONAL ENTRIES

To add entries, you will have to add new rows. New entries may be made at the end of the existing list, or alphabetically. All SUM functions that add column totals will automatically adjust to include the new rows as long as you insert the rows between the coordinates in the original formula. Formulas performing other functions within the columns expanded, however, will have to be entered into the new entry coordinates in each column where a formula is used. These existing formulas can be copied into the new coordinates individually or by using the REPLICATE COMMAND.

To insert a new row, place your cursor on the row you wish to move down and a blank row inserted.

/I	starts INSERT Command
R	inserts row and executes the command

You may now begin entering formulas where necessary, then begin making your new entries.

SAVING

In some instances you may wish to store your work format or completed work onto a disk file for later retrieval.
To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
FILENAME	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper left coordinate of the worksheet area rectangle you wish to print and type:

/P	starts PRINT command
P	printer

Type in the lower right-hand coordinate address of the worksheet area rectangle you wish to print and type:

RETURN	execute the command

PRODUCTION SCHEDULING

DESCRIPTION

You will use the ability of VisiCalc to calculate a value from a variable number base in this exercise. Movement of entire rows containing label and value entries, and recalculation of values as a result of those moves, are demonstrated; and VisiCalc's split window capability will be used to observe two sections of the worksheet at the same time. Changing the standard calculation sequence of the worksheet is also illustrated in this exercise.

To demonstrate VisiCalc's ability, a Production Scheduling worksheet for a stained glass lamp manufacturer has been set up to utilize the features described. Three weeks of plant production time are illustrated. The total number of shop hours available per week is entered, and this number is measured against the estimated hours required to complete customer work orders.

The scheduling sheet totals the number of shop hours in each department, calculates the remaining hours to maximum shop capacity and the percentage measurement of those remaining hours. A plant production summary displays the hourly totals for each week in the schedule, and the grand totals for the combined period.

Customer orders may be repositioned on the scheduling sheet from one week to another for planning or rescheduling purposes. The scheduling sheet will recalculate all values relative to the repositioning. With the entry of the month and the date of the first Monday of the scheduled week, the correct month and date will automatically be entered for the remaining sequential weeks.

OPERATIONS PERFORMED

Setting Up The Format

Entering Mathematical Formulas

Making Scheduling Sheet Entries

Rescheduling Entries

Making Additional Entries

Saving

Printing

FUNCTIONS USED

AVERAGE
INT
LOOKUP
MIN
SUM

COMMANDS USED

FORMAT	I = displays as integer
GLOBAL	O = changes order of calculation
INSERT	R = row
MOVE	R = row
REPEAT LABEL	
REPLICATE	copies
WINDOW	

SETTING UP THE FORMAT

To set up your production scheduling sheet, use the following directions, copying figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.

The VisiCalc worksheet format normally calculates values in a column-by-column sequence, starting in the left-most column and continuing to the right. In this exercise, a number of formulas require row-by-row calculation to be in proper sequence. The VisiCalc worksheet may be changed to a top-to-bottom row-by-row calculating sequence with a format change.

To change the order in which the worksheet will be calculated, type:

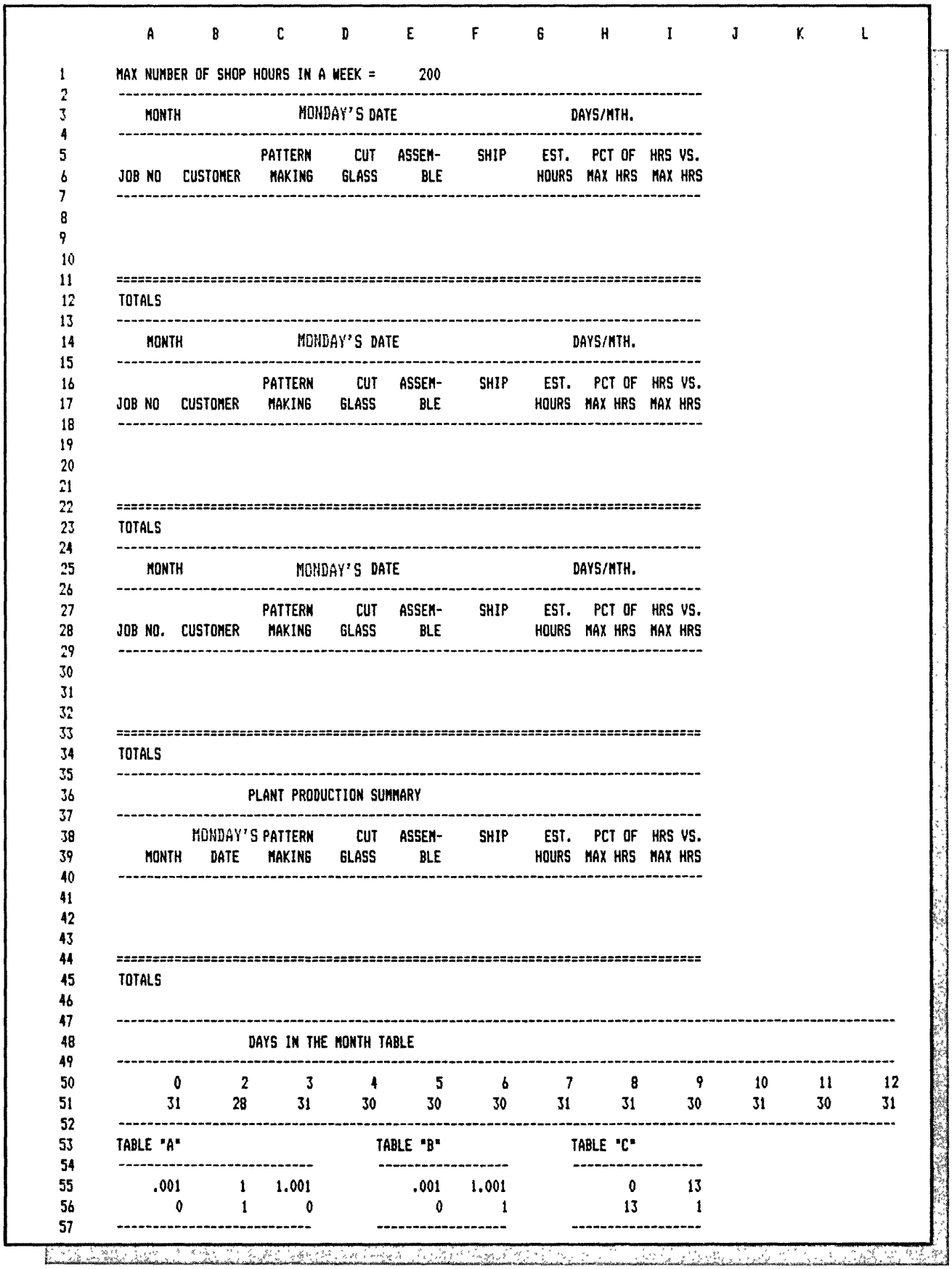
/G	starts GLOBAL command
O	order of calculation
R	calculates by row

To enter your column headings, type:

/F	starts FORMAT command
R	justifies right

Type in your column title. Depress your cursor (arrow) key to move to your next location.

Depressing the cursor key in this operation both enters your column label into the location and moves your cursor automatically to your next typing location. Type in the rest of your column headings using the sequence of commands bove.



	A	B	C	D	E	F	G	H	I	J	K	L
1	MAX NUMBER OF SHOP HOURS IN A WEEK =				200							
2												
3	MONTH			MONDAY'S DATE				DAYS/MTH.				
4												
5			PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
6	JOB NO	CUSTOMER	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
7												
8												
9												
10												
11												
12	TOTALS											
13												
14	MONTH			MONDAY'S DATE				DAYS/MTH.				
15												
16			PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
17	JOB NO	CUSTOMER	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
18												
19												
20												
21												
22												
23	TOTALS											
24												
25	MONTH			MONDAY'S DATE				DAYS/MTH.				
26												
27			PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
28	JOB NO.	CUSTOMER	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
29												
30												
31												
32												
33												
34	TOTALS											
35												
36				PLANT PRODUCTION SUMMARY								
37												
38		MONDAY'S	PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
39	MONTH	DATE	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
40												
41												
42												
43												
44												
45	TOTALS											
46												
47												
48				DAYS IN THE MONTH TABLE								
49												
50	0	2	3	4	5	6	7	8	9	10	11	12
51	31	28	31	30	30	30	31	31	30	31	30	31
52												
53	TABLE "A"			TABLE "B"			TABLE "C"					
54												
55	.001	1	1.001	.001	1.001		0	13				
56	0	1	0	0	1		13	1				
57												

Figure 1

To enter dashed lines on your ledger sheet, place your cursor on the left-most column of the row where you want the line (A3 in this example).

Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column your cursor is on will now have a line of dashes across its width. To extend the dashed line in the same row across the remaining columns, type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B2	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
I2	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns you have indicated by your coordinates. To enter a double-dashed line on the ledger sheet, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationships between column and row positions. The formulas and their positions are illustrated in Figure 2.

Formula one will total the estimated hours from the PATTERN MAKING, CUT GLASS, ASSEMBLE and SHIP columns in the EST. HOURS column.

Place your cursor on G8 and type:

@SUM(	adds values in the list

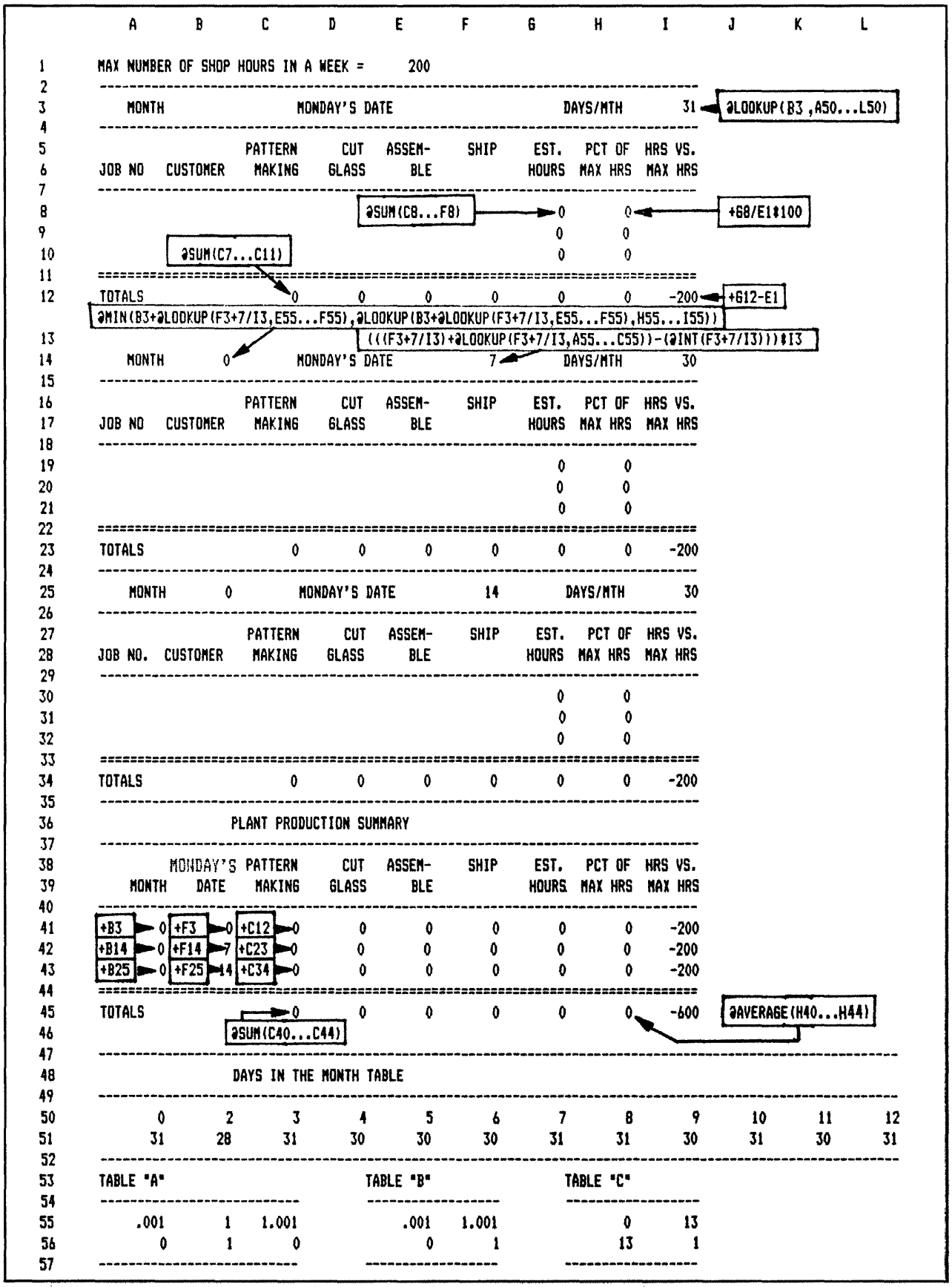

MAX NUMBER OF SHOP HOURS IN A WEEK = 200
MONTH MONDAY'S DATE DAYS/MTH 31
@LOOKUP(B3,A50...L50)
JOB NO CUSTOMER PATTERN MAKING CUT GLASS ASSEM-BLE SHIP EST. HOURS PCT OF MAX HRS HRS VS. MAX HRS
@SUM(C8...F8)
+G8/E1*100
@SUM(C7...C11)
TOTALS
+G12-E1
@MIN(B3+@LOOKUP(F3+7/I3,E55...F55),@LOOKUP(B3+@LOOKUP(F3+7/I3,E55...F55),H55...I55))
(((F3+7/I3)+@LOOKUP(F3+7/I3,A55...C55))-(@INT(F3+7/I3)))*I3
MONTH 0 MONDAY'S DATE 7 DAYS/MTH 30
MONTH 0 MONDAY'S DATE 14 DAYS/MTH 30
PLANT PRODUCTION SUMMARY
MONTH MONDAY'S DATE PATTERN MAKING CUT GLASS ASSEM-BLE SHIP EST. HOURS PCT OF MAX HRS HRS VS. MAX HRS
+B3
+F3
+C12
+B14
+F14
+C23
+B25
+F25
+C34
@SUM(C40...C44)
@AVERAGE(H40...H44)
DAYS IN THE MONTH TABLE
TABLE "A"
TABLE "B"
TABLE "C"

Figure 2

C8	first coordinate of the column that you wish to add
.	ellipsis . . . indicates from-to
F8)	last coordinate of the column that you wish to add
RETURN	enters the formula

Formula two calculates the percent each work order represents of the maximum hours available in the week by dividing the EST. HOURS column total for individual work orders by the maximum hours available. The result is multiplied by 100 to display the percentage value as a whole number.

Place your cursor on H8 and type:

+	prepares coordinate to accept a numeric expression
G8	coordinate containing estimated hours
/	divides
E1	coordinate containing maximum number of shop hours in a week
*	multiplies
100	number used to arrive at percentage value
RETURN	enters the formula
/F	starts FORMAT command
I	displays the value as an integer

Your next operation is to copy the formulas just entered into the remaining rows in their respective columns down to the dashed line.

Place your cursor on G8 and type:

/R	starts REPLICATE command
H8	copies all entries across columns G8 to H8
RETURN	prepares to receive additional information
G9	first coordinate where you wish to copy the formula down columns

.	ellipsis . . . indicating from-to
G10	last coordinate where you wish to copy the formula down columns
RETURN	executes the command and prepares to receive additional instructions
R R R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

Now copy the formulas for the EST. HOURS and PCT OF MAX HOURS columns into the same columns in the following sequential weeks, one at a time.

Leave your cursor on G8 and type:

/R	starts REPLICATE command
H8	copies all entries across columns G8 to H8
RETURN	prepares to receive additional information
G19	first coordinate where you wish to copy the formula down columns
.	ellipsis . . . indicates from-to
G21	last coordinate where you wish to copy the formula down columns
RETURN	executes the command and prepares to receive additional instructions
R R R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

To copy the formulas into the columns in the following sequential week, leave your cursor on G8 and type:

/R	starts REPLICATE command

H8	copies all entries across columns G8 to H8
RETURN	prepares to receive additional information
G30	first coordinate where you wish to copy the formula down columns
.	ellipsis . . . indicates from-to
G32	last coordinate where you wish to copy the formula down columns
RETURN	executes the command and prepares to receive additional instructions
R R R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

Formula three will add the total of values in the PATTERN MAKING Column.

Place your cursor on C12 and type:

@SUM(	adds values in the list
C7	first coordinate of the column that you wish to add
.	ellipsis . . . indicates from-to
C11)	last coordinate of the column that you wish to add
RETURN	enters the formula

Your next operation is to copy the formulas just entered at the bottom of each column you wish to add.

Leave your cursor on C12 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in C12

D12	first coordinate where you wish to copy the formula across columns
.	ellipsis . . . indicating from-to
H12	last coordinate where you wish to copy the formula across columns
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula four will compare the total estimated hours against the maximum shop hours available and display the difference at the bottom of the HRS VS. MAX HRS column. A negative value indicates hours remaining; a positive value, hours exceeded.

Place your cursor on I12 and type:

+	prepares coordinate to accept a numeric expression
G12	coordinate containing estimated hours
—	subtracts
E1	maximum number of shop hours in a week
RETURN	enters the formula

Your next operation is to copy the formulas just entered on the first week's TOTALS line into the TOTALS line of the next sequential week.

Place your cursor on C12 and type:

/R	starts REPLICATE command
I12	copies all entries across columns C12 to I12
RETURN	prepares to receive additional information
C23	first coordinate where you wish to copy the formula across columns
RETURN	executes the command and prepares to receive additional instructions

R R R R R R R R R R R R R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

Now, copy the formulas into the TOTALS line of the following sequential week or weeks, one at a time.

Leave your cursor on C12 and type:

/R	starts REPLICATE command
I12	copies all entries across columns C12 to I12
RETURN	prepares to receive additional information
C34	first coordinate where you wish to copy the formula across columns
RETURN	executes the command and prepares to receive additional instructions
R R R R R R R R R R R R R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

You will now enter a series of formulas into the production schedule to automatically advance the DAYS/MTH, MONTH and MONDAY'S DATE entries in subsequent weeks after manually entering the MONTH and MONDAY'S DATE in the first week. The DAYS/MTH entry for the first week will also calculate automatically following these two manual entries.

Formula five uses the LOOKUP function to select the appropriate number of days in the month.

Place your cursor on I3 and type:

@LOOKUP(	starts LOOKUP function
B3	coordinate containing value to be looked up
,	comma-separates LOOKUP value from the reference table
A50	first coordinate of the reference table
.	ellipsis . . . indicating from-to
L50)	last coordinate of the reference table
RETURN	enters the formula

Now copy the formula just entered into the DAYS/MTH entry position for the next sequential week.

Leave your cursor on I3 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in I3
I14	coordinate where you wish to copy the formula
RETURN	executes the command and prepares to receive additional instructions

R	tells the command to copy the coordinate address in the formula relative to its new location
N N	tells the command to copy the coordinate address in the formula in its new location without change

The next operation is to copy the DAYS/MTH formula into the final sequential week with the commands above, leaving your cursor on I3 and changing the coordinate to copy into (I25 in this example).

When the MONTH entry is made manually in the first work week of the production scheduling sheet, the appropriate MONTH entry is calculated and entered in the remaining sequential weeks. The calculation is performed using the MIN function and the LOOKUP function with reference tables.

Formula six calculates the month. The MIN function selects the minimum value from a list of values presented. The first value in the list will be generated by a LOOKUP value being added to the previous week's MONTH entry. First, seven is added to the MONDAY'S DATE entry from the previous week to advance it one week. The result is divided by the days in the month, taken from the DAYS/MTH entry of the previous week. The result of this division will be a fraction less than one, a number equal to one, or a number greater than one. This number is compared to the values in TABLE B. When the number is one or less than one, zero will be added to the previous week's MONTH entry. When the number is greater than one, the value one will be added to the previous week's MONTH entry.

The MIN function will select the lesser of the two values listed and display it as the appropriate MONTH entry. When the advancement is less than the remaining days in the month, the MIN value will be the same as the previous MONTH entry. When the advancement is more than the remaining days in the month, the MIN value will be the previous MONTH entry plus one. When the previous MONTH entry is 12 and the advancement is more than the remaining days in the month, the MIN value will be one.

To enter formula six,
Place your cursor on B14 and type:

@MIN(	selects the minimum value of the following list
B3	coordinate containing month
+	adds
@LOOKUP(	starts LOOKUP function

F3	the following formula generates the value to be looked up
+	adds
7	value
/	divides
I3	coordinate containing days in the month
,	comma-separates LOOKUP value from the reference table
E55	first coordinate in the reference table
.	ellipsis . . .indicating from-to
F55	last coordinate in the reference table
)	parenthesis-separates calculations within a formula
,	comma-separates values in the reference table
@LOOKUP(	starts LOOKUP function
B3	the following formula generates the value to be looked up
+	adds
@LOOKUP(	starts LOOKUP function
F3	coordinate containing Monday's date
+	adds
7	value
/	divides
I3	coordinate containing days in the month
,	comma-separates LOOKUP value from the reference table
E55	first coordinate in the reference table
.	ellipsis . . . indicating from-to

F55	last coordinate in the reference table
)	parenthesis-separates calculations within the formula
,	comma-separates values in the reference table
H55	first coordinate in the reference table
.	ellipsis . . . indicating from-to
I55))	last coordinate in the reference table
RETURN	enters the formula

Formula seven calculates MONDAY'S DATE in each sequential week following the manual entry of the MONTH and MONDAY'S DATE in the first week by using the LOOKUP function with reference tables, and the INTEGER function.

The first calculation in the formula adds seven days to the previous MONDAY'S DATE entry to advance it one week. It then divides that number by the number of days in the month determined by the DAYS/MTH entry in the previous week. When the advancement is less than the number of days remaining in the month, the result of this calculation will be a fraction (representing the days used up in that month). When the advancement is more than the remaining days in the month, the result will be the value one and a fraction (the fraction portion representing the number of days advanced into the next month). When the new date falls on the last day of the month, the result will be one, with no fractional value.

In a later calculation, the INTEGER (the whole number to the left of the decimal) of above result will be subtracted from the value, and the remaining value multiplied by the day in the month to determine the appropriate new date. When the advancement is less than the number of days remaining in the month, that INTEGER will be zero; when more than the days remaining in the month, the INTEGER will be one. In either case, when the INTEGER is subtracted, the fractional portion will remain, which is what you need for your calculation.

When the new date falls on the last day of the month, the INTEGER will be 1, with no fractional value. When this is the case, no value is left for computation when the INTEGER is subtracted. To correct for this condition, the LOOKUP function is used in your second calculation to compare the first calculation result to a table and determine if it is less than one or greater than one, in which case a zero value will be added to the result. When the result is equal to one, the value one will be added, to give the value two. Now when the new date is the last day in the month and the INTEGER one is subtracted in the third calculation, the value one will remain to be multiplied by the days in the month (resulting in the date of the last day in the month).

The third calculation adds seven days to the previous MONDAY'S DATE entry and divides the result by the number in the DAYS/MTH entry for the previous week. The INTEGER function then selects and retains the whole number to the left of the decimal place. The result will be one or zero. This value is subtracted from the result of the previous calculations.

The final calculation multiplies the result of the first three calculations by the number of days in the month from the DAYS/MTH entry from the previous week. The result will be the appropriate date of the month, which will be displayed as MONDAY'S DATE.

To enter formula seven,
Place your cursor on F14 and type:

(((F3	coordinate containing Monday's date
+	adds
7	value
/	divides
I3	coordinate containing days in the month
)	parenthesis-separates calculations within the formula
+	adds
@LOOKUP(	starts LOOKUP function
F3	coordinate containing value to look up
+	adds
7	value
/	divides
I3	coordinate containing days in the month

,	comma-separates LOOKUP value from the reference table
A55	first coordinate in the reference table
•	ellipsis . . . indicating from-to
C55	last coordinate in the reference table
))	parentheses-separates calculations within formula
—	subtracts
(@INT	integer-selects the value to the left of the decimal place
(F3	coordinate containing Monday's date
+	adds
7	value
/	divides
I3	coordinate containing days in the month
)))	parentheses-separates calculations within the formula
*	multiplies
I3	coordinate containing days in the month
RETURN	enters the formula

Now copy the MONTH, MONDAY'S DATE and DAYS/MTH formulas just entered into the appropriate positions in following subsequential weeks, one week at a time.

Place your cursor on B14 and type:

/R	starts REPLICATE COMMAND
I14	copies all entries across columns B14 to I14
RETURN	prepares to receive additional information
B25	first coordinate where you wish to copy the formulas across columns

RETURN	executes the command and prepares to receive additional instructions
R R R	tells the command to copy the coordinate address in the formula relative to its new location
N N	tells the command to copy the coordinate address in the formula in its new location without change

R
R
R
N
N
N
N
R
R
R
R
R
N
N
R
R
R
R
N
N

Now enter formulas eight through seventeen in the PLANT PRODUCTION SUMMARY that will transfer the MONTH, MONDAY'S DATE and the Pattern Making Totals from the weekly production schedule totals.

To enter formula eight,

Place your cursor on A41 and type:

+	prepares the coordinate to accept a numeric expression
B3	coordinate containing month
RETURN	enters the formula

To enter formula nine,

Place your cursor on A42 and type:

+	prepares the coordinate to accept a numeric expression
B14	coordinate containing month
RETURN	enters the formula

4 EXERCISE

To enter formula ten,

Place your cursor on A43 and type:

+	prepares the coordinate to accept a numeric expression
B25	coordinate containing month
RETURN	enters the formula

To enter formula eleven,

Place your cursor on B41 and type:

+	prepares the coordinate to accept a numeric expression
F3	coordinate containing Monday's date
RETURN	enters the formula

To enter formula twelve,

Place your cursor on B42 and type:

+	prepares the coordinate to accept a numeric expression
F14	coordinate containing Monday's date
RETURN	enters the formula

To enter formula thirteen,

Place your cursor on B43 and type:

+	prepares the coordinate to accept a numeric expression
F25	coordinate containing Monday's date
RETURN	enters the formula

To enter formula fourteen,

Place your cursor on C41 and type:

+	prepares the coordinate to accept a numeric expression
C12	coordinate containing Pattern Making Total
RETURN	enters the formula

To enter formula fifteen,

Place your cursor on C42 and type:

+	prepares the coordinate to accept a numeric expression
C23	coordinate containing Pattern Making Total
RETURN	enters the formula

To enter formula sixteen,

Place your cursor on C43 and type:

+	prepares the coordinate to accept a numeric expression
C34	coordinate containing Pattern Making Total
RETURN	enters the formula

To enter formula seventeen,

Place your cursor on C45 and type:

@SUM(	adds values in the list
C40	first coordinate of the row that you wish to add
.	ellipsis . . . indicating from-to
C44	last coordinate of the row that you wish to add
RETURN	enters the formula

Now copy the prior four formulas entered, formulas fourteen through seventeen, into appropriate positions in columns to the right.

Place your cursor on C41 and type:

/R	starts REPLICATE command
C45	copies all entries from C41 to C45
RETURN	prepares to receive additional information
D41	first coordinate where you wish to copy formulas across columns
.	ellipsis . . . indicating from-to
I41	last coordinate where you wish to copy formulas across columns

RETURN	executes the command and prepares to receive additional instructions
R R R R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula eighteen replaces the SUM formula in coordinate H45 with the AVERAGE function to obtain the correct percentage ratio of maximum hours used.

Place your cursor on H45 and type:

@AVERAGE(	averages the values in the following list
H40	first coordinate in the list
.	ellipsis . . . indicates from-to
H44	last coordinate in the list
RETURN	enters the formula

MAKING SCHEDULE SHEET ENTRIES

Your production scheduling sheet is now ready for use. To perform the following operations, type in the entries in Figure 3 exactly as they are shown.

NOTE

Never enter values in coordinates containing formulas, or the formulas will be erased.

RESCHEDULING ENTRIES

Your entire production scheduling sheet cannot be viewed on your computer screen because it is too long. To allow you to view the PLANT PRODUCTION SUMMARY as you move work orders from one week to another for rescheduling, you will now utilize the WINDOW command to split the screen horizontally in two. The PLANT PRODUCTION SUMMARY will be displayed in the lower window, and will remain stationary. The upper window will be used to scan the entire production scheduling sheet, selecting portions where changes will be made. The split window format is illustrated in Figure 4.

Position line 46 as the last line displayed on your screen. This will position your PLANT PRODUCTION SUMMARY in the lower half of your screen.

Place your cursor on A35 and type:

/W	starts WINDOW command
H	splits window horizontally
/W	starts WINDOW command
S	scrolls windows in synchronization

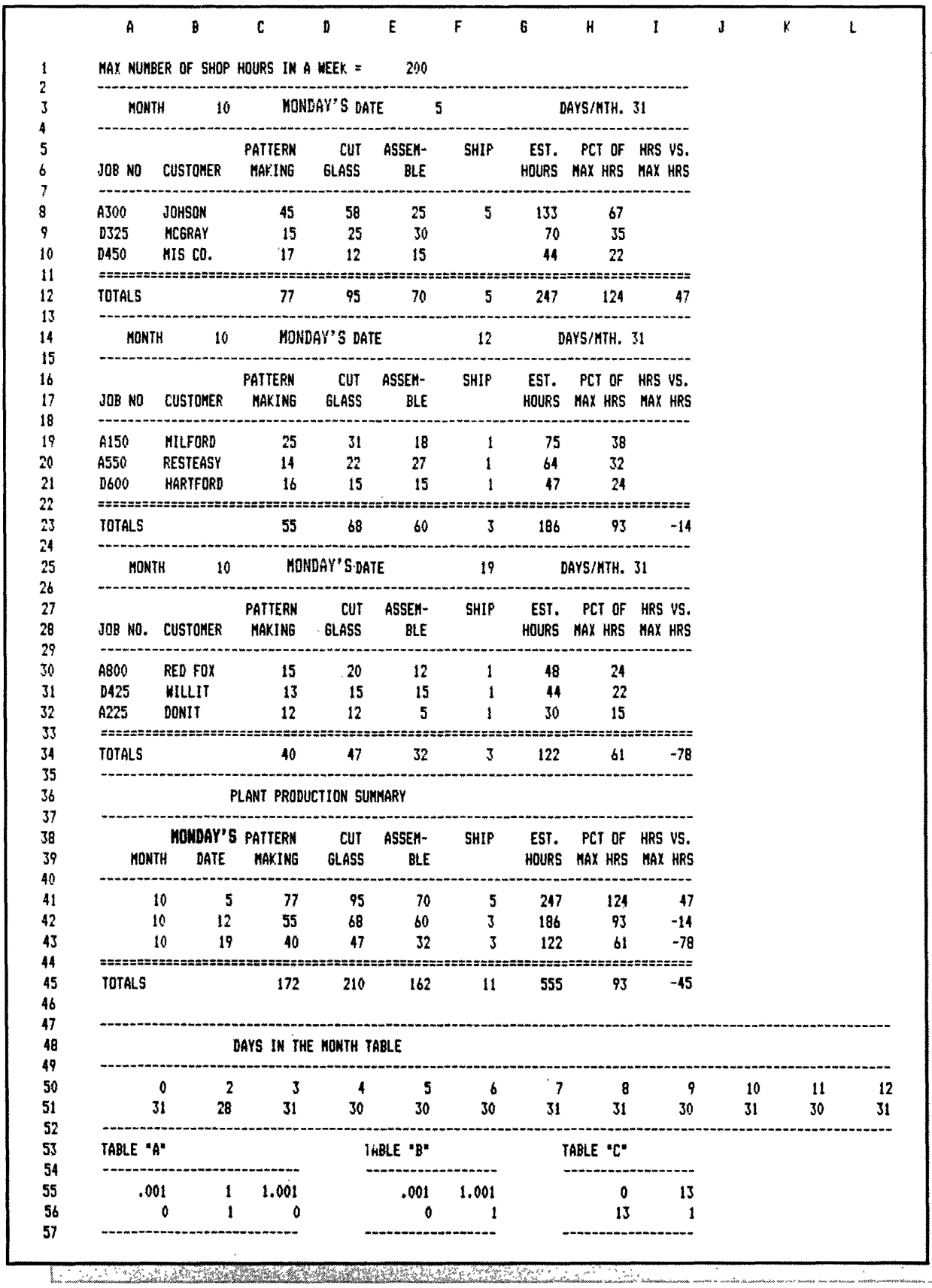
NOTES

Your cursor will be located in the upper window. You may move it from one window to the other by depressing the semicolon key (;).

To demonstrate how the production scheduling sheet recalculates values when a work order is moved for rescheduling, move the MCGRAY order from week one to week three.

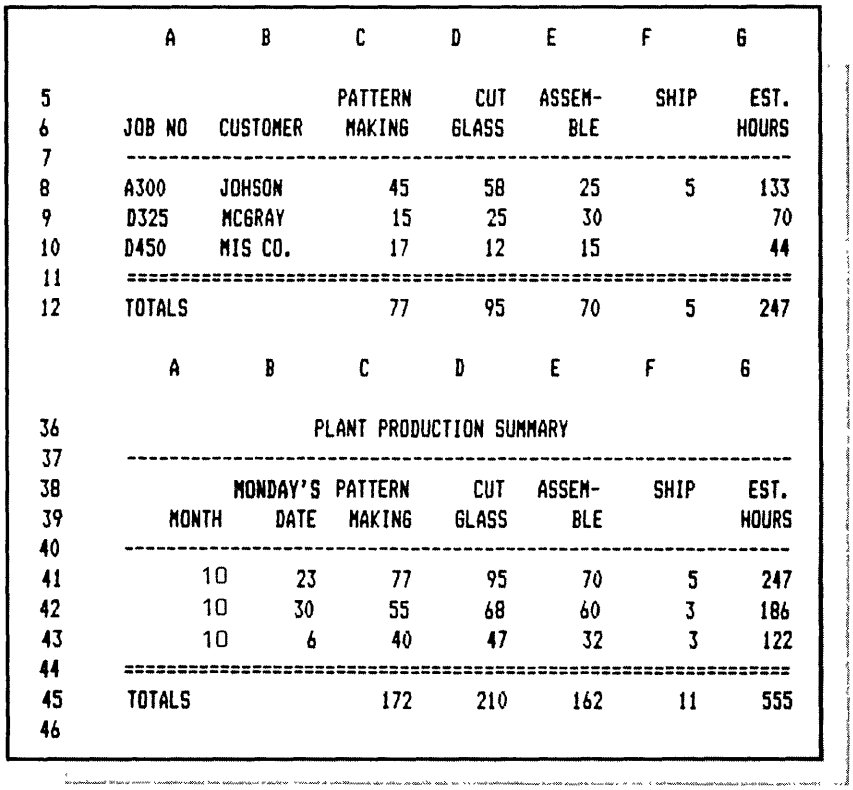
Place your cursor on A9 and type:

/M	starts MOVE command
A31	row where entry will be moved to
RETURN	executes the command



	A	B	C	D	E	F	G	H	I	J	K	L
1	MAX NUMBER OF SHOP HOURS IN A WEEK =		200									
2												
3	MONTH	10	MONDAY'S DATE	5			DAYS/MTH. 31					
4												
5			PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
6	JOB NO	CUSTOMER	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
7												
8	A300	JOHSON	45	58	25	5	133	67				
9	D325	MCGRAY	15	25	30		70	35				
10	D450	MIS CO.	17	12	15		44	22				
11												
12	TOTALS		77	95	70	5	247	124	47			
13												
14	MONTH	10	MONDAY'S DATE		12		DAYS/MTH. 31					
15												
16			PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
17	JOB NO	CUSTOMER	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
18												
19	A150	MILFORD	25	31	18	1	75	38				
20	A550	RESTEASY	14	22	27	1	64	32				
21	D600	HARTFORD	16	15	15	1	47	24				
22												
23	TOTALS		55	68	60	3	186	93	-14			
24												
25	MONTH	10	MONDAY'S DATE		19		DAYS/MTH. 31					
26												
27			PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
28	JOB NO.	CUSTOMER	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
29												
30	A800	RED FOX	15	20	12	1	48	24				
31	D425	WILLIT	13	15	15	1	44	22				
32	A225	DONIT	12	12	5	1	30	15				
33												
34	TOTALS		40	47	32	3	122	61	-78			
35												
36	PLANT PRODUCTION SUMMARY											
37												
38		MONDAY'S	PATTERN	CUT	ASSEM-	SHIP	EST.	PCT OF	HRS VS.			
39	MONTH	DATE	MAKING	GLASS	BLE		HOURS	MAX HRS	MAX HRS			
40												
41	10	5	77	95	70	5	247	124	47			
42	10	12	55	68	60	3	186	93	-14			
43	10	19	40	47	32	3	122	61	-78			
44												
45	TOTALS		172	210	162	11	555	93	-45			
46												
47												
48	DAYS IN THE MONTH TABLE											
49												
50	0	2	3	4	5	6	7	8	9	10	11	12
51	31	28	31	30	30	30	31	31	30	31	30	31
52												
53	TABLE "A"			TABLE "B"			TABLE "C"					
54												
55	.001	1	1.001	.001	1.001		0	13				
56	0	1	0	0	1		13	1				
57												

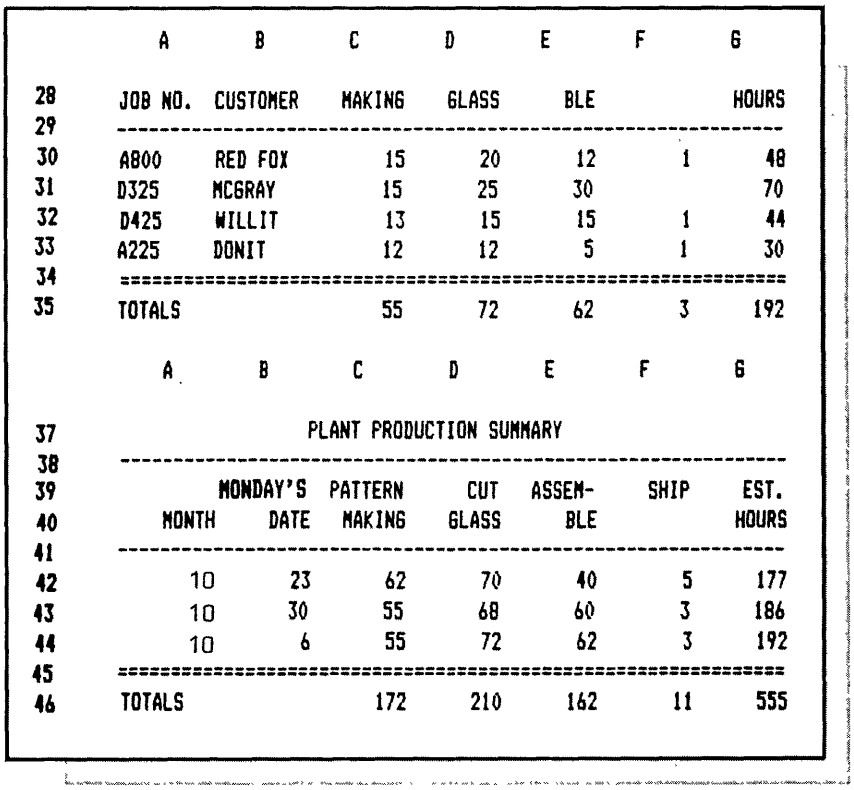
Figure 3



	A	B	C	D	E	F	G
5			PATTERN	CUT	ASSEM-	SHIP	EST.
6	JOB NO	CUSTOMER	MAKING	GLASS	BLE		HOURS
7	---	---	---	---	---	---	---
8	A300	JOHSON	45	58	25	5	133
9	D325	MCGRAY	15	25	30		70
10	D450	MIS CO.	17	12	15		44
11	==========	==========	==========	==========	==========	==========	==========
12	TOTALS		77	95	70	5	247

	A	B	C	D	E	F	G
36			PLANT PRODUCTION SUMMARY				
37	---	---	---	---	---	---	---
38		MONDAY'S	PATTERN	CUT	ASSEM-	SHIP	EST.
39	MONTH	DATE	MAKING	GLASS	BLE		HOURS
40	---	---	---	---	---	---	---
41	10	23	77	95	70	5	247
42	10	30	55	68	60	3	186
43	10	6	40	47	32	3	122
44	==========	==========	==========	==========	==========	==========	==========
45	TOTALS		172	210	162	11	555
46							

Split Screen Before Work Order Move



	A	B	C	D	E	F	G
28	JOB NO.	CUSTOMER	MAKING	GLASS	BLE		HOURS
29	---	---	---	---	---	---	---
30	A800	RED FOX	15	20	12	1	48
31	D325	MCGRAY	15	25	30		70
32	D425	WILLIT	13	15	15	1	44
33	A225	DONIT	12	12	5	1	30
34	==========	==========	==========	==========	==========	==========	==========
35	TOTALS		55	72	62	3	192

	A	B	C	D	E	F	G
37			PLANT PRODUCTION SUMMARY				
38	---	---	---	---	---	---	---
39		MONDAY'S	PATTERN	CUT	ASSEM-	SHIP	EST.
40	MONTH	DATE	MAKING	GLASS	BLE		HOURS
41	---	---	---	---	---	---	---
42	10	23	62	70	40	5	177
43	10	30	55	68	60	3	186
44	10	6	55	72	62	3	192
45	==========	==========	==========	==========	==========	==========	==========
46	TOTALS		172	210	162	11	555

Split Screen After Work Order Move

Figure 4

MAKING ADDITIONAL ENTRIES

To add entries, you will have to add new rows. New entries may be made at the end of the existing list, or alphabetically. All SUM functions that add column totals will automatically adjust to include the new rows as long as you insert the rows between the coordinates in the original formula. Formulas performing other functions within the columns expanded, however, will have to be entered into the new entry coordinates in each column where a formula is used. These existing formulas can be copied into the new coordinates individually or by using the REPLICATE COMMAND.

To insert a new row, place your cursor on the row you wish to move down and a blank row inserted.

/I	starts INSERT command
R	inserts row and executes the command

You may now begin entering formulas where necessary, then begin making your new entries.

SAVING

In some instances you may wish to store your work format or completed work onto a disk file for later retrieval.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
FILENAME	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper left coordinate of the worksheet area rectangle you wish to print and type;

/P	starts PRINT command
P	printer

Type in the lower right-hand coordinate address of the worksheet area rectangle you wish to print and type:

RETURN	executes the command

ESTIMATING

DESCRIPTION

Illustrated in this exercise are the abilities to utilize the calculating sequence of VisiCalc to calculate values for entry in a table before using that table for reference, and to select values from a set of tables for use in calculations.

To demonstrate VisiCalc's abilities, a Manufacturing Estimating worksheet has been designed for a pipe manufacturer. Following entry of the size parameters and the quantity and grade of material to be used, the estimating sheet will make a series of calculations automatically. Displayed as a result of the calculations will be the appropriate manufacturing machine to use, the amount and cost of material required, manufacturing time and cost, and total job costs.

OPERATIONS PERFORMED

Setting Up The Format

Entering Mathematical Formulas

Entering Parameters

Making Additional Entries

Saving

Printing

FUNCTIONS USED

INT

LOOKUP

PI

SUM

COMMANDS USED

BLANK	deletes entry
FORMAT	R = justifies right
INSERT	R = row
REPEAT LABEL	
STORAGE	saves

SETTING UP THE FORMAT

To set up your estimating sheet, use the following directions, copying 1 exactly as it is illustrated, retaining exact row and column locations of all information.

To enter your column headings, type:

/F	starts FORMAT command
R	justifies right

Type in your column title.

Depress your cursor (arrow) key to move to your next location.

Depressing the cursor key in this operation both enters your column label into the location and moves your cursor automatically to your next typing location. Type in the rest of your column headings using the sequence of commands above.

To enter dashed lines on your estimating sheet, place your cursor in the left-most column of the row where you want the line, and type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

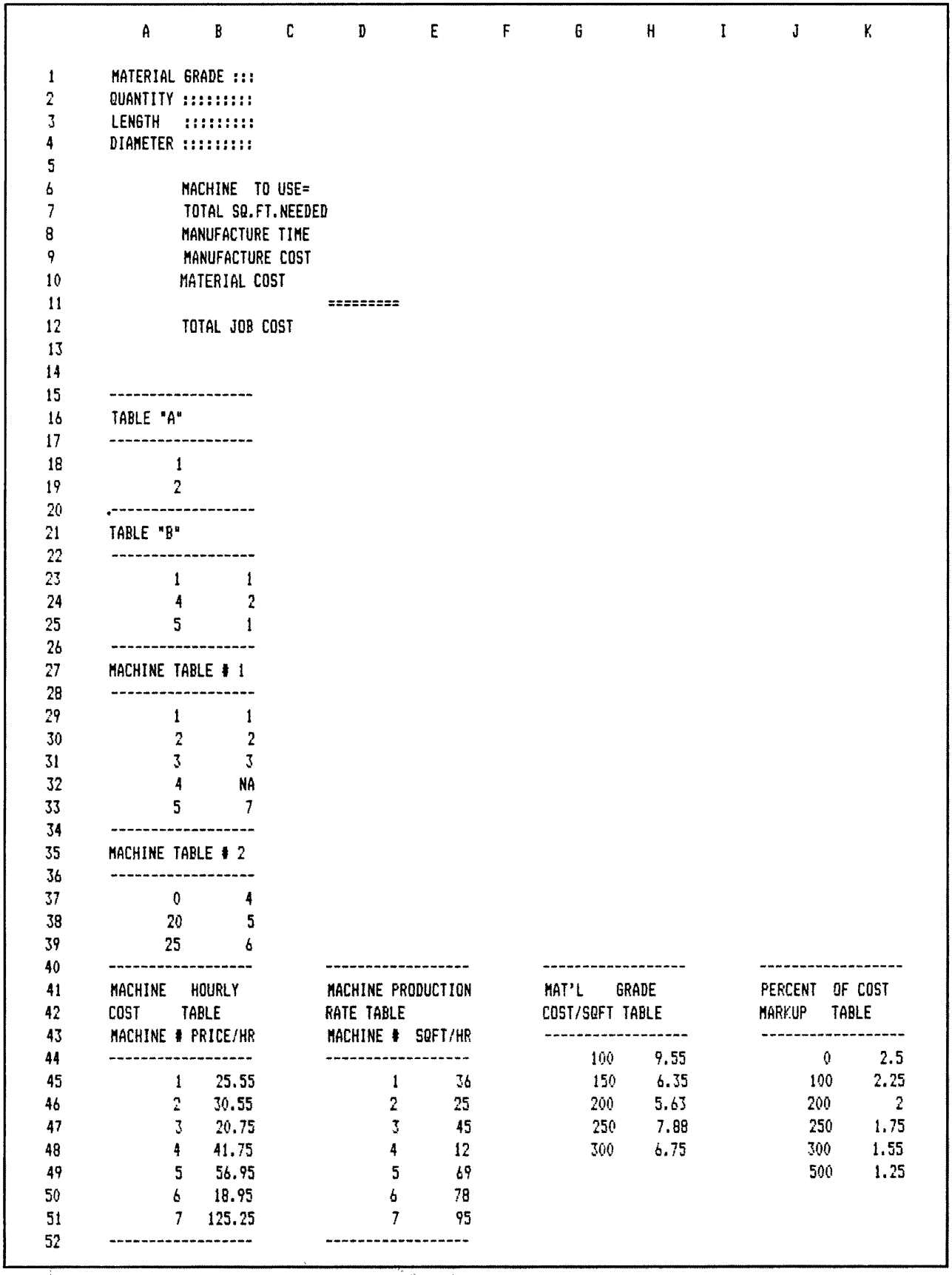
The column your cursor is on will now have a line of dashes across its width. To extend the dashed line in the same row across the additional columns, place your cursor on the column and repeat the above sequence.

To enter a double-dashed line on your estimating sheet, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationships between column and row positions. The formulas and their locations are illustrated in Figure 2.

Formulas one and two will generate the values for TABLE A. The diameter and length parameters of the pipe to be manufactured are used to select which machines are appropriate for the job from MACHINE TABLES 1 and 2. The resulting selections will appear in TABLE A, and will be used in a later calculation.



```
     A       B       C       D       E       F       G       H       I       J       K
1    MATERIAL GRADE :::
2    QUANTITY :::::::::
3    LENGTH   :::::::::
4    DIAMETER :::::::::
5
6             MACHINE  TO USE=
7             TOTAL SQ.FT.NEEDED
8             MANUFACTURE TIME
9             MANUFACTURE COST
10            MATERIAL COST
11                             =========
12            TOTAL JOB COST
13
14
15   ------------------
16   TABLE "A"
17   ------------------
18          1
19          2
20   ------------------
21   TABLE "B"
22   ------------------
23          1       1
24          4       2
25          5       1
26   ------------------
27   MACHINE TABLE # 1
28   ------------------
29          1       1
30          2       2
31          3       3
32          4      NA
33          5       7
34   ------------------
35   MACHINE TABLE # 2
36   ------------------
37          0       4
38         20       5
39         25       6
40   ------------------      ------------------      ------------------      ------------------
41   MACHINE   HOURLY        MACHINE PRODUCTION      MAT'L    GRADE          PERCENT  OF COST
42   COST      TABLE         RATE TABLE              COST/SQFT TABLE         MARKUP   TABLE
43   MACHINE # PRICE/HR      MACHINE #  SQFT/HR      ------------------      ------------------
44   ------------------      ------------------          100     9.55            0       2.5
45          1    25.55             1       36          150     6.35          100       2.25
46          2    30.55             2       25          200     5.63          200       2
47          3    20.75             3       45          250     7.88          250       1.75
48          4    41.75             4       12          300     6.75          300       1.55
49          5    56.95             5       69                                500       1.25
50          6    18.95             6       78
51          7   125.25             7       95
52   ------------------      ------------------
```

Figure 1

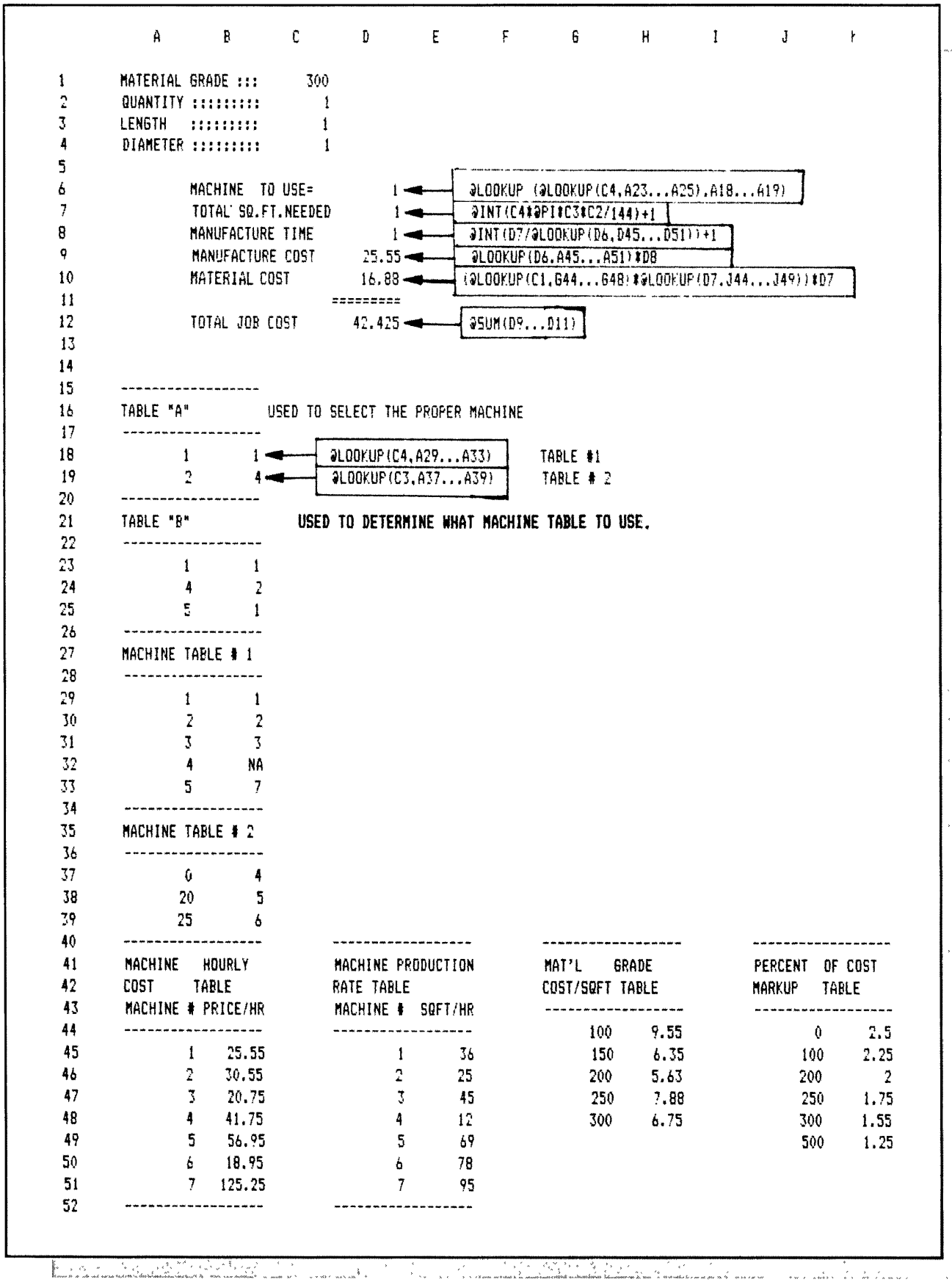

MATERIAL GRADE ::: 300
QUANTITY ::::::::: 1
LENGTH ::::::::: 1
DIAMETER ::::::::: 1
MACHINE TO USE= 1
@LOOKUP (@LOOKUP(C4,A23...A25),A18...A19)
TOTAL SQ.FT.NEEDED 1
@INT(C4*@PI*C3*C2/144)+1
MANUFACTURE TIME 1
@INT(D7/@LOOKUP(D6,D45...D51))+1
MANUFACTURE COST 25.55
@LOOKUP(D6,A45...A51)*D8
MATERIAL COST 16.88
(@LOOKUP(C1,G44...G48)*@LOOKUP(D7,J44...J49))*D7
TOTAL JOB COST 42.425
@SUM(D9...D11)
TABLE "A" USED TO SELECT THE PROPER MACHINE
1 1
2 4
@LOOKUP(C4,A29...A33)
@LOOKUP(C3,A37...A39)
TABLE #1
TABLE # 2
TABLE "B" USED TO DETERMINE WHAT MACHINE TABLE TO USE.
1 1
4 2
5 1
MACHINE TABLE # 1
1 1
2 2
3 3
4 NA
5 7
MACHINE TABLE # 2
0 4
20 5
25 6
MACHINE COST TABLE
MACHINE # PRICE/HR
1 25.55
2 30.55
3 20.75
4 41.75
5 56.95
6 18.95
7 125.25
MACHINE PRODUCTION RATE TABLE
MACHINE # SQFT/HR
1 36
2 25
3 45
4 12
5 69
6 78
7 95
MAT'L GRADE COST/SQFT TABLE
100 9.55
150 6.35
200 5.63
250 7.88
300 6.75
PERCENT OF COST MARKUP TABLE
0 2.5
100 2.25
200 2
250 1.75
300 1.55
500 1.25

Figure 2

To enter formula one,

Place your cursor on B18 and type:

@LOOKUP(	starts LOOKUP function
C4,	coordinate containing value to look up
A29	first coordinate of the reference table
.	ellipsis . . . indicating from-to
A33)	last coordinate of the reference table
RETURN	enters the formula

To enter formula two,

Place your cursor on B19 and type:

@LOOKUP(	starts LOOKUP function
C3,	coordinate containing value to look up
A37	first coordinate of the reference table
.	ellipsis . . . indicating from-to
A39)	last coordinate of the reference table
RETURN	enters the formula

Formula three first employs a LOOKUP within a LOOKUP function to compare the diameter of the pipe to a set of parameters in TABLE B and generates a reference number. That number is then used in TABLE A by the second LOOKUP function to select the appropriate machine to be used in the manufacturing operation.

Place your cursor on D6 and type:

@LOOKUP(	starts LOOKUP function
@LOOKUP(	starts LOOKUP function
C4,	coordinate containing value to look up
A23	first coordinate of the reference table
.	ellipsis . . . indicating from-to

A25)	last coordinate of the reference table
,	comma-separates calculations within a formula
A18	first coordinate of the reference table
.	ellipsis . . . indicating from-to
A19)	last coordinate of the reference table
RETURN	enters the formula

Formula four calculates the amount of flat material required to manufacture the pipe by first determining the pipe circumference in inches by multiplying the diameter times PI (3.1415926536). The circumference is then multiplied by the pipe length to find the material in one piece. The result is multiplied by the quantity to determine the total amount of material needed, then divided by 144 to convert the answer to square feet. The final quantity is carried to the next square foot by adding one and using the INTEGER function to select only the whole number to the left of the decimal place.

Place your cursor on D7 and type:

@INT(	selects the value to the left of the decimal point
C4	coordinate containing diameter
*	multiplies
@PI	3.1415926536 (multiplier)
*	multiplies
C3	coordinate containing pipe length
*	multiplies
C2	coordinate containing quantity
/	divides
144)	value used to convert to sq. ft.
+	adds

1	value
RETURN	enters the formula

Formula five calculates the MANUFACTURING TIME to produce the number of pipes indicated, by dividing the square feet of material by the number of square feet per hour the selected machine will process. The LOOKUP function is used to find the production rate of the selected machine in the MACHINE PRODUCTION RATE TABLE. To round out the result to the next whole hour, one is added to the answer and the INTEGER function is used to select only the whole number to the left of the decimal point.

Place your cursor on D8 and type:

@INT(	selects the value to the left of the decimal point
D7	coordinate containing total sq. ft. needed
/	divides
@LOOKUP(	starts LOOKUP function
D6,	coordinate containing value to be looked up
D45	first coordinate of the reference table
.	ellipsis . . . indicating from-to
D51	last coordinate in the reference table
))	parentheses-separates calculations within the formula
+	adds
1	value
RETURN	enters the formula

Formula six will use the LOOKUP function to select the hourly cost rate of the machine being used from the MACHINE HOURLY COST TABLE. It then multiplies that rate times the hours listed for MANUFACTURING TIME to obtain the MANUFACTURING COST.

Place your cursor on D9 and type:

@LOOKUP(	starts LOOKUP function
D6,	coordinate containing value to be looked up
A45	first coordinate in the reference table
.	ellipsis . . . indicating from-to
A51	last coordinate in the reference table
)	parenthesis-separates calculations within a formula
*	multiplies
D8	coordinate containing manufacturing time
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula seven calculates the MATERIAL COST. The LOOKUP function is first used to determine the material purchase cost from the MAT'S GRADE COSTS/SQ FT table. A second LOOKUP function is used to determine the percentage rate of the pricing markup from the PERCENT OF COST MARKUP table. The resulting values from these two LOOKUP functions are multiplied and the answer multiplied by the TOTAL SQ. FT. NEEDED value to obtain the MATERIAL COST.

Place your cursor on D10 and type:

(@LOOKUP(	starts LOOKUP function
C1,	coordinate containing value to be looked up
G44	first coordinate in the reference table
.	ellipsis . . . indicating from-to
G48	last coordinate in the reference table
)	parenthesis-separates calculations within a formula

*	multiplies
@LOOKUP(	starts LOOKUP function
D7,	coordinate containing value to be looked up
J44	first coordinate in the reference table
.	ellipsis . . . indicating from-to
J49	last coordinate in the reference table
))	parentheses-separate calculations within the formula
*	multiplies
D7	coordinate containing total sq. ft. needed
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula eight, the final mathematical formula on your estimating sheet, will add the total of the values listed for MANUFACTURING COST and MATERIAL COST, and display the answer on the TOTAL JOB COST line.
Place your cursor on D12 and type:

@SUM(	adds values in the list
D9	first coordinate of the column that you wish to add
.	ellipsis . . . indicating from-to
D11)	last coordinate of the column that you wish to add
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

ENTERING PARAMETERS

Your estimating sheet is now complete. To observe its operations, enter your measurement and material grade values on the appropriate lines at the top of the page (Figure 3).

	A	B	C	D	E	F	G	H	I	J	K
1	MATERIAL GRADE :::		300								
2	QUANTITY :::::::::		150								
3	LENGTH :::::::::		30								
4	DIAMETER :::::::::		4								
5											
6		MACHINE TO USE=		6							
7		TOTAL SQ.FT.NEEDED		393							
8		MANUFACTURE TIME		6							
9		MANUFACTURE COST		113.70							
10		MATERIAL COST		4111.76							
11				=========							
12		TOTAL JOB COST		4225.463							
13											
14											
15	----------										
16	TABLE "A"										
17	----------										
18		1	NA								
19		2	6								
20	----------										
21	TABLE "B"										
22	----------										
23		1	1								
24		4	2								
25		5	1								
26	----------										
27	MACHINE TABLE # 1										
28	----------										
29		1	1								
30		2	2								
31		3	3								
32		4	NA								
33		5	7								
34	----------										
35	MACHINE TABLE # 2										
36	----------										
37		0	4								
38		20	5								
39		25	6								
40	----------			----------			----------			----------	
41	MACHINE	HOURLY		MACHINE PRODUCTION			MAT'L	GRADE		PERCENT	OF COST
42	COST	TABLE		RATE TABLE			COST/SQFT	TABLE		MARKUP	TABLE
43	MACHINE #	PRICE/HR		MACHINE #	SQFT/HR		----------			----------	
44	----------			----------				100	9.55		0 2.5
45		1	25.55		1	36		150	6.35		100 2.25
46		2	30.55		2	25		200	5.63		200 2
47		3	20.75		3	45		250	7.88		250 1.75
48		4	41.75		4	12		300	6.75		300 1.55
49		5	56.95		5	69					500 1.25
50		6	18.95		6	78					
51		7	125.25		7	95					
52	----------			----------							

Figure 3

MAKING ADDITIONAL ENTRIES

To add entries, you will have to add new rows. New entries may be made at the end of the existing list, or alphabetically. All SUM functions that add column totals will automatically adjust to include the new rows as long as you insert the rows between the coordinates in the original formula. Formulas performing other functions within the columns expanded, however, will have to be entered into the new entry coordinates in each column where a formula is used. These existing formulas can be copied into the new coordinates individually or by using the REPLICATE COMMAND.

To insert a new row, place your cursor on the row you wish to move down and a blank row inserted.

/I	starts INSERT command
R	inserts row and executes the command

You may now begin entering formulas where necessary, then begin making your new entries.

SAVING

In some instances you may wish to store your work format or completed work onto a disk file for later retrieval.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
FILENAME	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper left coordinate of the worksheet area rectangle you wish to print and type:

/P	starts PRINT command
P	printer

Type in the lower right-hand coordinate address of the worksheet area rectangle you wish to print and type:

RETURN	executes the command

CHECKBOOK LEDGER

DESCRIPTION

The VisiCalc ability to store selected values onto disk storage and reenter them on a worksheet for accumulating is employed in this exercise. Ledger posting, with the ability to accumulate the postings and add or subtract the resulting value from a balance figure is demonstrated. A method for displaying a zero value in a column prior to ledger entry is featured.

To demonstrate VisiCalc's abilities, a Checkbook Ledger has been designed. Deposit and payment entries are made in the checkbook, and the resulting checkbook balance and the totals of all the columns containing entries are automatically calculated. On a monthly schedule, the year to date total is transferred to a disk file for later reentry and repositioning as a cumulative total on the following month's worksheet.

OPERATIONS PERFORMED

Setting Up The Format

Entering Mathematical Formulas

Posting Entries

Monthly Updating

Making Additional Entries

Saving

Printing

FUNCTIONS USED

MIN

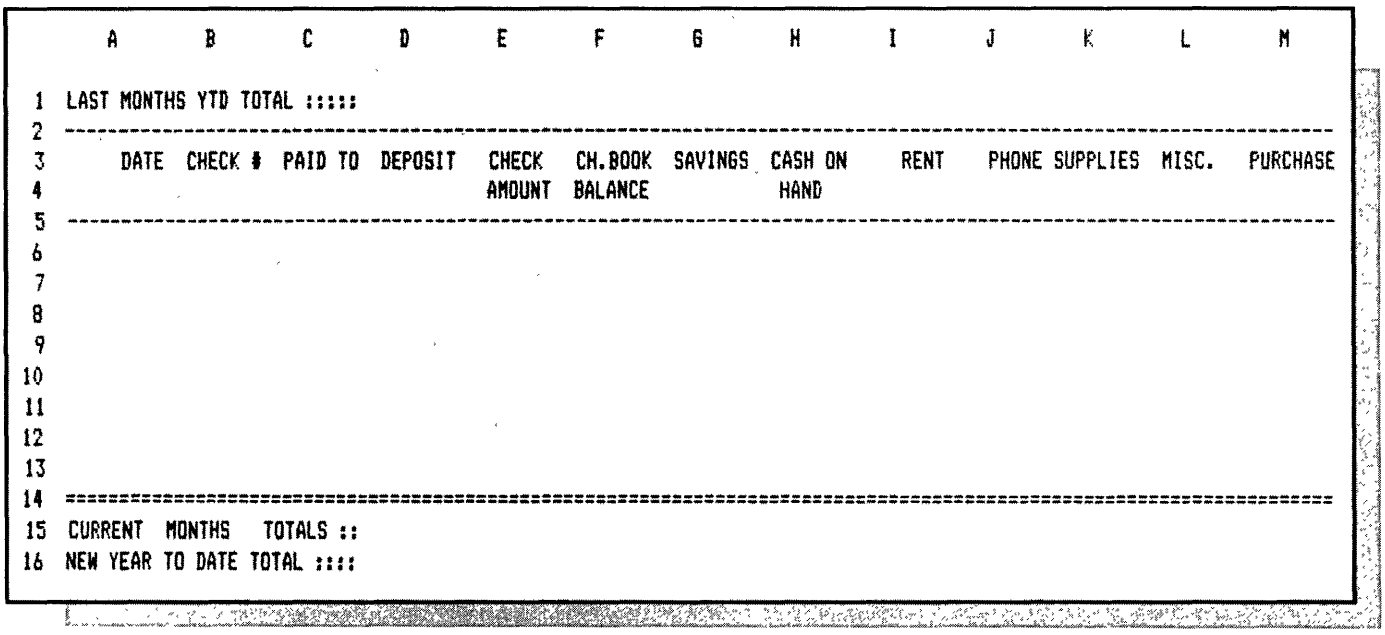
SUM

COMMANDS USED

FORMAT	R = justifies right
GLOBAL	$ = displays in dollars and cents
INSERT	R = row
REPEAT LABEL	
STORAGE	saves
STORAGE	# = saves a Data Interchange Format file

SETTING UP THE FORMAT

To set up your checkbook, use the following directions, copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1	LAST MONTHS YTD TOTAL :::::												
2	---												
3		DATE	CHECK #	PAID TO	DEPOSIT	CHECK AMOUNT	CH.BOOK BALANCE	SAVINGS	CASH ON HAND	RENT	PHONE	SUPPLIES	MISC.	PURCHASE
4														
5	---													
6														
7														
8														
9														
10														
11														
12														
13														
14	===													
15	CURRENT MONTHS TOTALS ::													
16	NEW YEAR TO DATE TOTAL ::::													

Figure 1

To format all locations to display value entries in dollars and cents, type:

/G	starts GLOBAL command
F	FORMAT
$	dollars and cents

To enter your column headings, type:

/F	starts FORMAT command
R	justifies right

Type in your column title. Depress your cursor (arrow) key to move to your next location.

Depressing the cursor key in this operation both enters your column title into the location and moves your cursor automatically to your next typing location. Type in the rest of your column headings using the sequence of commands above.

To enter dashed lines on your checkbook, place your cursor on the left-most column of the row where you want the line (line A2 in this example).

Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column your cursor is on will now have a line of dashes across its width. To extend the dashed line in the same row across the remaining columns,

Type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B2	the first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
M2	the last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns you have indicated by your coordinates. To enter a double-dashed line on the checkbook, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationships between column and row positions. The formulas and their positions are illustrated in Figure 2.

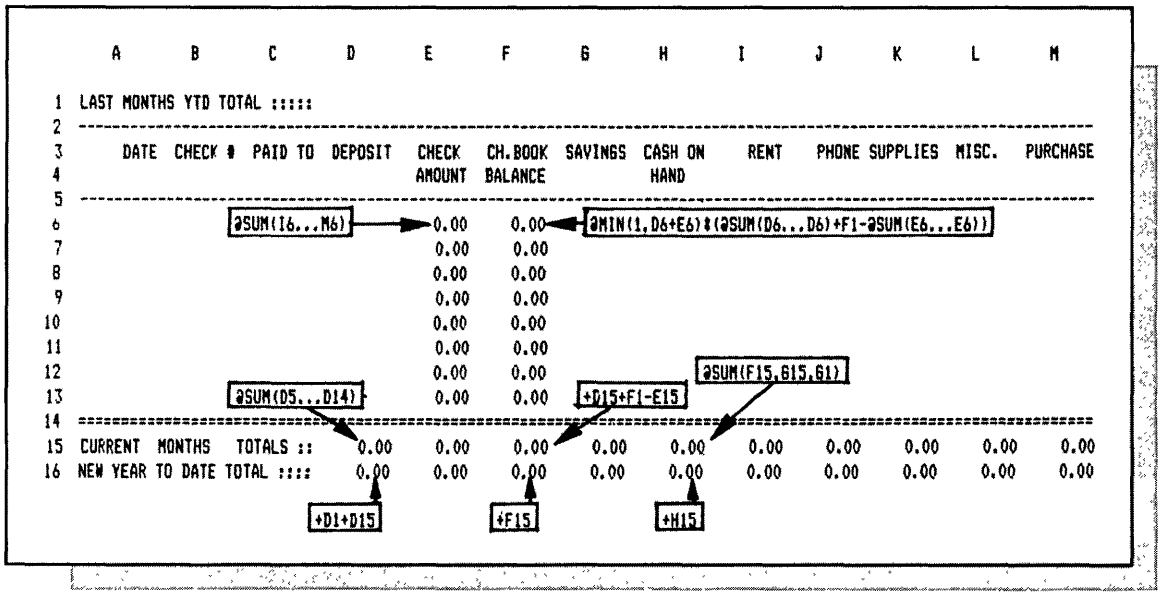


Figure 2

Formula one will add the total of the postings from the RENT column across to the PURCHASE column.

Place your cursor on E6 and type:

@SUM(	adds values in the list
I6	first coordinate of the row you wish to add
.	ellipsis . . . indicates from-to
M6)	last coordinate of the row you wish to add
RETURN	enters the formula

Formula two determines the CH. BOOK BALANCE. The MIN function is used to select the lesser of the values, one, or the total of the DEPOSIT and CHECK AMOUNT for the CH. BOOK BALANCE. The resulting value is multiplied by the total of the DEPOSITS, LAST MONTH'S YTD TOTAL for the CH. BOOK BALANCE minus the CHECK AMOUNTS to date for the month.

Place your cursor on F6 and type:

@MIN(1,D6 + E6)	selects the minimum value, 1 or the total of D6 and E6
*	multiplies
(	parenthesis-separates values within the formula
@SUM(	adds values in the list
D6	first coordinate of the column that you wish to add
.	ellipsis . . . indicating from-to
D6)	last coordinate of the column that you wish to add
+	adds
F1	coordinate containing last month's YTD total
—	subtracts
@SUM(	adds values in the list
E6	first coordinate of the column that you wish to add
.	ellipsis . . . indicating from-to
E6))	last coordinate of the column that you wish to add
RETURN	enters the formula

Now copy the formulas in the CHECK AMOUNT and CH. BOOK BALANCE columns down the columns in each row to the double-dashed line.

Place your cursor on E6 and type:

/R	starts REPLICATE command
F6	copies all entries across columns E6 to F6
RETURN	prepares to receive additional information
E7	first coordinate where you wish to copy the formulas down columns
.	ellipsis . . . indicating from-to

E13	last coordinate where you wish to copy the formulas down columns
RETURN	executes the command and prepares to receive additional instructions
R R R R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change
R N N R	

Formula three adds the CURRENT MONTH'S TOTAL in the DEPOSIT column.

Place your cursor on D15 and type:

@SUM(	adds values in the list
D5	first coordinate of the column that you wish to add
.	ellipsis . . . indicating from-to
D14)	last coordinate of the column that you wish to add
RETURN	enters the formula

Formula four will add the LAST MONTH'S YTD TOTAL in the DEPOSIT column to the CURRENT MONTH'S TOTAL in that same column to provide the NEW YEAR TO DATE TOTAL.

Place your cursor on D16 and type:

+	prepares coordinate to accept a numeric expression
D1	coordinate containing last month's YTD total, deposit
+	adds
D15	coordinate containing current month's total, deposit
RETURN	enters the formula

Now, copy the two formulas you just entered across under the remaining columns to the right on your worksheet.

Place your cursor on D15 and type:

/R	starts REPLICATE command
D16	copies all entries down columns D15 to D16
RETURN	prepares to receive additional information
E15	first coordinate where you wish to copy the formulas across columns
.	ellipsis . . . indicating from-to
M15	last coordinate where you wish to copy the formulas across columns
RETURN	executes the command and prepares to receive additional instructions
R R R R	tells the command to copy the coordinate address in the formula relative to its new location

Formulas five through eight, in the CH. BOOK BALANCE and CASH ON HAND columns, obtain totals on their CURRENT MONTH TOTAL and NEW YEAR TO DATE TOTAL lines. You will now replace the formulas in those locations.

To enter formula five,

Place your cursor on F15 and type:

+	prepares coordinate to accept a numeric expression
D15	coordinate containing current month's total, deposit
+	adds
F1	coordinate containing last month's YTD total, deposit
—	subtracts
E15	coordinate containing current month's total, check amount
RETURN	enters the formula

To enter formula six,

Place your cursor on F16 and type:

+	prepares coordinate to accept a numeric expression
F15	coordinate containing current month's total, check book balance
RETURN	enters the formula

To enter formula seven,

Place your cursor on H15 and type:

@SUM(	adds values in the following list
F15	coordinate containing value in the list
,	comma-separates values in the list
G15	coordinate containing value in the list
,	comma-separates values in the list
G1)	coordinate containing value in the list
RETURN	enters the formula

To enter formula eight,

Place your cursor on H16 and type:

+	prepares coordinate to accept a numeric expression
H15	coordinate containing current month's total, cash on hand
RETURN	enters the formula

Your blank checkbook worksheet is now complete, containing all the formulas necessary for its operation. Prior to posting entries, save the entire worksheet by transferring it to a disk file for later use.

Now save the worksheet to disk storage.

Type:

/S	starts STORAGE command
S	saves
CHECKBOOK	name of file; do not type spaces between words
RETURN	executes the command

POSTING ENTRIES

You may now begin posting entries in your checkbook worksheet to observe its operation. Sample entries are shown in Figure 3. You may use them, if you wish, to check the operation of your worksheet against the illustration.

NOTES

To enter check numbers as labels, depress the quotation mark (")key prior to the entry, which prepares the coordinate to accept a label expression.

Never enter values in coordinates containing formulas, or the formulas will be erased.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	LAST MONTHS YTD TOTAL :::::												
2													
3	DATE	CHECK #	PAID TO	DEPOSIT	CHECK AMOUNT	CH.BOOK BALANCE	SAVINGS	CASH ON HAND	RENT	PHONE	SUPPLIES	MISC.	PURCHASE
4													
5													
6	JUN 2,81			15000.00	0.00	15000.00	1200.00						
7	JUN 25	101	RENTALS		550.00	14450.00			550.00				
8	JUN 25	102	NW BELL		250.00	14200.00				250.00			
9	JUN 30	103	ACME		125.00	14075.00					125.00		
10	JUN30	104	HARDWARE		4500.00	9575.00							4500.00
11					0.00	0.00							
12					0.00	0.00							
13					0.00	0.00							
14													
15	CURRENT MONTHS TOTALS ::			15000.00	5425.00	9575.00	1200.00	10775.00	550.00	250.00	125.00	0.00	4500.00
16	NEW YEAR TO DATE TOTAL ::::			15000.00	5425.00	9575.00	1200.00	10775.00	550.00	250.00	125.00	0.00	4500.00

Figure 3

MONTHLY UPDATING

To perform the updating process, you will transfer the values in the NEW YEAR TO DATE TOTAL row to a disk storage file. You will later reenter these values into a worksheet for the new month by recalling them from the file.

NOTE

Prior to performing the monthly update, be sure you make arrangements, if desired, for permanent storage of the current worksheet before erasing it from the computer memory.

Place your cursor on D16 (the left-most coordinate of the row you wish to copy into the storage file).

Type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
S	saves
CHBK.TOTALS	name of file; do not type spaces between words
RETURN	prepares to receive additional information
M16	right-most coordinate of the row of value entries to be saved
RETURN	prepares to receive additional instructions
R	saves the values in row form and executes the command

When your arrangements for permanent storage of your current worksheet are complete, your next step is to clear the computer memory.

To clear the computer memory, type:

/C	starts CLEAR command
Y	activates CLEAR command

Next, load your blank checkbook worksheet, saved in a previous operation, from your disk storage file.

To load your blank checkbook worksheet, type:

/S	starts STORAGE command
L	loads

CHECKBOOK	name of file; do not type spaces between words
RETURN	executes the command

Now, load the NEW YEAR TO DATE TOTAL values saved from the old checkbook worksheet into the LAST MONTH'S YTD TOTAL row on the new worksheet.

Place your cursor on D1 (the left-most coordinate of the row where you wish the values to be reentered)

Type:

/S	starts STORAGE command
#	loads a (DIF) Data Interchange Format file
L	loads
CHBK.TOTALS	name of file; do not type spaces between words
RETURN	prepares to receive additional instructions
R	loads the values in row form and executes the command

You have now completed your monthly update and have entered the cumulative totals in your next checkbook worksheet, as illustrated in Figure 4. You are ready to begin posting entries for the new month.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	LAST MONTHS YTD TOTAL :::::			15000.00	5425.00	9575.00	1200.00	10775.00	550.00	250.00	125.00	0.00	4500.00
2													
3	DATE	CHECK #	PAID TO	DEPOSIT	CHECK AMOUNT	CH.BOOK BALANCE	SAVINGS	CASH ON HAND	RENT	PHONE	SUPPLIES	MISC.	PURCHASE
4													
5													
6					0.00	0.00							
7					0.00	0.00							
8					0.00	0.00							
9					0.00	0.00							
10					0.00	0.00							
11					0.00	0.00							
12					0.00	0.00							
13					0.00	0.00							
14													
15	CURRENT MONTHS TOTALS ::			0.00	0.00	9575.00	0.00	10775.00	0.00	0.00	0.00	0.00	0.00
16	NEW YEAR TO DATE TOTAL ::::			15000.00	5425.00	9575.00	1200.00	10775.00	550.00	250.00	125.00	0.00	4500.00

Figure 4

MAKING ADDITIONAL ENTRIES

To add entries, you will have to add new rows. New entries may be made at the end of the existing list, or alphabetically. All SUM functions that add column totals will automatically adjust to include the new rows as long as you insert the rows between the coordinates in the original formula. Formulas performing other functions within the columns expanded, however, will have to be entered into the new entry coordinates in each column where a formula is used. These existing formulas can be copied into the new coordinates individually or by using the REPLICATE COMMAND.

To insert a new row, place your cursor on the row you wish to move down and a blank row inserted.

/I	starts INSERT command
R	inserts row and executes the command

You may now begin entering formulas where necessary, then begin making your new entries.

SAVING

In some instances you may wish to store your work format or completed work onto a disk file for later retrieval.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
FILENAME	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper left coordinate of the worksheet area rectangle you wish to print and type:

/P	starts PRINT COMMAND
P	printer

Type in the lower right-hand coordinate address of the worksheet area rectangle you wish to print and type:

RETURN	executes the command

ENGINEERING FORMULA

DESCRIPTION

VisiCalc presents an excellent tool for working complex calculations with relative ease when compared to using individual calculator operations for each step. In this exercise, you will modify a mathematical formula to VisiCalc entry format. You will then enter the formula and exercise the computations by changing the formula parameters.

To demonstrate VisiCalc's ability, an engineering formula was selected to demonstrate mathematical calculation entry and operation, and was taken from an engineering handbook. Conversion of the formula to a form that can be entered into the VisiCalc worksheet is illustrated. Identifying and labeling variable parameter locations, and entry and exercise of the formula, is demonstrated.

OPERATIONS PERFORMED

Converting Mathematical Formulas to VisiCalc Entry Format

Identifying and Labeling Variable Parameter Locations

Entering a Mathematical Formula

Entering Calculation Values

FUNCTIONS USED

COS

SQRT

^ to the power of

7 EXERCISE

Figure 1 illustrates the mathematical formula used in this exercise, along with identification of the parameters used.

Resultant force (R) of two forces, F_1 and F_2, which make an angle α with each other, the angle between the resultant force **R** and the force F_1 being θ.

$$R = \sqrt{F_1^2 + F_2^2 + 2F_1F_2\cos\alpha}.$$

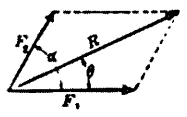


FIG. 495.

Figure 1

Your first operation is to prepare the formula for conversion to a form that can be entered into the VisiCalc worksheet. To do this, write the calculating operations in sequential form, substituting VisiCalc functions where appropriate. The modified mathematical formula is illustrated in Figure 2.

NOTE

The SIN, COS and TAN functions are calculated internally by VisiCalc in radians. To obtain the natural SIN, COS and TAN values from SIN, COS and TAN calculations in VisiCalc, it is necessary to divide by the conversion factor 57.30. The example in this section using the COS function is illustrated with this conversion factor added as a part of the operation.

```
R = @SQRT(((F1^2)+(F2^2))+(2*F1*F2*(@COS(a/57.30))))
```

Figure 2

Now, select locations where you will enter the formula parameter values on your worksheet and type in an identifying label in the column to the left of each one.

In this example, the label for parameter (F1) will be located in coordinate A1, and the value will be in coordinate B1.

The label for parameter (F2) will be located in coordinate A2, and the value will be in coordinate B2.

The label for (a) will be located in coordinate A3, and the value will be in coordinate B3.

The label for (R) will be located in coordinate A4. The formula for (R) will be entered in coordinate B4.

Your next operation is to type in the identifying labels for your parameter values, as illustrated in Figure 3.

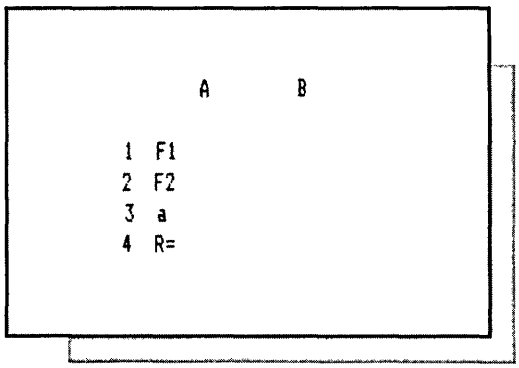


Figure 3

Place your cursor on A1 and type:

F1	label for parameter F1

Place your cursor on A2 and type:

F2	label for parameter F2

Place your cursor on A3 and type:

a	label for parameter a

Place your cursor on A4 and type:

R=	label for parameter R

Now, enter your formula to calculate (R) in B4.

Place your cursor on B4 and type:

@SQRT(	calculates the square root of the following value
(	parenthesis-separates calculations in the formula
(B1	coordinate where (F1) value is located
^	tells the computer to take the previous value to the power indicated
2)	power
+	adds

(B2	coordinate containing (F2) value
^	tells the computer to take the previous value to the power indicated
2))	power
+	adds
(2	value
*	multiplies
B1	coordinate containing (F1) value
*	multiplies
B2	coordinate containing (F2) value
*	multiplies
(@COS(	cosine
B3	coordinate containing (a) value
/	divides
57.3	divisor-factor for converting to natural cosine value
))))	parentheses-encloses calculations within formula
RETURN	enters formula

Your formula is now entered on your worksheet and ready to use. To exercise your formula, type in the sample entries illustrated in Figure 4. By changing the input parameters, you can continually recalculate the value of (R).

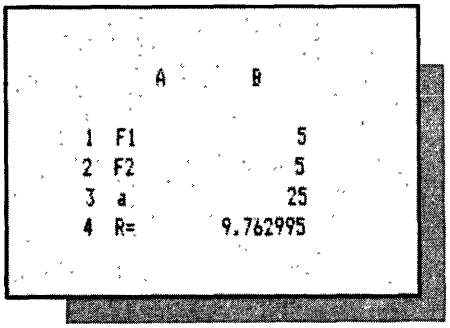


Figure 4

ACCOUNTS PAYABLE

DESCRIPTION

VisiCalc has the ability to provide automatic calculation of columns and rows when new entries are inserted.

To demonstrate VisiCalc's ability, a monthly ACCOUNTS PAYABLE worksheet has been set up. Updating functions are performed as necessary. The accumulated totals of each column are automatically calculated and displayed at the bottom of each column. The updating of an entry in any column or row will update the entire column or row.

OPERATIONS PERFORMED

Setting Up The Worksheet Format

Entering Mathematical Formulas

Making Worksheet Entries

Making Additional Worksheet Entries

Saving

Printing

FUNCTIONS USED

IF

LOOKUP

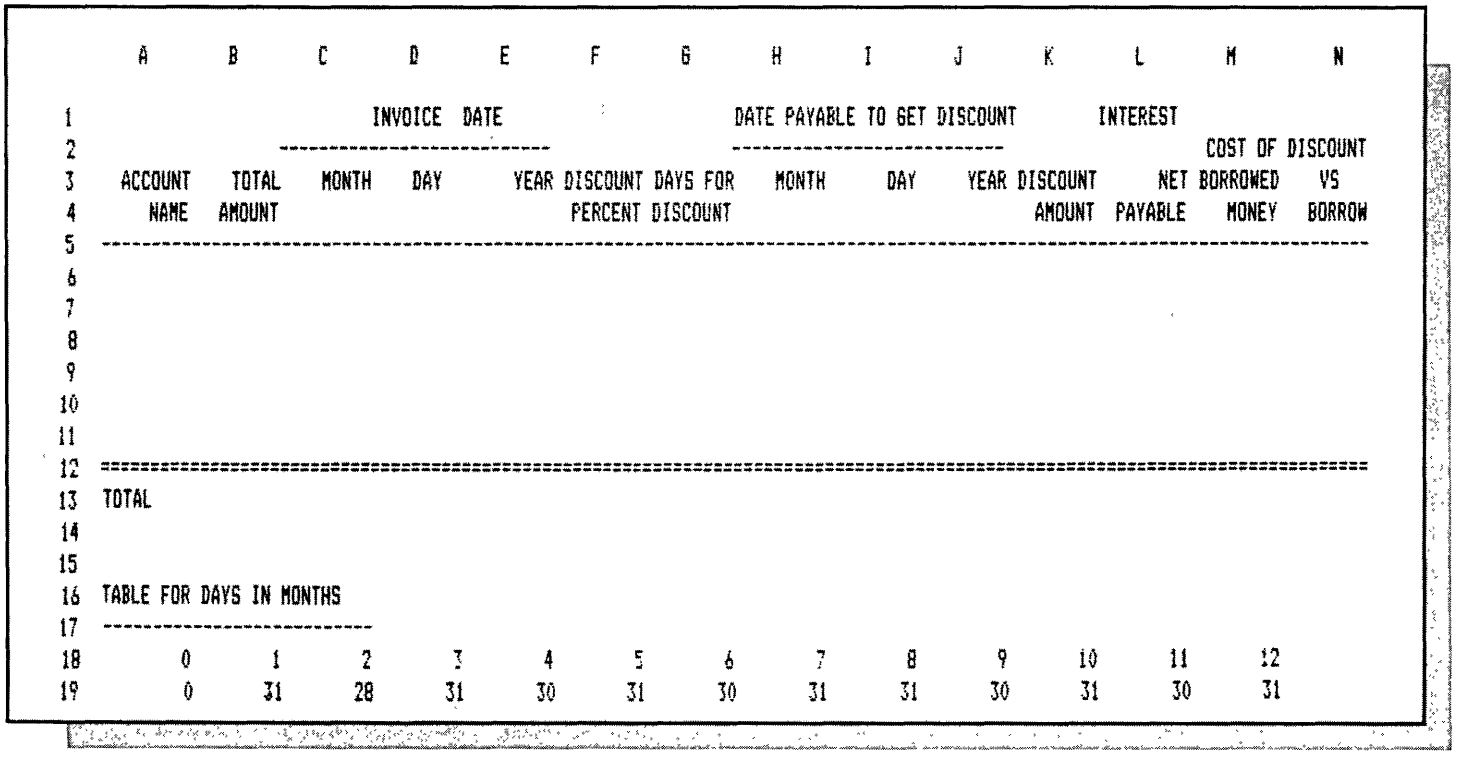
SUM

COMMANDS USED

FORMAT	$ = displays in dollars and cents
FORMAT	R = justifies right
GLOBAL	manual recalculates
PRINT	
REPEAT LABEL	
REPLICATE	copies
STORAGE	saves

SETTING UP THE WORKSHEET FORMAT

To set up and label the execise format on your worksheet, use the following directions, copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.



	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1				INVOICE DATE				DATE PAYABLE TO GET DISCOUNT				INTEREST		
2				---				---						COST OF DISCOUNT
3	ACCOUNT NAME	TOTAL AMOUNT	MONTH	DAY	YEAR	DISCOUNT PERCENT	DAYS FOR DISCOUNT	MONTH	DAY	YEAR	DISCOUNT AMOUNT	NET PAYABLE	BORROWED MONEY	VS BORROW
4														
5	---													
6														
7														
8														
9														
10														
11														
12	===													
13	TOTAL													
14														
15														
16	TABLE FOR DAYS IN MONTHS													
17	---													
18	0	1	2	3	4	5	6	7	8	9	10	11	12	
19	0	31	28	31	30	31	30	31	31	30	31	30	31	

Figure 1

VisiCalc automatically calculates the worksheet. However, due to the size of the calculations in this exercise, you may want to manually calculate the worksheet after making your entries.

To set up the worksheet for manual calculation, type:

/G	starts GLOBAL command
R	recalculates
M	manual

To enter your column labels, place your cursor on the location where you want to make your entry. (VisiCalc automatically left justifies the label.) To right justify the label, type:

/F	starts FORMAT command
R	justifies right

Type in the column label.

Depressing the cursor (directional) key enters the label into the location and allows the cursor to be advanced to the next location.

NOTE

When entering a label that contains more characters than the width of the column allows, you must move the cursor to the next adjacent column and continue typing the label. Type in the rest of your column headings using the sequence of commands above.

To enter dashed lines on your ledger sheet, place your cursor on the column and row where you want your dashed line to start (coordinate C2 in Figure 1). Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column your cursor is on will now have a dashed line across its width. To extend the dashed line in the same row, across other columns, leave your cursor on C2 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
D2	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
E2	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns that you have indicated by your coordinates. To enter a double dashed line on your worksheet, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationship between column and row positions. The formulas and their positions are illustrated in Figure 2.

8 EXERCISE

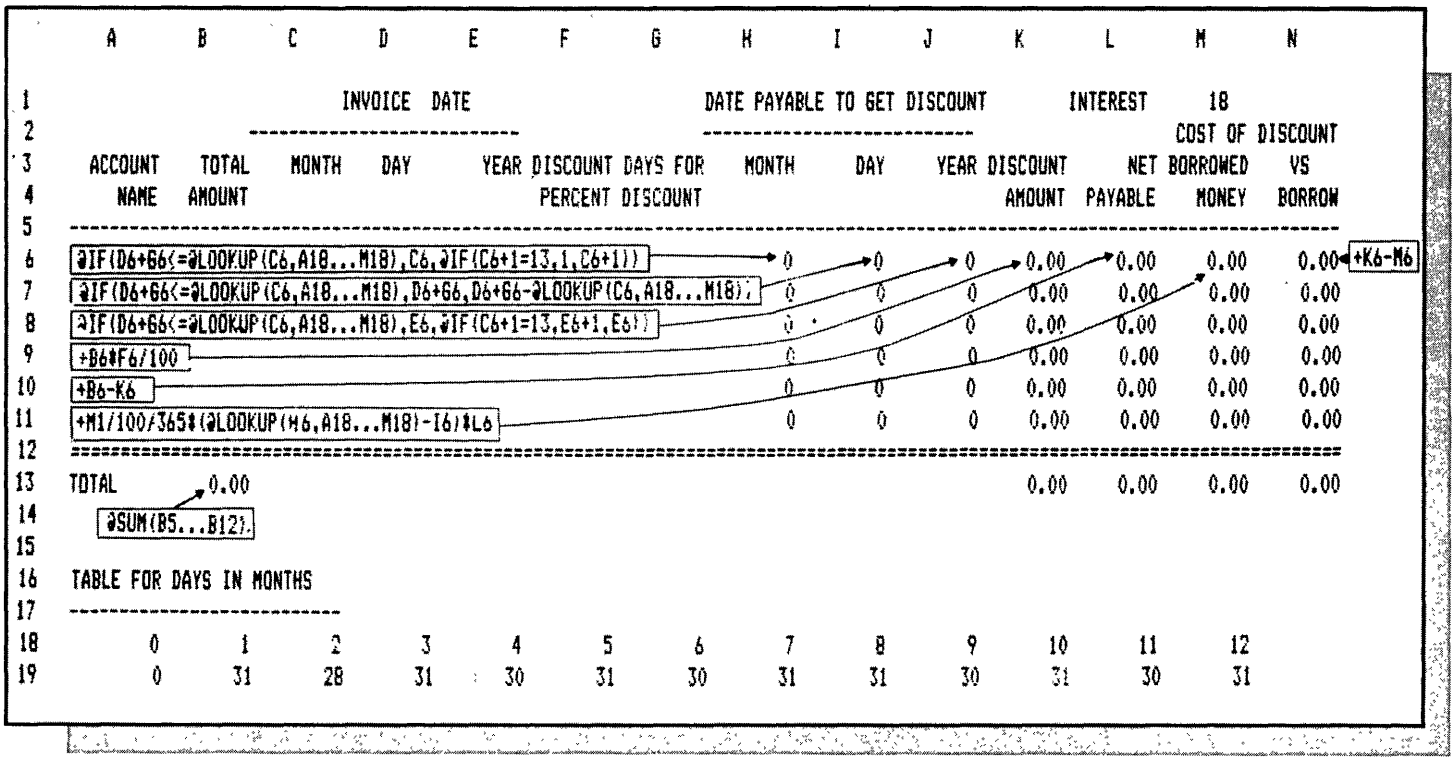


Figure 2

Formula one, in the MONTH column of the DATE PAYABLE TO GET DISCOUNT column, utilizes IF logic function and LOOKUP function to determine the month in which the payment must be paid to enable you to take the discount.

NOTE

If logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression. In the following formula, the value of the third expression is generated by the use of a second IF function.

Place your cursor on H6 and type:

@IF(	starts IF logic function
D6+G6	part of the first expression, which generates the first value to be compared

<=	LOGICAL OPERATORS, compare the first value against the second value, and result in the logical value of true or false
@LOOKUP(	starts LOOKUP function, which generates the second value to be compared
C6	coordinate containing value to look up
,	comma-separates LOOKUP value from the reference table
A18	first coordinate in the reference table
.	ellipsis . . . indicating from-to
M18	last coordinate in the reference table
)	closes LOOKUP function
,	comma-separates expressions in the formula
C6	second expression in IF function, which is selected if the first expression is true
,	comma-separates expressions in the formula
@IF(	starts the second IF logic function, which generates the value for the third expression, which is selected if the first expression is false
C6+1	part of the first expression in the second IF function, which generates the first value to be compared
=	LOGICAL OPERATOR, compares the first value against the second value and results in the logical value of true or false
13	second value to be compared
,	comma-separates expressions in the formula
1	second expression in the second IF function, which is selected if the first expression is true
,	comma-separates expressions in the formula

C6+1	third expression in the second IF function, which is selected if the first expression is false
)	closes second IF logic function
)	closes first IF logic function
RETURN	enters the formula

Formula two, in the DAY column, of the DATE PAYABLE TO GET DISCOUNT column, utilizes IF logic function and LOOKUP function to determine the day that the payable must be paid to allow you to take the discount.

NOTE

IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

Place your cursor on I6 and type:

@IF(	starts IF logic function
D6+G6	part of the first expression, which generates the first value to be compared
<=	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false
@LOOKUP(	starts LOOKUP function, which generates the second value to be compared
C6	coordinate containing value to look up
,	comma-separates LOOKUP value from the reference table
A18	first coordinate in the reference table
.	ellipsis . . . indicating from-to
M18	last coordinate in the reference table
)	closes LOOKUP function

,	comma-separates expressions in the formula
D6+G6	second expression in the IF function, which is selected if the first expression is true
,	comma-separates expressions in the formula
D6+G6	beginning of the third expression, which generates part of the value of the third expression which will be selected if the first expression is false
—	subtracts
@LOOKUP(	starts LOOKUP function, which generates the value to be subtracted in the third expression
C6	coordinate containing value to look up
,	comma-separates LOOKUP value from the reference table
A18	first coordinate in the reference table
•	ellipsis . . . indicating from-to
M18	last coordinate in the reference table
)	closes LOOKUP function
)	closes the formula
RETURN	enters the formula

Formula three, in the YEAR column, of the DATE PAYABLE TO GET DISCOUNT column, utilizes IF logic function and LOOKUP function, to determine the year in which the payable must be paid to allow you to take the discount.

NOTE

IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

In the following formula, the value of the third expression is generated by the use of a second IF function.

Place your cursor on J6 and type:

@IF(	starts IF logic function
D6+G6	part of the first expression, which generates the first value to be compared
<=	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false
@LOOKUP(	starts LOOKUP function, which generates the second value to be compared
C6	coordinate containing value to LOOKUP
,	comma-separates LOOKUP value from the reference table
A18	first coordinate in the reference table
.	ellipsis . . . indicating from-to
M18	last coordinate in the reference table
)	closes LOOKUP Function
,	comma-separates expressions in the formula
E6	second expression in the IF function, which is selected if the first expression is true
,	comma-separates expressions in the formula

@IF(	starts the second IF logic function, which generates the value for the third expression, which is selected if the first expression is false
C6+1	part of the first expression in the second IF function, which generates the first value to be compared
=	LOGICAL OPERATOR, compares the first value against the second value and results in the logical value of true or false
13	second value to be compared
,	comma-separates expressions in the formula
E6+1	second expression in the second IF function, which is selected if the first expression is true
,	comma-separates expressions in the formula
E6	third expression in the second IF function, which is selected if the first expression is false
)	closes second IF logic function
)	closes first IF logic function
RETURN	enters the formula

Formula four, in the DISCOUNT AMOUNT column, calculates the discount amount, and displays it in dollars and cents.

Place your cursor on K6 and type:

+	prepares coordinate to accept a numeric expression
B6	coordinate containing total amount
*	multiplies
F6	coordinate containing discount percent
/	divides
100	value
RETURN	enters the formula

/F	starts FORMAT command
$	displays in dollars and cents

Formula five, in the NET PAYABLE column, calculates the net payable amount and displays it in dollars and cents.

Place your cursor on coordinate L6 and type:

+	prepares coordinate to accept a numeric expression
B6	coordinate containing total amount
—	subtracts
K6	coordinate containing discount amount
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

To enter the bank interest which will be used in the following formula,

Place your cursor on coordinate M1 and type:

18	value
RETURN	enters the value

Formula six, in the COST OF BORROWED MONEY column, makes the following assumptions: That all bills are received on the first day of the month and are due on the last day of the month; that all discounted bills are paid on the date payable to get discount; that the money to pay the discounted bills does not come from cash flow, but is borrowed from the bank on the date payable to get discount, and is paid back on the last day of the month.

This formula calculates the cost of borrowing the money from the date payable to get discount through the last day of the month.

Place your cursor on M6 and type:

+	prepares coordinate to accept a numeric expresion
M1	coordinate containing bank interest rate

/	divides
100	number used to reduce the value generated to a percentage
/	divides
365	number used to reduce the bank interest to a percent per day value
*	multiplies
(@LOOKUP(	starts LOOKUP function, which generates the value to be multiplied
H6	coordinate containing value to look up
,	comma-separates LOOKUP value from the reference table
A18	first coordinate in the reference table
.	ellipsis . . . indicating from-to
M18	last coordinate in the reference table
)	closes LOOKUP function
—	subtracts
I6	coordinate containing day of Date Payable
)	closes subtraction function from LOOKUP
*	multiplies result generated
L6	coordinate containing net payable
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula seven, in the DISCOUNT VS BORROW column, subtracts the cost of the borrowed money from the amount of discount received. This enables you to see whether you have actually gained or lost money by borrowing the money necessary to pay the bills and take the discount.

8 EXERCISE

Place your cursor on N6 and type:

+	prepares coordinate to accept a numeric expression
K6	coordinate containing discount amount
—	subtracts
M6	coordinate containing cost of borrowed money
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Your next operation is to copy, using REPLICATE command, the formulas just entered at the top of each column into each row in the respective columns.

Place your cursor on H6 and type:

/R	starts REPLICATE command
N6	copies all entries across columns H6 to N6
RETURN	prepares to receive additional information
H7	first coordinate where you wish to copy the formulas down columns
.	ellipsis . . . indicating from-to
H11	last coordinate where you wish to copy the formulas down columns
RETURN	executes the command and prepares to receive additional instructions

R R R	tells the command to copy the coordinate address in the formula relative to its new location
N N	tells the command to copy the coordinate address in the formula in its new location without change

R
R
R
R
R
R
R
N
N
R
R
R
R
R
R
N
N
R
R
R
N
N
R
R
R
R
R
R
R
N
R
N
N
R
R
R
R
R

Formula eight, in the TOTAL AMOUNT column, calculates the total amount of payables to be paid, prior to any discounts being taken.

Place your cursor on B13 and type:

@SUM(	adds values in the list
B5	first coordinate in the list

.	ellipsis . . . indicating from-to
B12	last coordinate in the list
)	closes the list
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Your next operation is to copy, using REPLICATE command, the formula just entered into the respective row at the bottom of each appropriate column.

Place your cursor on B13 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in B13
K3	first coordinate where you wish to copy the formula across columns
.	ellipsis . . . indicating from-to
N13	last coordinate where you wish to copy the formula across columns
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location

MAKING WORKSHEET ENTRIES

Enter worksheet entries exactly as illustrated in Figure 3, retaining exact row and column locations of all information.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1				INVOICE DATE				DATE PAYABLE TO GET DISCOUNT				INTEREST	18	
2													COST OF	DISCOUNT
3	ACCOUNT	TOTAL	MONTH	DAY	YEAR	DISCOUNT	DAYS FOR	MONTH	DAY	YEAR	DISCOUNT	NET	BORROWED	VS
4	NAME	AMOUNT				PERCENT	DISCOUNT				AMOUNT	PAYABLE	MONEY	BORROW
5														
6	TYLER	500	6	2	82	1	10	6	12	82	5.00	495.00	**4.39**	**0.61**
7	TIFFANY	900	6	12	82	1.5	15	6	27	82	13.50	886.50	**1.31**	**12.19**
8	KAREN	1500	12	25	82	1.25	10	1	4	83	18.75	1481.25	**19.72**	**-0.97**
9								0	0	0	0.00	0.00	0.00	0.00
10								0	0	0	0.00	0.00	0.00	0.00
11								0	0	0	0.00	0.00	0.00	0.00
12														
13	TOTAL	2900.00									37.25	2862.75	**25.42**	**11.83**
14														
15														
16	TABLE FOR DAYS IN MONTHS													
17														
18	0	1	2	3	4	5	6	7	8	9	10	11	12	
19	0	31	28	31	30	31	30	31	31	30	31	30	31	

Figure 3

After the entries have been made, you will want to do a manual recalculation to calculate the entire sheet at one time.

To perform this function, depress the following key:

!	manual recalculation

MAKING ADDITIONAL WORKSHEET ENTRIES

To make additional worksheet entries after you have manually recalculated, simply complete the following operations:

Place your cursor on the coordinate whose value you wish to change, and type the new value for that coordinate. Then type:

!	manual recalculation

SAVING

In some instances you may wish to store your work format or completed work on a disk file for later retrieval.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
FILENAME	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper-left coordinate of the worksheet area rectangle that you wish to print and type:

/P	starts PRINT command
P	printer

Type in the lower-right coordinate of the worksheet area rectangle that you wish to print and press:

RETURN	executes the command

PAYROLL REPORTING

DESCRIPTION

VisiCalc has the ability to allow the updating, storage, retrieval and use of multiple worksheets. VisiCalc allows you to draw information from one worksheet, and insert it into another worksheet, for updating and accumulating purposes.

To demonstrate VisiCalc's ability, Exercise Nine consists of two worksheets, a MONTHLY PAYROLL worksheet and a QUARTERLY PAYROLL worksheet. Information for the QUARTERLY PAYROLL worksheet is updated from the MONTHLY PAYROLL worksheet, allowing you to keep updated quarterly year to date totals, and the MONTHLY PAYROLL worksheet to receive YTD totals from the QUARTERLY PAYROLL worksheet.

OPERATIONS PERFORMED

Setting Up The Wòrksheet

Entering Mathematical Formulas

Making Worksheet Entries

Making Ledger Entries to Worksheet

Saving Worksheet

Loading Worksheet

Printing

FUNCTIONS USED

LOOKUP

MAX

MIN

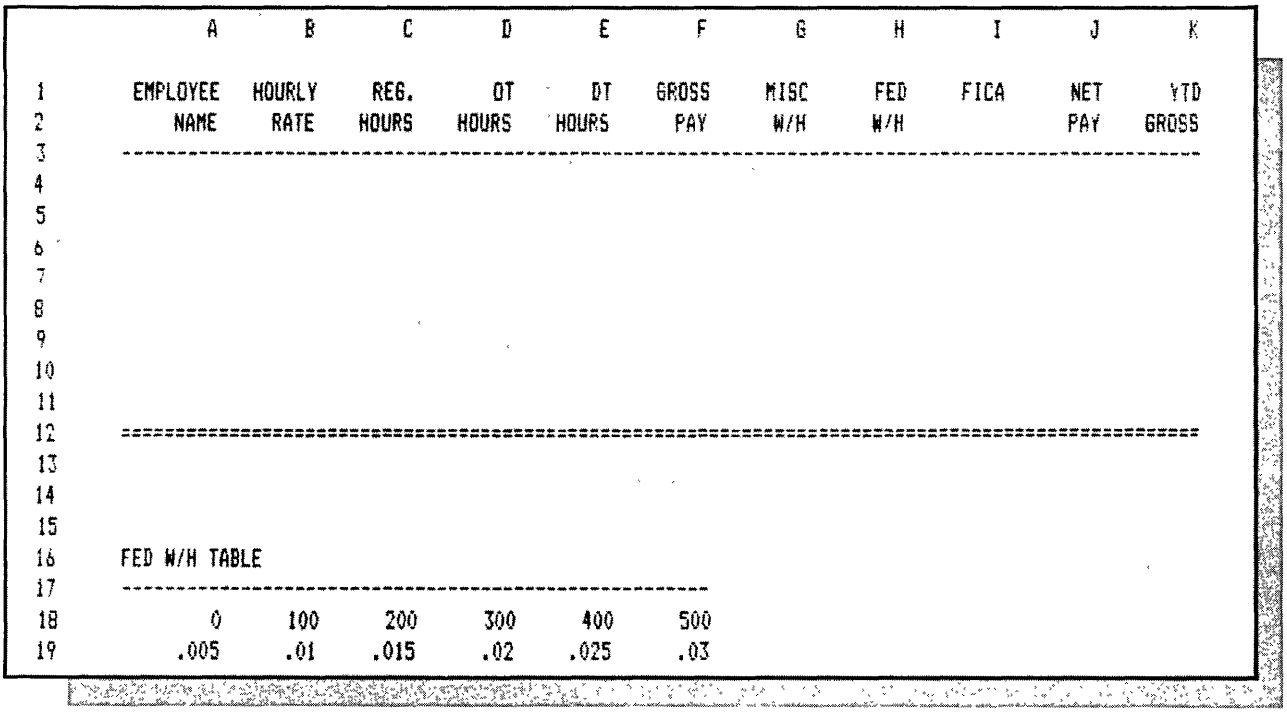
SUM

COMMANDS USED

CLEAR	
FORMAT	R = justifies right
FORMAT	$ = displays in dollars and cents
PRINT	
REPEAT LABEL	
REPLICATE	copies
STORAGE	# = saves a (DIF) Data Interchange Format file
STORAGE	# = loads a (DIF) Data Interchange Format file

SETTING UP THE WORKSHEET FORMAT

The first worksheet that you will set up and label is the MONTHLY PAYROLL WORKSHEET. To do this, use the following directions, copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.



	A	B	C	D	E	F	G	H	I	J	K
1	EMPLOYEE	HOURLY	REG.	OT	DT	GROSS	MISC	FED	FICA	NET	YTD
2	NAME	RATE	HOURS	HOURS	HOURS	PAY	W/H	W/H		PAY	GROSS
3	---										
4											
5											
6											
7											
8											
9											
10											
11											
12	===										
13											
14											
15											
16	FED W/H TABLE										
17	---										
18	0	100	200	300	400	500					
19	.005	.01	.015	.02	.025	.03					

Figure 1

To enter your column labels, place your cursor on the location where you want to make your entry. VisiCalc automatically left justifies the label; to right justify the label, type:

/F	starts FORMAT command
R	justifies right

Type the column label.

Depressing the cursor (directional) key enters the label into the location and allows the cursor to be advanced to the next location.

NOTE

When entering a label that contains more characters than the width of the column allows, you must move the cursor to the next adjacent column and continue typing the label.

Type in the rest of your column headings using the sequence of commands above.

To enter dashed lines on your worksheet, place your cursor on the column and row where you want your dashed line to start (coordinate A3 in Figure 1). Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column that your cursor is on will now have a dashed line across its width. To extend the dashed line in the same row, across other columns, leave your cursor where it is and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B3	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
K3	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns that you have indicated by your coordinates. To enter a double dashed line on your worksheet, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationship between column and row positions. The formulas and their positions are illustrated in Figure 2.

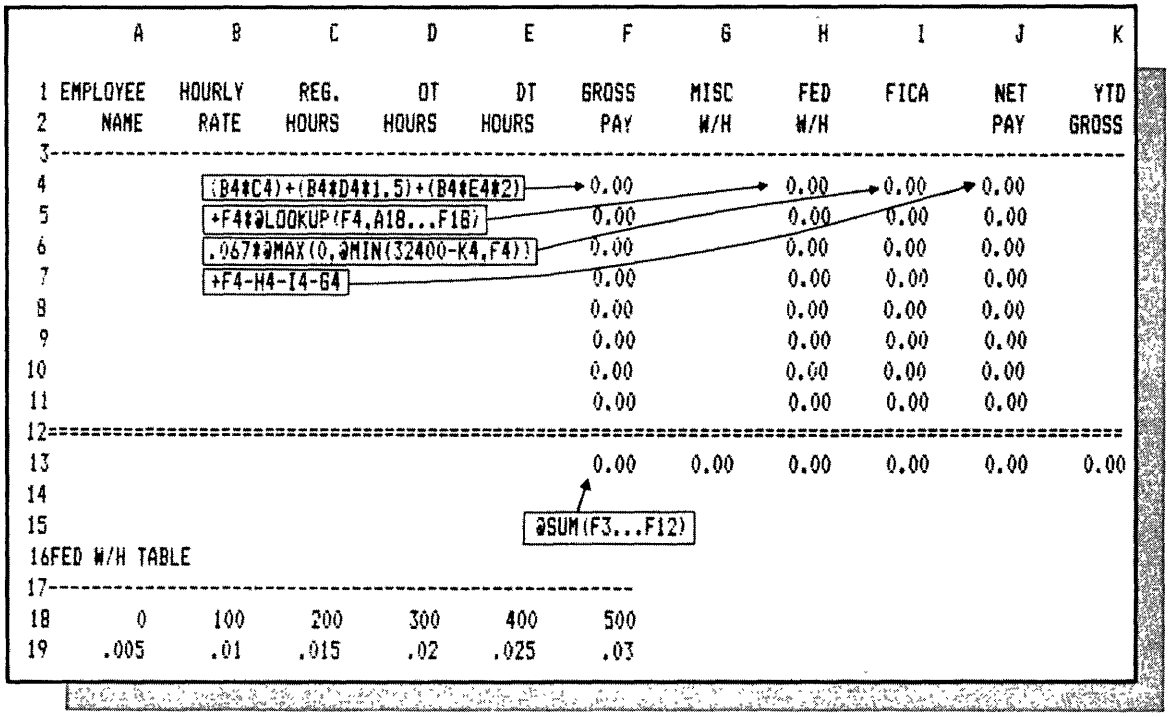


Figure 2

Formula one, in the GROSS PAY column, figures total gross pay by first taking the total number of regular hours worked, and multiplying that times the hourly rate. It then takes the number of overtime hours worked and multiplies that one and one-half times the hourly rate. It then takes the number of double time hours worked and multiplies the total by two times the hourly rate. It adds the three totals and displays the total amount in the GROSS PAY Column.

Place your cursor on F4 and type:

(	starts first expression
B4	coordinate containing hourly rate
*	multiplies
C4	coordinate containing regular hours
)	closes first expression
+	adds
(	opens second expression
B4	coordinate containing hourly rate
*	multiplies

D4	coordinate containing overtime hours
*	multiplies
1.5	value
)	closes second expression
+	adds
(	opens third expression
B4	coordinate containing hourly rate
*	multiplies
E4	coordinate containing double time hours
*	multiplies
2	value
)	closes third expression and formula
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula two, in the FED W/H column, takes the amount of gross pay and multiplies it times a value generated by a LOOKUP of the FED W/H table. With these operations, formula number two calculates the correct amount of money payable to FED W/H and displays that amount in dollars and cents.

NOTE

The table shown is for demonstration purposes only. It is not meant to be used for actual calculation of the FED W/H.

Place your cursor on H4 and type:

+	prepares coordinate to accept a numeric expression
F4	coordinate containing gross pay
*	multiplies
@LOOKUP(	starts LOOKUP function, which generates the second value to be multiplied

F4	coordinate containing value to look up
,	comma, separates LOOKUP value from the reference table
A18	first coordinate in the reference table
.	ellipsis . . . indicating from-to
F18	last coordinate in the reference table
)	closes LOOKUP function
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula three, in the FICA column, calculates the amount of money to be paid to FICA, up to a gross pay amount of $32,400. It then displays the amount payable, in dollars and cents. This formula uses a MAX function to select a fixed value, or the value generated from a list by the MIN function.

Place your cursor on I4 and type:

.067	value to multiply by
*	multiplies
@MAX	selects the maximum value of the following list
(	opens the list
0	value in the list
,	comma-separates values in the list
@MIN	selects the minimum value of the following list, which will generate the second value in the first list
(	opens the second list
32400	value
—	subtracts

K4	coordinate containing YTD gross
,	comma-separates values in the list
F4	coordinate containing value in the second list
)	closes the second list
)	closes the first list
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula four, in the NET PAY column, subtracts the amounts in the FED W/H, FICA, and MISC. W/H columns from the GROSS PAY amount to arrive at a NET PAY figure. It then displays that figure in dollars and cents.

Place your cursor on J4 and type:

+	prepares coordinate to accept a numeric expression
F4	coordinate containing gross pay
—	subtracts
H4	coordinate containing Fed. W/H
—	subtracts
I4	coordinate containing FICA
—	subtracts
G4	coordinate containing Misc. W/H
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Your next operation is to copy, using REPLICATE command, the formulas that you just entered, in the appropriate rows and columns on the worksheet.

9 EXERCISE

Place your cursor on F4 and type:

/R	starts REPLICATE command
J4	copies all entries across columns, F4 through J4
RETURN	prepares to receive additional information
F5	first coordinate where you wish to copy the formulas down columns
.	ellipsis . . . indicating from-to
F11	last coordinate where you wish to copy the formulas down columns
RETURN	executes the command and prepares to receive additional instructions
R R R R R R R R	tells the command to copy the coordinate address in the formula relative to its new location
N N	tells the command to copy the coordinate address in the formula in its new location without change
R R R R R R	

Formula five, in the GROSS PAY column, calculates the total of the gross pay at the bottom of the column and displays that amount in dollars and cents.

Place your cursor on F13 and type:

@SUM(	adds values in the list
F3	first coordinate of the column that you wish to add
.	ellipsis . . . indicating from-to

F12)	last coordinate of the column that you wish to add
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Your next operation is to copy, using REPLICATE command, the formula just entered in the GROSS PAY column, into the row at the bottom of each appropriate column.

Place your cursor on F13 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in F13
G13	first coordinate where you wish to copy the formula across columns
.	ellipsis . . . indicating from-to
K13	last coordinate where you wish to copy the formula across colums
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location.

SAVING

Now that the monthly worksheet is completed, you will need to save it on a disk for later use.

To save the entire worksheet type:

/S	starts STORAGE command
S	saves
MONTHLY.RPT	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on the upper-left coordinate of the worksheet area rectangle that you wish to print, coordinate A1, and type:

/P	starts PRINT command
P	printer
K19	the lower-right coordinate of the worksheet area rectangle that you wish to print
RETURN	executes the command

Now that your worksheet formatting is complete, you may wish to print the formulas for later use.

To print the formulas, type:

/S	starts STORAGE command
S	saves
.PRINTER	prints the file
RETURN	executes the command

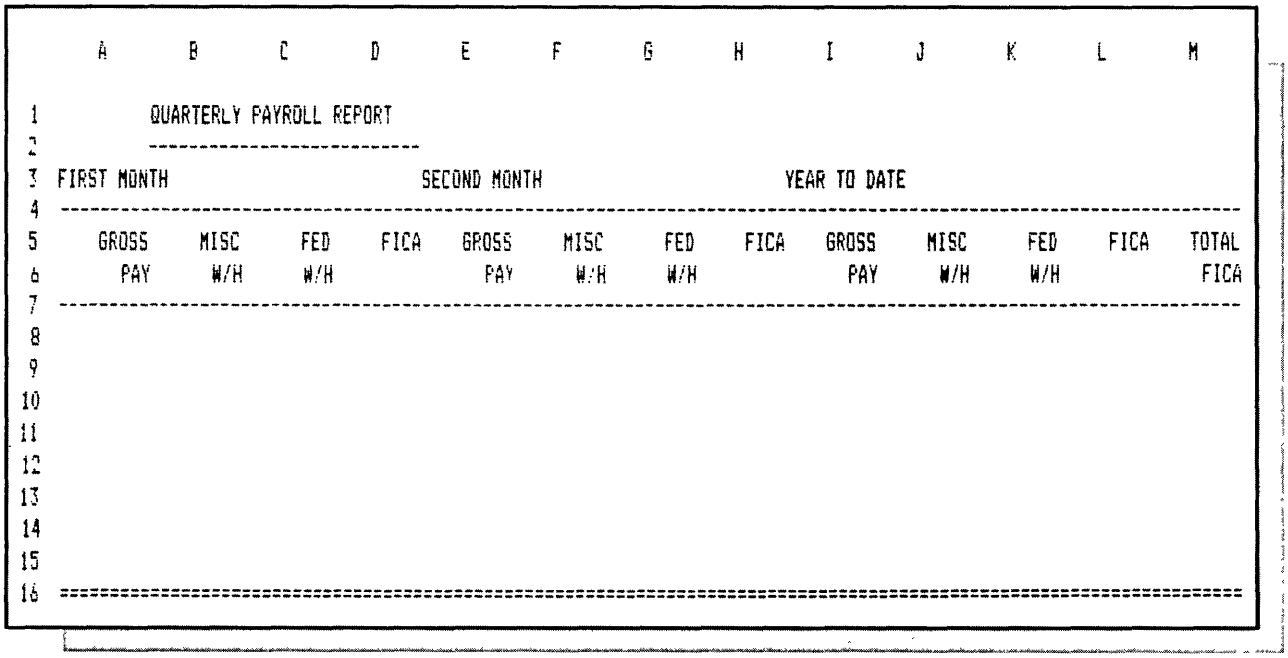
SETTING UP THE WORKSHEET FORMAT

Prior to setting up a second worksheet, you must be sure that you have cleared memory. To do this, type:

/C	starts CLEAR command
Y	yes, clears memory and executes the command

The second worksheet that you will set up and label is the QUARTERLY PAYROLL REPORT worksheet. Copy Figure 3 exactly as it is illustrated, retaining exact row and column locations of all information.

For the purpose of demonstration, we are only going to use two months in the quarter.



	A	B	C	D	E	F	G	H	I	J	K	L	M
1		QUARTERLY PAYROLL REPORT											
2		---											
3	FIRST MONTH				SECOND MONTH				YEAR TO DATE				
4	---												
5	GROSS	MISC	FED	FICA	GROSS	MISC	FED	FICA	GROSS	MISC	FED	FICA	TOTAL
6	PAY	W/H	W/H		PAY	W/H	W/H		PAY	W/H	W/H		FICA
7	---												
8													
9													
10													
11													
12													
13													
14													
15													
16	==========												

Figure 3

To format all coordinates to display value entries in dollars and cents, type:

/G	starts GLOBAL command
F	FORMAT
$	dollars and cents

To enter your column labels, place your cursor on the location where you want to make your entry. (VisiCalc automatically left justifies the label.) To right justify the label, type:

/F	starts FORMAT command
R	justifies right

Type the column label.

Depressing the cursor (directional) key enters the label into the location and allows the cursor to be advanced to the next location.

NOTE

When entering a label that contains more characters than the width of the column allows, you must move the cursor to the next adjacent column and continue typing the label.

Type in the rest of your column headings, using the sequence of commands above.

To enter dashed lines on your worksheet, move your cursor to the column and row where you want your dashed line to start (coordinate B2 in Figure 3). Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column that your cursor is on will now have a dashed line across its width. To extend the dashed line in the same row, across the other columns, leave your cursor where it is and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
C2	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
D2	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed lines will appear extended across the columns that you have indicated by your coordinates. To enter a double dashed line, or any other character, on your worksheet, repeat the operations above, using whatever character you chose as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationship between column and row positions. The formulas and their positions are illustrated in Figure 4.

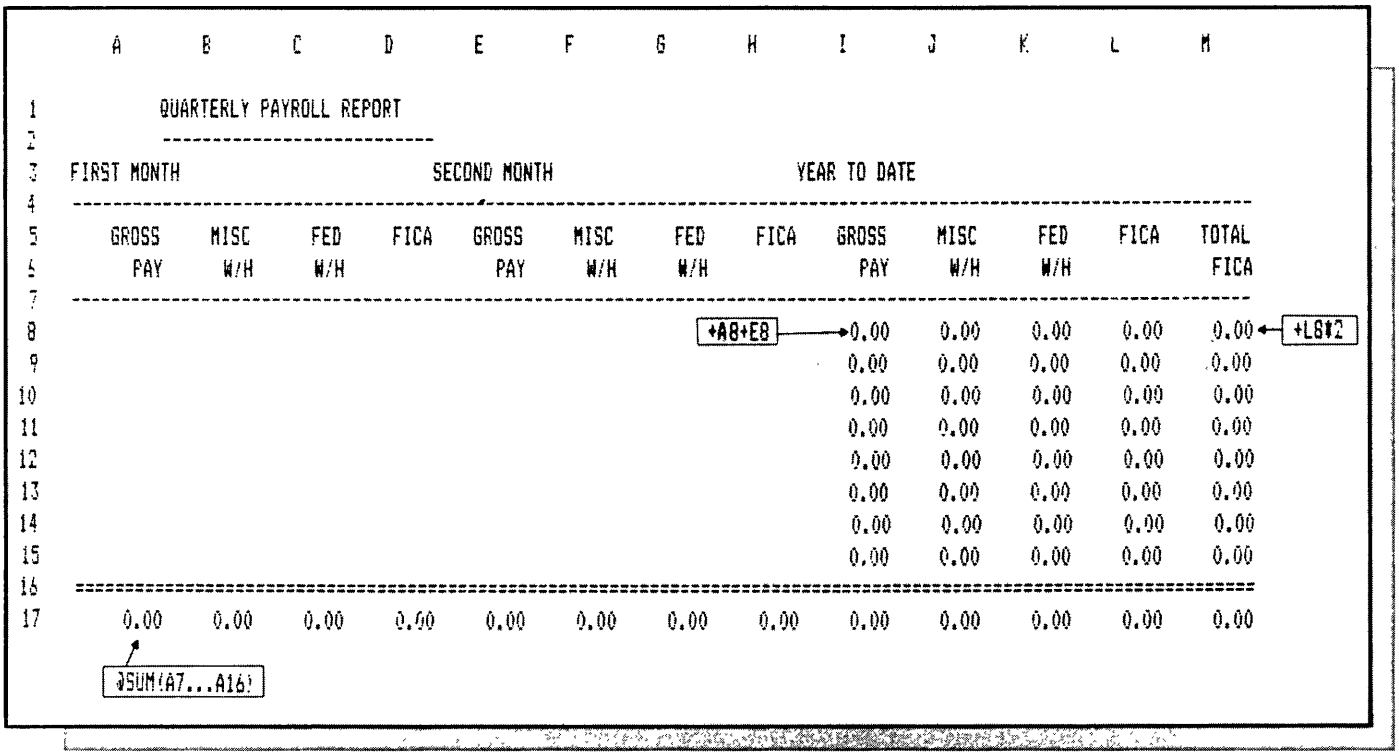


Figure 4

Formula one, in the YEAR TO DATE, GROSS PAY column, takes the amount of gross pay in the first and second months, totals the amount and displays it in dollars and cents.

Place your cursor on I8 and type:

+	prepares coordinate to accept a numeric expression
A8	coordinate containing first month, gross pay
+	adds
E8	coordinate containing second month, gross pay
RETURN	enters the formula

Your next operation is to copy the YTD, GROSS PAY formula that you just entered across the row into the MISC W/H, FED W/H and FICA columns.

Place your cursor on I8 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in I8
J8	first coordinate where you wish to copy the formulas across rows
.	ellipsis . . . indicating from-to
L8	last coordinate where you wish to copy the formulas across rows
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location.

Formula two calculates the total amount of FICA due, by taking the amount in the FICA column and multiplying by two.

Place your cursor on M8 and type:

+	prepares coordinate to accept a numeric expression
L8	coordinate containing FICA
*	multiplies
2	value
RETURN	enters the formula

The next operation is to copy the formulas in the YTD, GROSS PAY, MISC W/H, FICA and TOTAL FICA down the columns.

Place your cursor on I8 and type:

/R	starts REPLICATE command
M8	copies all entries across columns I8 through M8
RETURN	prepares to receive additional information

I9	first coordinate where you wish to copy formulas down columns
.	ellipsis . . . indicating from-to
I15	last coordinate where you wish to copy formulas down columns
RETURN	executes the command and prepares to receive additional instructions
R R R R R R R R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula three totals the first month's GROSS PAY column.

Place your cursor on A17 and type:

@SUM(	adds values in list
A7	first coordinate in the list
.	ellipsis . . . indicating from-to
A16	last coordinate in the list
)	closes the list
RETURN	enters the formula

The next operation is to copy the formula just entered, at the bottom of the FIRST MONTH GROSS PAY column, across the columns, starting with the FIRST MONTH MISC W/H through the TOTAL FICA column.

Place your cursor on A17 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in A17
B17	first coordinate where you wish to copy the formulas across columns

.	ellipsis . . . indicating from-to
M17	last coordinate where you wish to copy the formulas across columns
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location

SAVING

Now that your QUARTERLY PAYROLL REPORT worksheet is completed, you will need to save it on a disk for later use.
To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
QTRLY.RPT	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

You may wish to print a portion or all of your worksheet for filing or distribution.

Place your cursor on A1, the upper-left coordinate of the worksheet area rectangle that you wish to print, and type:

/P	start PRINT command
P	printer
M17	the lower-right coordinate of the worksheet area rectangle that you wish to print
RETURN	executes the command

The last operation for you to perform is to clear memory of the QUARTERLY PAYROLL REPORT worksheet. To do this, type:

/C	starts CLEAR command
Y	yes, clears memory and executes the command

MAKING WORKSHEET ENTRIES

The first operation is making MONTHLY PAYROLL REPORT entries. To do this you must load the computer. (Computer memory should already be cleared.)

To load the MONTHLY PAYROLL REPORT worksheet into memory, type:

/S	starts STORAGE command
L	loads file
MONTHLY.RPT	name of file; do not type spaces between words
RETURN	executes the command

You are now ready to make entries to your monthly report as illustrated in Figure 5.

	A	B	C	D	E	F	G	H	I	J	K
1	EMPLOYEE	HOURLY	REG.	OT	DT	GROSS	MISC	FED	FICA	NET	YTD
2	NAME	RATE	HOURS	HOURS	HOURS	PAY	W/H	W/H		PAY	GROSS
3	---	---	---	---	---	---	---	---	---	---	---
4	TIFFANY	3.5	40	1	1	152.25		1.52	10.20	140.53	
5	TYLER	5.65	40	5		268.38		4.03	17.98	246.37	
6	WILLIAMS	9.55	40		4	458.40		11.46	30.71	416.23	
7	KING	9.55	40	2	3	467.95		11.70	31.35	424.90	
8						0.00		0.00	0.00	0.00	
9						0.00		0.00	0.00	0.00	
10						0.00		0.00	0.00	0.00	
11						0.00		0.00	0.00	0.00	
12	==========										
13						1346.98	0.00	28.71	90.25	1228.02	0.00
14											
15											
16	FED W/H TABLE										
17	---										
18	0	100	200	300	400	500					
19	.005	.01	.015	.02	.025	.03					

Figure 5

Now that the entries are entered, you will need to update the QUARTERLY PAYROLL REPORT with the monthly payroll totals.

Place your cursor on F4 and type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
S	saves
QTRLY.UPD	name of file; do not type spaces between words
RETURN	prepares to receive additional information
I11	lower right corner of worksheet to save
RETURN	prepares to receive additional instructions
C	saves the values in column format and executes the command

You may wish to save the entire worksheet for later use. To do this, type:

/S	starts STORAGE command
S	saves
MTH.ONE	name of file; do not type spaces between words
RETURN	executes the command

You now have to clear memory of the MONTHLY PAYROLL REPORT worksheet to allow you to load the QUARTERLY PAYROLL WORKSHEET.

To do this, type:

/C	starts CLEAR command
Y	yes, clears memory and executes the command

To load the QUARTERLY PAYROLL REPORT worksheet, type:

/S	starts STORAGE command
L	loads file
QTRLY.RPT	name of file; do not type spaces between words
RETURN	executes the command

You are now ready to make entries to your QUARTERLY PAYROLL WORKSHEET, as illustrated in Figure 6.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1		QUARTERLY PAYROLL REPORT											
2		---											
3	FIRST MONTH				SECOND MONTH				YEAR TO DATE				
4	---												
5	GROSS	MISC	FED	FICA	GROSS	MISC	FED	FICA	GROSS	MISC	FED	FICA	TOTAL
6	PAY	W/H	W/H		PAY	W/H	W/H		PAY	W/H	W/H		FICA
7	---												
8	152.25		1.52	10.20					152.25	0.00	1.52	10.20	20.40
9	268.38		4.03	17.98					268.38	0.00	4.03	17.98	35.96
10	458.40		11.46	30.71					458.40	0.00	11.46	30.71	61.43
11	467.95		11.70	31.35					467.95	0.00	11.70	31.35	62.71
12	0.00		0.00	0.00					0.00	0.00	0.00	0.00	0.00
13	0.00		0.00	0.00					0.00	0.00	0.00	0.00	0.00
14	0.00		0.00	0.00					0.00	0.00	0.00	0.00	0.00
15	0.00		0.00	0.00					0.00	0.00	0.00	0.00	0.00
16	==========												
17	1346.98	0.00	28.71	90.25	0.00	0.00	0.00	0.00	1346.98	0.00	28.71	90.25	180.49

Figure 6

To update the report with monthly payroll values, into the first month entries, place your cursor on A8 and type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
L	loads
QTRLY.UPD	name of file; do not type spaces between words

RETURN	prepares to receive additional instructions
C	loads the values in column format and executes the command

Now you need to save this information on a disk for later use.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
QTRLY.RPT	name of file; do not type spaces between words
RETURN	executes the command

Now we will have to save the gross YTD total from the QUARTERLY PAYROLL REPORT worksheet, so that it can be entered in the new MONTHLY PAYROLL REPORT worksheet to allow the accumulation of accurate FICA totals on the monthly worksheet.

Place your cursor on I8 and type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
S	saves
YTD.TOT	name of file; do not type spaces between words
RETURN	prepares to receive additional information
I15	lower-right coordinate of the rectangle of value entries to be saved
RETURN	prepares to receive additional instructions
C	saves the values in column format and executes the command

The next operation is to clear the memory of the present worksheet (which you have already saved) and load the MONTHLY PAYROLL REPORT worksheet.

To do this, you will type:

/C	starts CLEAR command
Y	yes, clears memory and executes the command

To load the MONTHLY PAYROLL WORKSHEET, type:

/S	starts STORAGE command
L	loads file
MONTHLY.RPT	name of file; do not type spaces between words
RETURN	executes the command

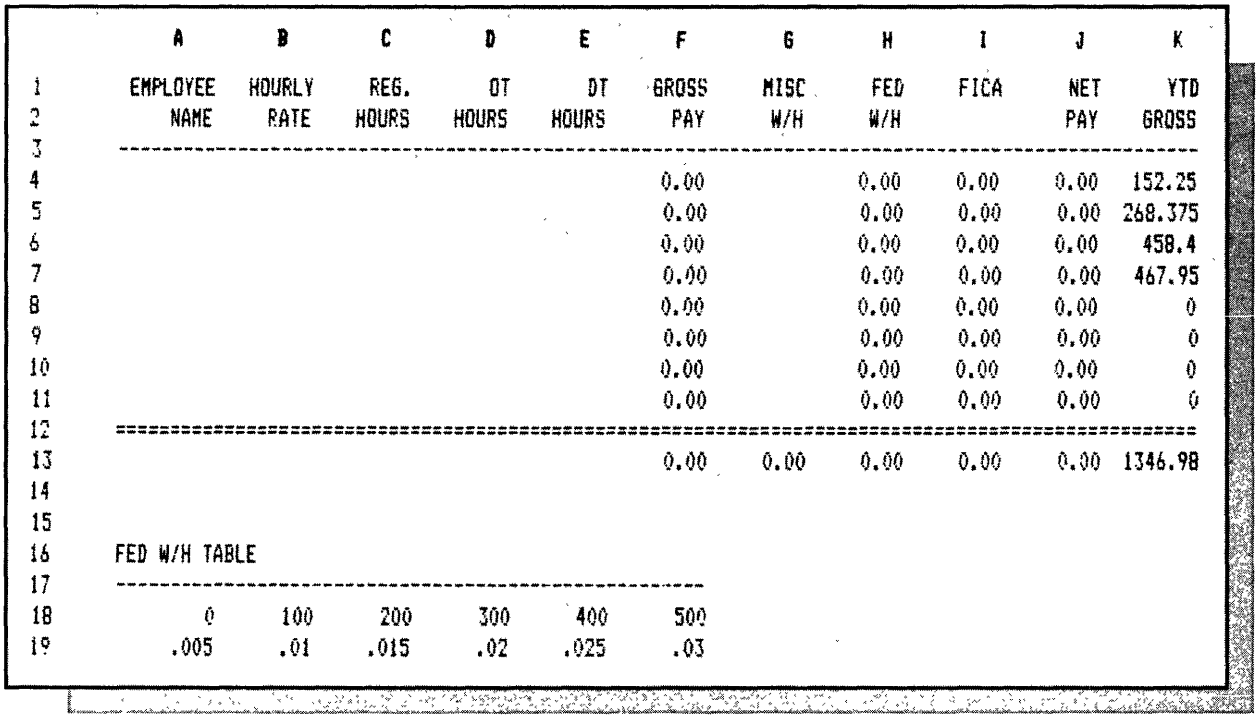
Before making the monthly payroll entries, you will need to load the YTD.TOT file, so that the FICA column will calculate properly.

Place your cursor on K4 and type:

/S	starts STORAGE command
#	loads a (DIF) Data Interchange Format file
L	loads file
YTD.TOT	name of file
RETURN	prepares to receive additional instructions
C	loads the values in column format and executes the command

Your worksheet is ready for the monthly pay entries, which are illustrated in Figure 7 as you start the updating process again.

9 EXERCISE



	A	B	C	D	E	F	G	H	I	J	K
1	EMPLOYEE	HOURLY	REG.	OT	DT	GROSS	MISC	FED	FICA	NET	YTD
2	NAME	RATE	HOURS	HOURS	HOURS	PAY	W/H	W/H		PAY	GROSS
3	---	---	---	---	---	---	---	---	---	---	---
4						0.00		0.00	0.00	0.00	152.25
5						0.00		0.00	0.00	0.00	268.375
6						0.00		0.00	0.00	0.00	458.4
7						0.00		0.00	0.00	0.00	467.95
8						0.00		0.00	0.00	0.00	0
9						0.00		0.00	0.00	0.00	0
10						0.00		0.00	0.00	0.00	0
11						0.00		0.00	0.00	0.00	0
12	==========										
13						0.00	0.00	0.00	0.00	0.00	1346.98
14											
15											
16	FED W/H TABLE										
17	---										
18	0	100	200	300	400	500					
19	.005	.01	.015	.02	.025	.03					

Figure 7

MONTHLY SALES REPORTING

DESCRIPTION

VisiCalc has the capability of formatting, updating, performing calculations and totaling multiple reports on one worksheet. This can save time in the summarization of multiple reports because the summarization is updated simultaneously as entries are made to individual reports.

To demonstrate VisiCalc's ability, a MONTHLY SALES REPORT worksheet has been set up. In this worksheet we have set up MONTHLY SALES REPORTS for two salespersons. We have also set up a MONTHLY SALES REPORT SUMMARY, to summarize the two sales reports. Entries that are made to the MONTHLY SALES REPORTS will simultaneously update the MONTHLY SALES REPORT SUMMARY.

OPERATIONS PERFORMED

Setting Up The Worksheet

Entering Mathematical Formulas

Making Worksheet Entries

Saving

Printing

FUNCTIONS NEEDED

AND
AVERAGE
IF
LOOKUP
MAX
NA
SUM

COMMANDS USED

FORMAT	I = displays as integer
FORMAT	R = justifies right
GLOBAL	$ = displays in dollars and cents
GLOBAL	manual calculates
PRINT	
REPEAT LABEL	
REPLICATE	copies
STORAGE	saves

SETTING UP THE WORKSHEET FORMAT

The worksheet that you will set up consists of two MONTHLY SALES REPORTS, which are summarized in a MONTHLY SALES REPORT SUMMARY. To set up this worksheet, use the following directions, copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.

To format all coordinates to display value entries in dollars and cents, type:

/G	starts GLOBAL command
F	FORMAT
$	dollars and cents

To set up the worksheet for manual calculation, type:

/G	starts GLOBAL command
R	recalculates
M	manual

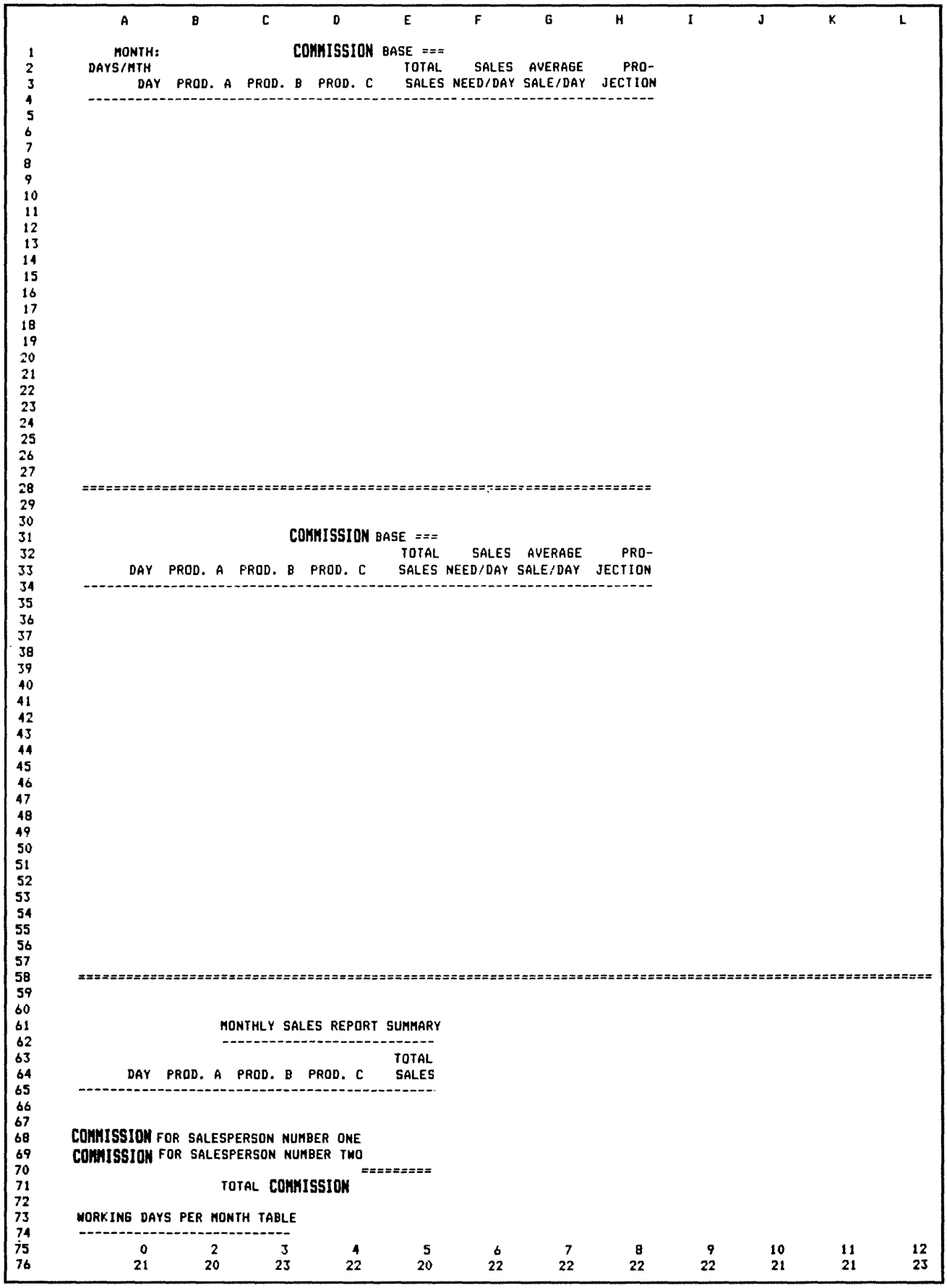
To calculate your worksheet, you must type:

!	manual recalculates

To enter your column labels, place your cursor on the location where you want to make your entry. VisiCalc automatically left justifies the label. To right justify the label, type:

/F	starts FORMAT command
R	justifies right

Type the column label.



	A	B	C	D	E	F	G	H	I	J	K	L
1	MONTH:				COMMISSION BASE ===							
2	DAYS/MTH				TOTAL	SALES	AVERAGE	PRO-				
3	DAY	PROD. A	PROD. B	PROD. C	SALES	NEED/DAY	SALE/DAY	JECTION				
4	---	---	---	---	---	---	---	---				
28	==========											
31					COMMISSION BASE ===							
32					TOTAL	SALES	AVERAGE	PRO-				
33	DAY	PROD. A	PROD. B	PROD. C	SALES	NEED/DAY	SALE/DAY	JECTION				
34	---	---	---	---	---	---	---	---				
58	==========											
61				MONTHLY SALES REPORT SUMMARY								
62				---								
63					TOTAL							
64	DAY	PROD. A	PROD. B	PROD. C	SALES							
65	---	---	---	---	---							
68	COMMISSION FOR SALESPERSON NUMBER ONE											
69	COMMISSION FOR SALESPERSON NUMBER TWO											
70					=========							
71				TOTAL COMMISSION								
73	WORKING DAYS PER MONTH TABLE											
74	---											
75	0	2	3	4	5	6	7	8	9	10	11	12
76	21	20	23	22	20	22	22	22	22	21	21	23

Figure 1

Depressing the cursor (directional) key enters the label into the location and allows the cursor to be advanced to the next location.

NOTE

When entering a label that contains more characters than the width of the column allows, you must move the cursor to the next adjacent column and continue typing the label.

Type in the rest of your column headings, using the sequence of commands above.

To enter dashed lines on your worksheet, place your cursor on the column and row where you want your dashed line to start (coordinate A4 in Figure 1), and type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

The column that your cursor is on will now have a dashed line across its width. To extend the dashed line, in the same row, across the other columns, leave the cursor on A4 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B4	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
H4	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns that you have indicated by your coordinates. To enter a double dashed line on your worksheet, repeat the opeations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationship between column and row locations. The formulas and their locations are illustrated in Figure 2.

Formula one, in the DAYS/MONTH column, looks up in the reference table the number of working days in the month, using the value in the MONTH row (which will be entered when you make your worksheet entries).

Place your cursor on B2 and type:

@LOOKUP(	starts LOOKUP function
B1	coordinate containing value to look up
,	comma, separates LOOKUP value from the reference table
A75	first coordinate in the reference table
.	ellipsis . . . indicating from-to
L75	last coordinate in the reference table
)	closes LOOKUP function
RETURN	enters the formula
/F	starts FORMAT command
I	displays the value as an integer

Formula two, in the DAY column, of the first MONTHLY SALES REPORT, sequentially increases the day, from the top to the bottom of the column. It is a three-part process as follows:

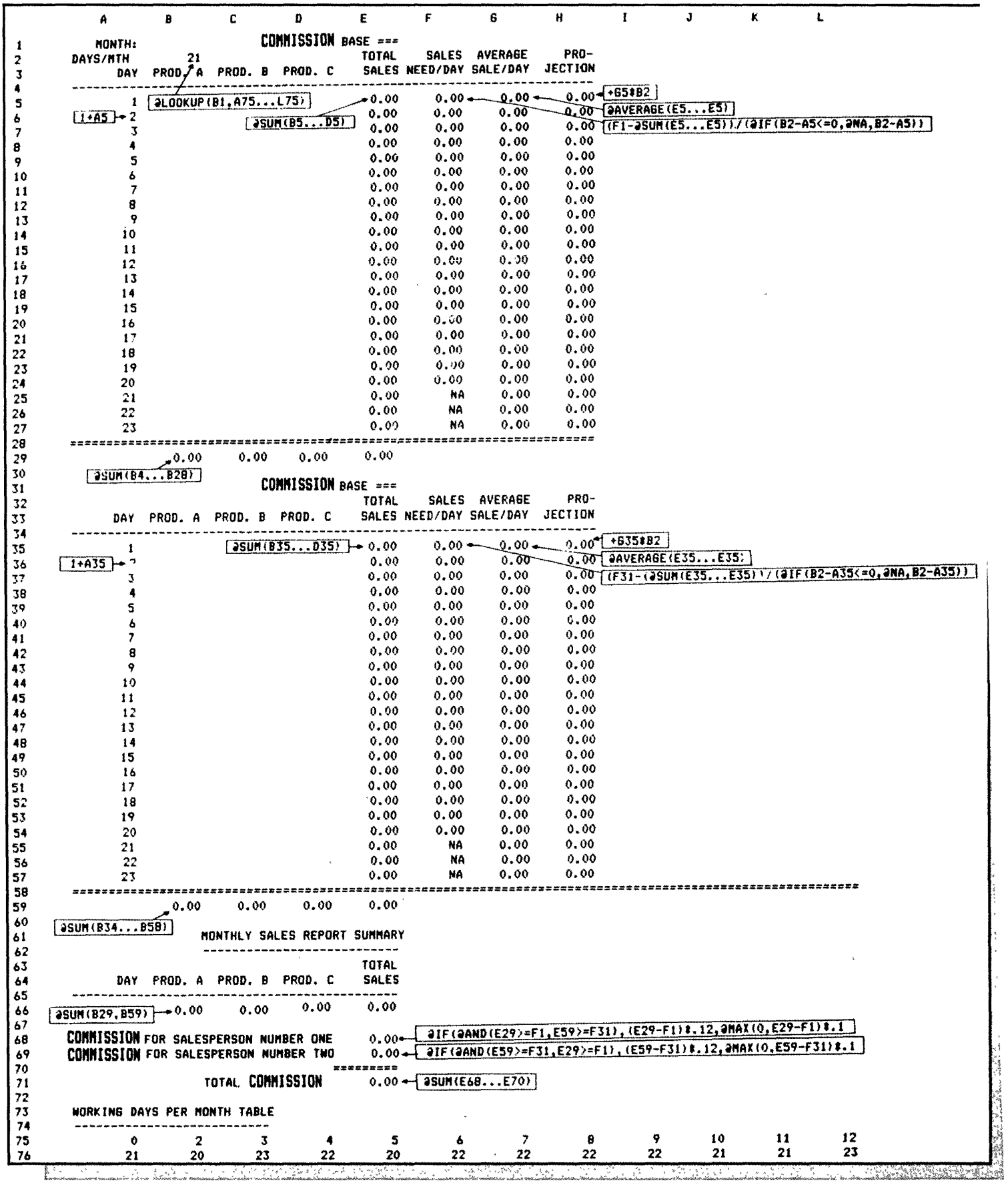

MONTH:
DAYS/MTH 21
DAY PROD. A PROD. B PROD. C
COMMISSION BASE ===
TOTAL SALES
SALES NEED/DAY
AVERAGE SALE/DAY
PRO-JECTION
@LOOKUP(B1,A75...L75)
@SUM(B5...D5)
1+A5
+G5$B2
@AVERAGE(E5...E5)
(F1-@SUM(E5...E5))/(@IF(B2-A5<=0,@NA,B2-A5))
@SUM(B4...B28)
COMMISSION BASE ===
@SUM(B35...D35)
1+A35
+G35$B2
@AVERAGE(E35...E35)
(F31-(@SUM(E35...E35))/(@IF(B2-A35<=0,@NA,B2-A35))
@SUM(B34...B58)
MONTHLY SALES REPORT SUMMARY
TOTAL SALES
@SUM(B29,B59)
COMMISSION FOR SALESPERSON NUMBER ONE
@IF(@AND(E29>=F1,E59>=F31),(E29-F1)$.12,@MAX(0,E29-F1)$.1
COMMISSION FOR SALESPERSON NUMBER TWO
@IF(@AND(E59>=F31,E29>=F1),(E59-F31)$.12,@MAX(0,E59-F31)$.1
TOTAL COMMISSION
@SUM(E68...E70)
WORKING DAYS PER MONTH TABLE
0 2 3 4 5 6 7 8 9 10 11 12
21 20 23 22 20 22 22 22 22 21 21 23

Figure 2

Step one, place your cursor on A5 and type:

/F	starts FORMAT command
I	displays the value as an integer
1	value
RETURN	enters the value

You have just assigned the value of one to coordinate A5.

Step two enters the formula which generates the value in the next coordinate in the column.

Place your cursor on A6 and type:

/F	starts FORMAT command
I	displays the value as an integer
1	value
+	adds
A5	coordinate containing value of 1
RETURN	enters the formula

Step three is to copy this formula down the column, using the REPLICATE command, to allow the values to be sequentially increased in the coordinates in the column.

Place your cursor on A6 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in A6
A7	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
A27	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
R	tells the command to copy the coordinate address in the formula relative to its new location

Formula three, in the TOTAL SALES column, adds the daily sales in columns labeled PROD. A, PROD. B, and PROD. C, and displays the total amount sold.

Place your cursor on E5 and type:

@SUM(	adds values in the list
B5	first coordinate in the list
.	ellipsis . . . indicating from-to
D5	last coordinate in the list
)	closes the list
RETURN	enters the formula

Your next operation is to copy the formula just entered, down the column, using the REPLICATE command.

Place your cursor on E5 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in E5
E6	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
E27	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula four, in the SALES NEED/DAY column, utilizes the IF logic function and the NA function to calculate the sales needed per day to reach the commission base.

NOTE

IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

The NA function for this exercise means NOT APPLICABLE, and is displayed on the last working day of the month and on every day thereafter.

Place your cursor on F5 and type:

(	opens first expression in formula
F1	coordinate containing commission base
—	subtracts
@SUM(	adds values in the list
E5	first coordinate in the list
.	ellipsis . . . indicating from-to
E5	last coordinate in the list
)	closes the list
)	closes first expression
/	divides
(	opens second expression in the formula
@IF(	starts IF logic function
B2-A5	part of the first expression, which generates the first value to be compared
< =	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false
0	the second value to be compared

,	comma-separates expressions in the IF function
@NA	second expression in the IF function, which will be selected if the first expression is true
,	comma-separates expressions in the IF function
B2-A5	third expression in the IF function, generates the value which will be selected if the first expression is false
)	closes IF logic function
)	closes second expression
RETURN	enters formula

Your next operation is to copy the formula you just entered, down the column, using the REPLICATE command.

Place your cursor on F5 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in F5
F6	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
F27	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
N N	tells the command to copy the coordinate address in the formula in its new location without change
R	tells the command to copy the coordinate address in the formula relative to its new location

N
R
N
R

Formula five, in the AVERAGE SALE/DAY column, calculates the average amount of sales per day.

Place your cursor on G5 and type:

@AVERAGE(	averages the values in the list
E5	first coordinate in the list
.	ellipsis . . . indicating from-to
E5	last coordinate in the list
)	closes the list
RETURN	enters the formula

The next operation is to copy this formula down the column, using the REPLICATE command, to allow each coordinate to display its appropriate daily average.

Place your cursor on G5 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in G5
G6	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
G27	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
N	tells the command to copy the coordinate address in the formula in its new location without change
R	tells the command to copy the coordinate address in the formula relative to its new location

Formula six, in the PROJECTION column, takes the average sales per day and multiplies it times the number of working days in the month to determine a projected total sales figure for the month.

10 EXERCISE

Place your cursor on H5 and type:

+	prepares the coordinate to accept a numeric expression
G5	coordinate containing average sales/day
*	multiplies
B2	coordinate containing number of working days per month
RETURN	enters the formula

Your next operation is to copy the formula just entered, down the column, using the REPLICATE command.

Place your cursor on H5 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in H5
H6	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
H27	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

Formula seven, at the bottom of the PROD. A column, adds the total daily sales of Product A, to give you a monthly sales total.

Place your cursor on B29 and type:

@SUM(	adds values in the list
B4	first coordinate in the list
.	ellipsis . . . indicating from-to

B28	last coordinate in the list
)	closes the list
RETURN	enters the formula

Your next operation is to copy the formula entered above, using the REPLICATE command, across the bottom of the PROD. B, PROD. C and TOTAL SALES row.

Place your cursor on B29 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in B29
C29	first coordinate where you wish to copy the formula across rows
.	ellipsis . . . indicating from-to
E29	last coordinate where you wish to copy the formula across rows
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula eight, in the DAY column, of the second MONTHLY SALES REPORT, sequentially increases the day, from the top to the bottom of the column. It is a three-step process as follows:

Step one, place your cursor on A35 and type:

/F	starts FORMAT command
I	displays the value as an integer
1	value
RETURN	enters the value

You have just assigned the value of one to coordinate A35.

Step two enters the formula which generates the value in the next coordinate in the column.

Place your cursor on A36 and type:

/F	starts FORMAT command
I	displays the value as an integer
1	value
+	adds
A35	coordinate containing day of month
RETURN	enters the formula

Step three is to copy this formula down the column, using the REPLICATE command, to allow the sequential increase in the coordinates in the column.

Place your cursor on A36 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in A36
A37	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
A57	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
R	tells the command to copy the coordinate address in the formula relative to its new location

Formula nine, in the TOTAL SALES column, adds the daily sales in columns labeled PROD. A, PROD. B and PROD. C and displays the total of the bottom of the TOTAL SALES column.

Place your cursor on E35 and type:

@SUM(	adds values in the list
B35	first coordinate in the list
.	ellipsis . . . indicating from-to
D35	last coordinate in the list

)	closes the list
RETURN	enters the formula

Your next operation is to copy the formula just entered, down the column, using the REPLICATE command.

Place your cursor on E35 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in E35
E36	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
E57	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location.

Formula ten, in the SALES NEED/DAY column, utilizes IF logic function and the NA function to calculate the sales needed per day to reach the commission base.

NOTE

IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

The NA function, for this exercise, means NOT APPLICABLE, and is displayed on the last working day of the month and on every day thereafter.

Place your cursor on F35 and type:

(	opens first expression in formula
F31	coordinate containing commission base
—	subtracts

(@SUM(	adds values in the list
E35	first coordinate in the list
•	ellipsis . . . indicating from-to
E35	last coordinate in the list
)	closes the list
)	closes first expression
/	divides
(	opens second expression in the formula
@IF(	starts IF logic function
B2-A35	part of the first expression which generates the first value to be compared
< =	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false
0	second value to be compared
,	comma-separates expressions in the IF function
@NA	second expression in the IF function which is selected if the first expression is true
,	comma, separates expressions in the IF function
B2-A35	third expression, generates the value to be compared, which will be selected if the first expression is false
)	closes IF logic function
)	closes the formula
RETURN	enters the formula

Your next operation is to copy the formula just entered, down the column, using the REPLICATE command.

Place your cursor on F35 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in F35
F36	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
F57	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
N N	tells the command to copy the coordinate address in the formula in its new location without change
R	tells the command to copy the coordinate address in the formula relative to its new location

N
R
N
R

Formula eleven, in the AVERAGE SALE/DAY column, calculates the average amount of sales per day.

Place your cursor on G35 and type:

@AVERAGE(	averages values in the list
E35	first coordinate in the list
.	ellipsis . . . indicating from-to
E35	last coordinate in the list
)	closes list
RETURN	enters the formula

The next operation is to copy this formula down the column, using the REPLICATE command, to allow each coordinate in the column to display its appropriate daily average.

10 EXERCISE

Place your cursor on G35 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in G35
G36	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
G57	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
N	tells the command to copy the coordinate address in the formula in its new location without change
R	tells the command to copy the coordinate address in the formula relative to its new location

Formula twelve, in the PROJECTION column, takes the average sales per day and multiplies it times the number of working days in the month, to determine a projected total sales figure for the month.

Place your cursor on H35 and type:

+	prepares the coordinate to accept a numeric expression
G35	coordinate containing average sales per day
*	multiplies
B2	coordinate containing working days per month
RETURN	enters formula

Your next operation is to copy the formula just entered, down the column, using the REPLICATE command.

Place your cursor on H35 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in H35

H36	first coordinate where you wish to copy the formula down the column
.	ellipsis . . . indicating from-to
H57	last coordinate where you wish to copy the formula down the column
RETURN	executes the command and prepares to receive additional instructions
R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

Formula thirteen, at the bottom of the PROD. A column, adds the total daily sales of Product A, to give you a monthly sales total.

Place your cursor on B59 and type:

@SUM(	adds values in the list
B34	first coordinate in the list
.	ellipsis . . . indicating from-to
B58	last coordinate in the list
)	closes list
RETURN	enters formula

Your next operation is to copy the formula entered above, across the bottom of the PROD. B, PROD. C and TOTAL SALES row.

Place your cursor on B59 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in B59
C59	first coordinate where you wish to copy the formula across rows
.	ellipsis . . . indicating from-to

E59	last coordinate where you wish to copy the formula across rows
RETURN	executes the command and prepares to receive additional instructions
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula fourteen, in the PROD. A column, of the MONTHLY SALES REPORT SUMMARY, totals the amount of Product A sold in both of the MONTHLY SALES REPORTS.

Place your cursor on B66 and type:

@SUM(	adds values in the list
B29	coordinate containing value in the list
,	comma-separates values in the list
B59	coordinate containing value in the list
)	closes the list
RETURN	enters the formula

The next operation is to copy the formula just entered above, using the REPLICATE command, across the PROD. B, PROD. C and total sales row.

Place your cursor on B66 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in B66
C66	first coordinate where you wish to copy the formula across rows
.	ellipsis . . . indicating from-to
E66	last coordinate where you wish to copy the formula across rows
RETURN	executes the command and prepares to receive additional instructions

R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula fifteen, in the COMMISSION FOR SALESPERSON NUMBER ONE row, calculates the salesperson's commission, which is based on two factors. First, that he receives a ten percent commission on any amount over the base amount that is set. Second, that he receives a twelve percent commission on any sale amount over the base amount that is set, if both he and the other salesperson surpass their base commission amount.

NOTE

IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

This formula utilizes AND logic function, which is true if all the values in the list are true and is otherwise false.

Place your cursor on E68 and type:

@IF(	starts IF logic function
@AND(	starts AND logic function
E29	coordinate containing value to be compared
>=	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false
F1	coordinate containing second value to be compared
,	comma-separates expressions in AND function
E59	coordinate containing total sales
>=	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false

F31	coordinate containing second value to be compared
)	closes AND function. Ends first expression in the IF function
,	comma, separates expressions in IF function
(	opens second expression in IF function
E29	coordinate containing total sales
—	subtracts
F1)	coordinate containing commission base
*	multiplies
.12	value
,	comma-separates expressions in IF function
@MAX(	opens third expression of IF function, which generates the value to be compared, which will be selected if the first expression is false
0	first value to be compared
,	comma, separates values in the expression
E29	coordinate containing total sales
—	subtracts
F1	coordinate containing commission base
)	closes third expression
*	multiplies
.1	value
)	closes IF logic function
RETURN	enters the formula

Formula sixteen, in the COMMISSION FOR SALESPERSON NUMBER TWO row, calculates that if the salesperson has reached his base commission amount, or is below that amount, in total sales for the month, then he is paid his base commission. If he has surpassed his base commission amount in total sales, then the base commission amount is subtracted from the total sales figure and the salesman is paid an additional commission, at a set rate (which is entered when you make your worksheet entries), on the difference between the two figures.

NOTE

IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

This formula utilizes the AND logic function, which is true if all the values in the list are true and is otherwise false.

Place your cursor on E69 and type:

@IF(	starts IF logic function
@AND(	starts AND logic function
E59	part of the first expression which generates the first value to be compared
>=	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false
F31	coordinate containing second value to be compared
,	comma-separates values in AND function
E29	coordinate containing total sales
>=	LOGICAL OPERATORS, compare the first value against the second value and result in the logical value of true or false

F1	coordinate containing commission base
)	closes AND function. Ends first expression in IF function
,	comma-separates expressions in IF function
(E59	coordinate containing value, opens second expression in IF function, which generates the value to be compared, which will be selected if the first expression is true
—	subtracts
F31)	coordinate containing commission base
*	multiplies
.12	value
,	comma-separates expressions in IF function
@MAX(	opens third expression in IF function, which generates the value to be compared, which will be selected if the first expression is false
0	first value to be compared
,	comma-separates values in the expression
E59	coordinate containing total sales
—	subtracts
F31	coordinate containing commission base
)	closes IF logic function
*	multiplies
.1	value
RETURN	enters formula

Formula seventeen, in the TOTAL COMMISSION row, calculates the total amount of commission for salesman one and salesman two.

Place your cursor on E71 and type:

@SUM(	adds values in the list
E68	coordinate containing commission for salesperson one
.	ellipsis . . . indicating from-to
E70	coordinate containing commission for salesperson two
)	closes list
RETURN	enters formula

Now type:

!	recalculates all formulas

PRINTING

Now that your MONTHLY SALES REPORT WORKSHEET is completed, you may wish to print it for filing or distribution.

Place your cursor on A1, the upper-left coordinate of the worksheet area rectangle that you wish to print, and type:

/P	starts PRINT command
P	printer
L76	lower-right coordinate of the worksheet area rectangle that you wish to print
RETURN	executes the command

MAKING WORKSHEET ENTRIES

You are now ready to make entries to your MONTHLY SALES REPORT worksheet as illustrated in Figure 3.

To start making worksheet entries, first enter the month that the report is for in B1. Then enter the commission base for each report in F1 and F31. Then enter the daily sales of each product by each salesperson.

Now type:

!	recalculates all formulas

Now that you have made the worksheet entries as illustrated in Figure 3, you may wish to save the entire worksheet for later use.

	A	B	C	D	E	F	G	H	I	J	K	L
1	MONTH:	2		COMMISSION BASE ===	7000.00							
2	DAYS/MTH	20			TOTAL	SALES	AVERAGE	PRO-				
3	DAY	PROD. A	PROD. B	PROD. C	SALES	NEED/DAY	SALE/DAY	JECTION				
4												
5	1	125.00	75.00	25.00	225.00	356.58	225.00	4500.00				
6	2	50.00	68.00	90.00	208.00	364.83	216.50	4330.00				
7	3	75.00	25.00	35.00	135.00	378.35	189.33	3786.67				
8	4				0.00	402.00	142.00	2840.00				
9	5				0.00	428.80	113.60	2272.00				
10	6				0.00	459.43	94.67	1893.33				
11	7				0.00	494.77	81.14	1622.86				
12	8				0.00	536.00	71.00	1420.00				
13	9				0.00	584.73	63.11	1262.22				
14	10				0.00	643.20	56.80	1136.00				
15	11				0.00	714.67	51.64	1032.73				
16	12				0.00	804.00	47.33	946.67				
17	13				0.00	918.86	43.69	873.85				
18	14				0.00	1072.00	40.57	811.43				
19	15				0.00	1286.40	37.87	757.33				
20	16				0.00	1608.00	35.50	710.00				
21	17				0.00	2144.00	33.41	668.24				
22	18				0.00	3216.00	31.56	631.11				
23	19				0.00	6432.00	29.89	597.89				
24	20				0.00	NA	28.40	568.00				
25	21				0.00	NA	27.05	540.95				
26	22				0.00	NA	25.82	516.36				
27	23				0.00	NA	24.70	493.91				
28	==========	==========	==========	==========	==========	==========	==========	==========				
29		250.00	168.00	150.00	568.00							
30												
31				COMMISSION BASE ===	9000.00							
32					TOTAL	SALES	AVERAGE	PRO-				
33	DAY	PROD. A	PROD. B	PROD. C	SALES	NEED/DAY	SALE/DAY	JECTION				
34												
35	1	590.00	80.00	65.00	735.00	435.00	735.00	14700.00				
36	2	150.00	75.00	25.00	250.00	445.28	492.50	9850.00				
37	3	36.00	190.00	178.00	404.00	447.71	463.00	9260.00				
38	4				0.00	475.69	347.25	6945.00				
39	5				0.00	507.40	277.80	5556.00				
40	6				0.00	543.64	231.50	4630.00				
41	7				0.00	585.46	198.43	3968.57				
42	8				0.00	634.25	173.63	3472.50				
43	9				0.00	691.91	154.33	3086.67				
44	10				0.00	761.10	138.90	2778.00				
45	11				0.00	845.67	126.27	2525.45				
46	12				0.00	951.38	115.75	2315.00				
47	13				0.00	1087.29	106.85	2136.92				
48	14				0.00	1268.50	99.21	1984.29				
49	15				0.00	1522.20	92.60	1852.00				
50	16				0.00	1902.75	86.81	1736.25				
51	17				0.00	2537.00	81.71	1634.12				
52	18				0.00	3805.50	77.17	1543.33				
53	19				0.00	7611.00	73.11	1462.11				
54	20				0.00	NA	69.45	1389.00				
55	21				0.00	NA	66.14	1322.86				
56	22				0.00	NA	63.14	1262.73				
57	23				0.00	NA	60.39	1207.83				
58	==========	==========	==========	==========	==========	==========	==========	==========	==========	==========	==========	==========
59		776.00	345.00	268.00	1389.00							
60												
61			MONTHLY SALES REPORT SUMMARY									
62			----------									
63					TOTAL							
64	DAY	PROD. A	PROD. B	PROD. C	SALES							
65	----------	----------	----------	----------	----------							
66		1026.00	513.00	418.00	1957.00							
67												
68	COMMISSION FOR SALESPERSON NUMBER ONE				0.00							
69	COMMISSION FOR SALESPERSON NUMBER TWO				0.00							
70					=========							
71			TOTAL COMMISSION		0.00							
72												
73	WORKING DAYS PER MONTH TABLE											
74	----------											
75	0	2	3	4	5	6	7	8	9	10	11	12
76	21	20	23	22	20	22	22	22	22	21	21	23

Figure 3

SAVING

To save the entire worksheet for later use, type:

/S	starts STORAGE command
S	saves
MTH.SR	name of file; do not type spaces between words
RETURN	executes the command

DAILY INVENTORY

DESCRIPTION

VisiCalc has the ability to accumulate totals, and have those totals updated. To do this, blocks of values must be saved, reentered, updated and saved again. VisiCalc also has the capability to assign a word value, to a coordinate, of TRUE, FALSE or NA, as the result of a logical operation.

To demonstrate VisiCalc's ability, a DAILY INVENTORY REPORT worksheet has been set up. Updating functions are performed on a daily basis and the entire TOTAL CASES column is saved at the end of each day and the CASES REC'D and CASES SOLD columns are cleared. The TOTAL CASES column values are then reentered in the CASES ON HAND column and the worksheet is ready for the next day's inventory process. The REORDER TIME column tells you when it is time to reorder by displaying the word TRUE when the REORDER QUANTITY column reaches its minimum stocking amount. At all other times, the REORDER TIME column will display NA (not applicable) because it is not yet time to reorder.

OPERATIONS PERFORMED

Setting Up the Worksheet Format

Entering Mathematical Formulas

Making Worksheet Entries

Clearing Worksheet Entries

Saving Worksheet

Loading Worksheet

Printing

FUNCTIONS USED

IF

MAX

NA

SUM

TRUE

COMMANDS USED

BLANK	
FORMAT	R = justifies right
FORMAT	$ = displays in dollars and cents
PRINT	
REPEAT LABEL	
REPLICATE	copies
STORAGE	# = saves a (DIF) Data Interchange Format file
STORAGE	# = loads a (DIF) Data Interchange Format file

SETTING UP THE WORKSHEET FORMAT

The worksheet that you will set up consists of the DAILY INVENTORY REPORT. To set up this worksheet, use the following instructions, copying Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.

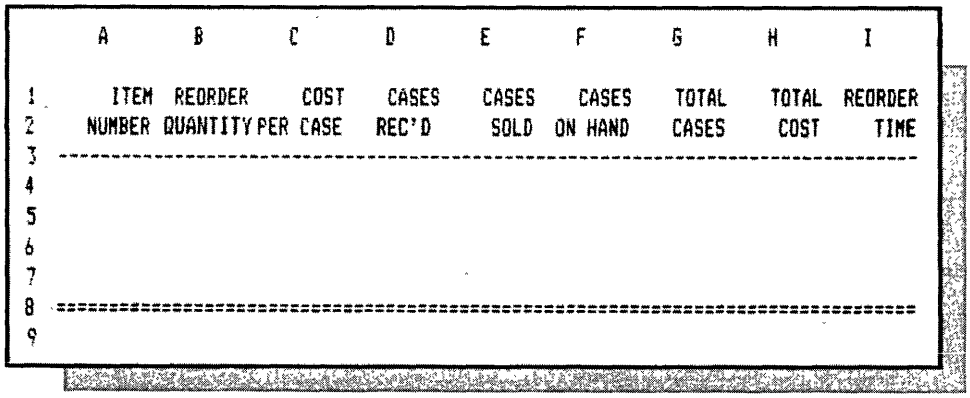


Figure 1

To enter your column labels, place your cursor on the location where you want to make your entry. (VisiCalc automatically left justifies the label.) To right justify the label, type:

/F	starts FORMAT command
R	justifies right

Type the column label.

Depressing the cursor (directional) key, enters the label into the location and allows the cursor to be advanced to the next location.

Type in the rest of your column headings, using the sequence of commands above.

To enter dashed lines on your worksheet, place your cursor on column and row where you want your dashed line to start (coordinate A3 in Figure 1), and type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	enters the label

The column that your cursor is on will now have a dashed line across its width. To extend the dashed line, in the same row, across the other columns, leave your cursor where it is and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B3	first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
I3	last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns that you have indicated by your coordinates. To enter a double dashed line on your worksheet, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will begin entering mathematical formulas that will establish the relationship between column and row locations. The formulas and their locations are illustrated in Figure 2.

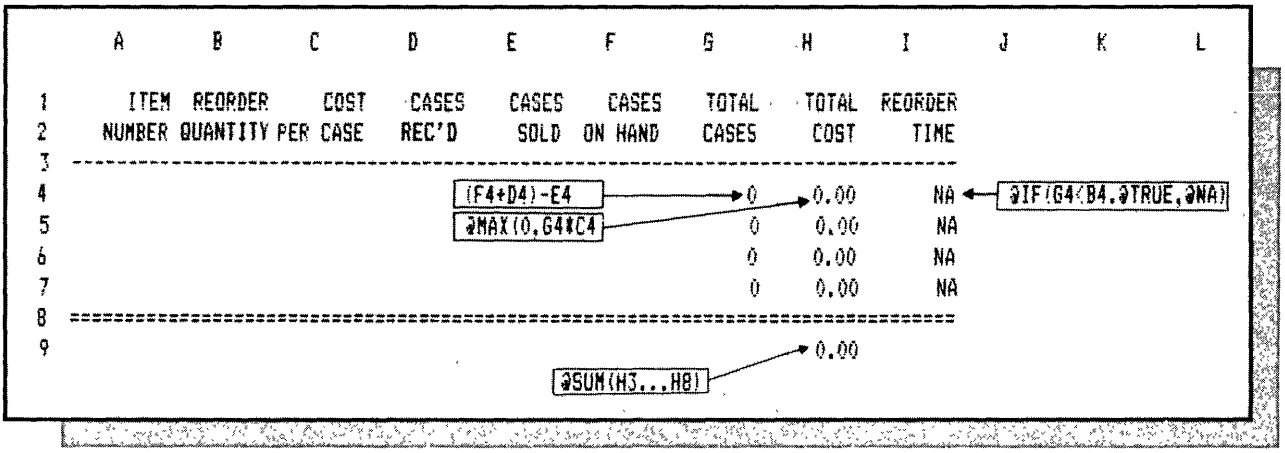


Figure 2

Formula one adds, in the same row, the CASES REC'D column and the CASES ON HAND column and, from that total, subtracts the CASES SOLD column, in the same row. The value generated is then displayed in the TOTAL CASES column of the same row.

Place your cursor on G4 and type:

(	opens expression
D4	coordinate containing cases rec'd
+	adds
F4	coordinate containing cases on hand
)	closes expression
—	subtracts
E4	coordinate containing cases sold
RETURN	enters the formula

Formula two, in the TOTAL COST column, determines the total cost of each inventory item. The MAX logic function is used so that a zero value will be displayed if the item is out of stock. Otherwise, a minus amount could be displayed, because a negative amount would be totaled.

Place your cursor on H4 and type:

@MAX	selects the maximum value of the following list
(	opens the list
0	value in the list
,	comma-separates values in the list
G4	coordinate containing total cases
*	multiplies
C4	coordinate containing cost per case
)	closes the list
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

Formula three, in the REORDER TIME column, uses IF logic function to determine if it is time to reorder an item. If it is time to reorder, it displays the word TRUE; if not, it displays NA.

NOTE

IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

Place your cursor on I4 and type:

@IF(	starts IF logic function
G4	part of the first expression, which generates the first value to be compared
<	LOGICAL OPERATOR, compares the first value against the second value and results in the logical value of true or false

B4	coordinate containing the second value to be compared
,	comma-separates expressions in the IF function
@TRUE	TRUE function produces a logical value TRUE, which is the second expression in the IF function and which will be selected if the first expression is true
,	comma-separates expressions in the IF function
@NA	NA function produces a logical value NA, which is the third expression of the IF function, which will be selected if the first expression is false
)	closes IF logic function
RETURN	enters the formula

Your next operation is to copy, using the REPLICATE command, the formulas at the top of the TOTAL CASES, TOTAL COST and REORDER TIME columns, down the columns.

Place your cursor on G4 and type:

/R	starts REPLICATE command
I4	copies all entries across columns G4 through I4
RETURN	prepares to receive additional information
G5	first coordinate where you wish to copy the formulas down columns
•	ellipsis . . . indicating from-to
G7	last coordinate where you wish to copy the formulas down columns

RETURN	executes the command and prepares to receive additional instructions
R R R R R R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula four, at the bottom of the TOTAL COST column, totals the cost of the entire inventory, and displays that amount in dollars and cents.

Place your cursor on H9 and type:

@SUM(	adds values in the list
H3	first coordinate in the list
.	ellipsis . . . indicating from-to
H8	last coordinate in the list
)	closes the list
RETURN	enters the formula
/F	starts FORMAT command
$	displays in dollars and cents

PRINTING

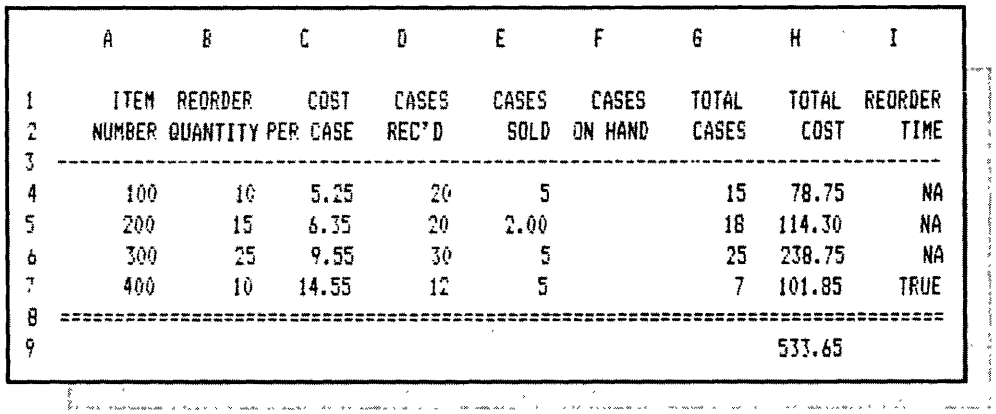
Now that your DAILY INVENTORY REPORT WORKSHEET is completed, you will need to print the formulas for later use.

To print the formulas, type:

/S	starts STORAGE command
S	saves
.PRINTER	prints the file
RETURN	executes the command

MAKING WORKSHEET ENTRIES

You are now ready to make entries to your DAILY INVENTORY REPORT WORKSHEET as illustrated in Figure 3.



	A	B	C	D	E	F	G	H	I
1	ITEM	REORDER	COST	CASES	CASES	CASES	TOTAL	TOTAL	REORDER
2	NUMBER	QUANTITY	PER CASE	REC'D	SOLD	ON HAND	CASES	COST	TIME
3									
4	100	10	5.25	20	5		15	78.75	NA
5	200	15	6.35	20	2.00		18	114.30	NA
6	300	25	9.55	30	5		25	238.75	NA
7	400	10	14.55	12	5		7	101.85	TRUE
8									
9								533.65	

Figure 3

SAVING

Now that you have made the worksheet entries as illustrated above, and the worksheet is complete for the day, you may wish to save the entire worksheet for later use, or print it for distribution.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves
INV.RPT.	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

To print a portion or all of your worksheet for filing or distribution, place your cursor on A1, the upper-left coordinate of the worksheet rectangle that you wish to print, and type:

/P	starts PRINT command
P	printer

Type in I9, the lower-right coordinate of the worksheet area rectangle that you wish to print.

RETURN	executes the command

SAVING

Now we will have to save the totals in the TOTAL CASES columns of the current DAILY INVENTORY REPORT, so that they can be reentered in the CASES ON HAND column before entering the next day's inventory information, to allow the accumulation of accurate totals in the TOTAL CASES column of the new DAILY INVENTORY REPORT.

Place your cursor on G4 and type:

/S	starts STORAGE command
#	saves a (DIF) Data Interchange Format file
S	saves
TOT.CASES	name of file; do not type spaces between words
RETURN	prepares to receive additional information
G7	lower-right coordinate of the rectangle of value entries to be saved
RETURN	prepares to receive additional instructions
C	saves the values in column format and executes the command

You will now want to update the worksheet to prepare for tomorrow's entries by entering the TOTAL CASES file into the CASES ON HAND column, as illustrated in Figure 4.

Place your cursor on F4 and type:

/S	starts STORAGE command
#	loads a (DIF) Data Interchange Format file
L	loads
TOT.CASES	name of file; do not type spaces between words

RETURN	prepares to receive additional instructions
C	loads the values in column format and executes the command

It will be necessary to blank out the entries in the CASES REC'D and CASES SOLD columns to allow for tomorrow's entries into those columns. To do this, we will enter a blank in coordinate D4 and replicate it down and across the two columns.

Place your cursor on D4 and type:

/B	starts BLANK command
RETURN	tells the command to copy the blank in D4

Now copy the blank down the column, using the REPLICATE command.

Leave the cursor on D4 and type:

/R	starts REPLICATE command
RETURN	prepares to receive additional information
D5	first coordinate where you wish to copy the blank down the column
.	ellipsis . . . indicating from-to
D7	last coordinate where you wish to copy the blank down the column
RETURN	executes the command

You have just blanked out the entries in the CASES REC'D column and your next operation is to copy that blank column into the CASES SOLD column.

Place your cursor on D4 and type:

/R	starts REPLICATE command
D7	last coordinate in column
RETURN	prepares to receive additional information
E4	top coordinate of column into which the blank is to be entered
RETURN	executes the command

Your DAILY INVENTORY REPORT WORKSHEET is now updated and ready to have new entries made as you repeat the entry and updating process for the new day.

	A	B	C	D	E	F	G	H	I
1	ITEM	REORDER	COST	CASES	CASES	CASES	TOTAL	TOTAL	REORDER
2	NUMBER	QUANTITY	PER CASE	REC'D	SOLD	ON HAND	CASES	COST	TIME
3	---	---	---	---	---	---	---	---	---
4	100	10	5.25			15	15	78.75	NA
5	200	15	6.35			18	18	114.30	NA
6	300	25	9.55			25	25	238.75	NA
7	400	10	14.55			7	7	101.85	TRUE
8	===	===	===	===	===	===	===	===	===
9								533.65	

Figure 4

FINANCIAL FORECASTING

DESCRIPTION

VisiCalc provides you with the capability to do complete financial statements and financial forecasting. You are able to update your financial statements or forecasts at any time by merely entering new values in those areas that are variables.

To demonstrate VisiCalc's ability, we have set up a FINANCIAL BALANCE SHEET with last year's balance sheet. We will forecast next year's balance sheet by using projected sales figures for the coming year.

OPERATIONS PERFORMED

Setting Up The Worksheet

Entering Mathematical Formulas

Making Worksheet Entries

Saving

Printing

FUNCTIONS USED

IF

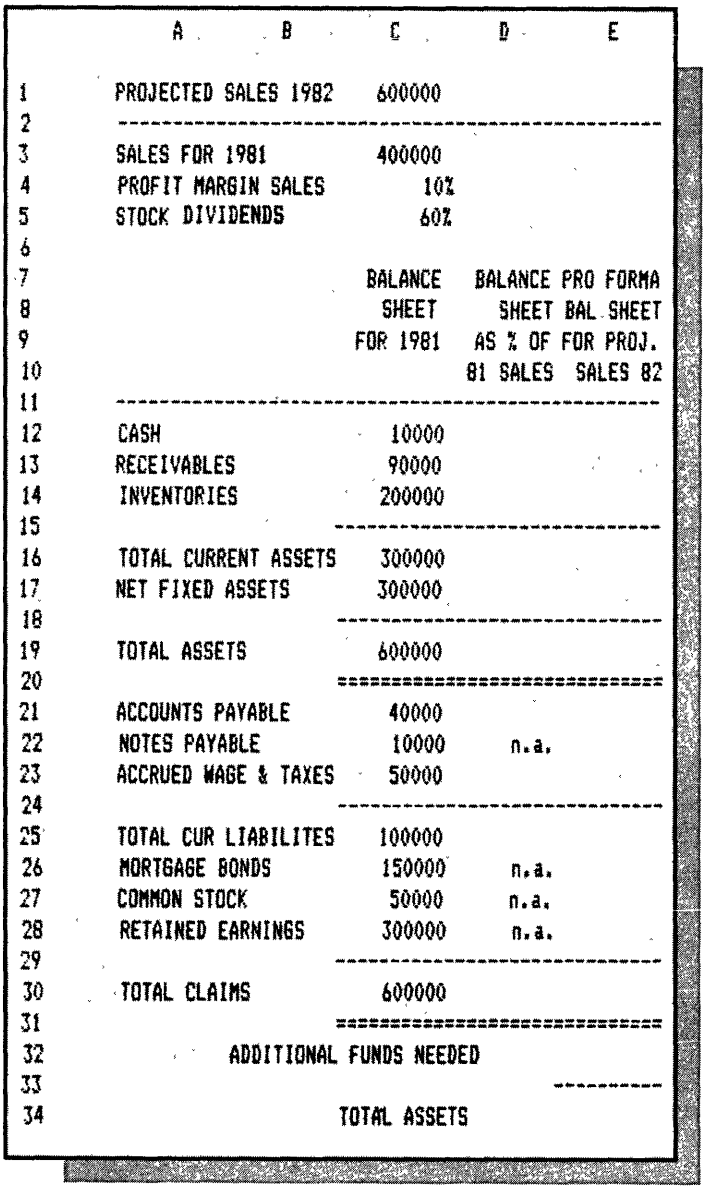
SUM

COMMANDS USED

FORMAT	R = justifies right
GLOBAL	C = adjusts column width
PRINT	
REPEAT LABEL	
REPLICATE	copies
STORAGE	saves

SETTING UP THE FORMAT

The worksheet that you will set up and label is the FINANCIAL STATEMENT worksheet. Using the following instructions, copy Figure 1 exactly as it is illustrated, retaining exact row and column locations of all information.



	A	B	C	D	E
1	PROJECTED SALES 1982		600000		
2					
3	SALES FOR 1981		400000		
4	PROFIT MARGIN SALES		10%		
5	STOCK DIVIDENDS		60%		
6					
7			BALANCE	BALANCE PRO FORMA	
8			SHEET	SHEET BAL SHEET	
9			FOR 1981	AS % OF FOR PROJ.	
10				81 SALES	SALES 82
11					
12	CASH		10000		
13	RECEIVABLES		90000		
14	INVENTORIES		200000		
15					
16	TOTAL CURRENT ASSETS		300000		
17	NET FIXED ASSETS		300000		
18					
19	TOTAL ASSETS		600000		
20					
21	ACCOUNTS PAYABLE		40000		
22	NOTES PAYABLE		10000	n.a.	
23	ACCRUED WAGE & TAXES		50000		
24					
25	TOTAL CUR LIABILITES		100000		
26	MORTGAGE BONDS		150000	n.a.	
27	COMMON STOCK		50000	n.a.	
28	RETAINED EARNINGS		300000	n.a.	
29					
30	TOTAL CLAIMS		600000		
31					
32		ADDITIONAL FUNDS NEEDED			
33					
34			TOTAL ASSETS		

Figure 1

Your first operation is to change the column width from the standard 9 to a width of 10 characters for this exercise. To do this, type:

/G	starts GLOBAL command
C	column width
10	number of spaces per column
RETURN	executes the command

To enter your column labels, place your cursor on the location where you want to make your entry. VisiCalc automatically left justifies the label. To right justify the label, type:

/F	starts FORMAT command
R	justifies right

Type the column label.

Depressing the cursor (directional) key enters the label into the location and allows the cursor to be advanced to the next location.

NOTE

When entering a label that contains more characters than the width of the column allows, you must move the cursor to the next adjacent column and continue typing the label.

To be able to use a numeric value, or any special symbol as a label, you must first enter a quote " symbol to prepare the coordinate to accept it as a label.

Type in the rest of your column headings, using the sequence of commands above.

To enter dashed lines on your worksheet, move your cursor to the column and row where you want your dashed line to start (coordinate A2 in Figure 1). Type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

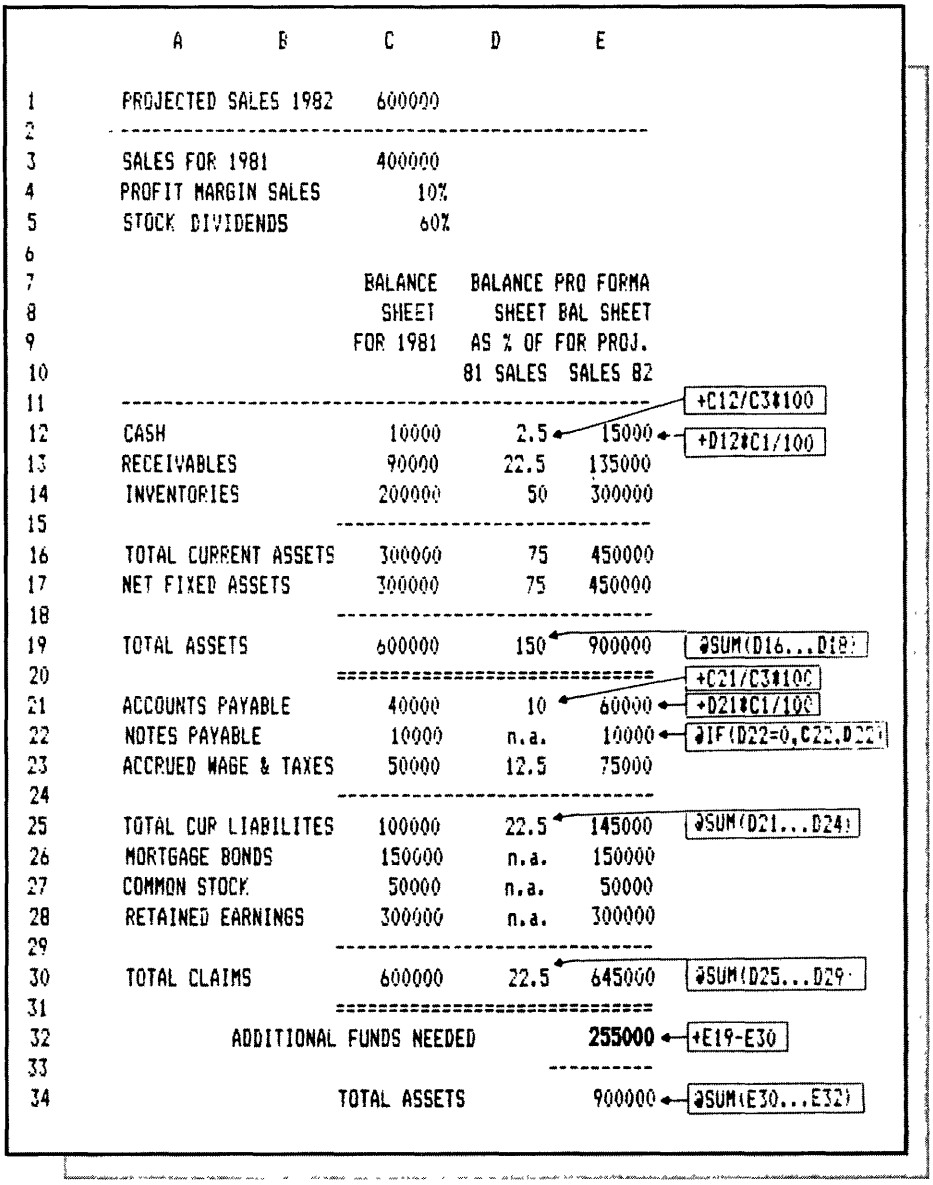
The column that your cursor is on will now have a dashed line across its width. To extend the dashed line in the same row, across other columns, leave your cursor where it is and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the dashed line your cursor is on
B2	the first coordinate in the row from which you wish the dashed line to be extended
.	ellipsis . . . indicating from-to
E2	the last coordinate in the row you wish the dashed line to be extended to
RETURN	executes the command

The dashed line will now appear extended across the columns that you have indicated by your coordinates. To enter a double dashed line on your worksheet, repeat the operations above, using the symbol = as your label to be repeated.

ENTERING MATHEMATICAL FORMULAS

You will now begin entering mathematical formulas that will establish the relationship between column and row positions. The formulas and their positions are illustrated in Figure 2.



	A	B	C	D	E	
1		PROJECTED SALES 1982	600000			
2						
3		SALES FOR 1981	400000			
4		PROFIT MARGIN SALES	10%			
5		STOCK DIVIDENDS	60%			
6						
7			BALANCE	BALANCE	PRO FORMA	
8			SHEET	SHEET	BAL SHEET	
9			FOR 1981	AS % OF	FOR PROJ.	
10				81 SALES	SALES 82	
11						+C12/C3*100
12		CASH	10000	2.5	15000	+D12*C1/100
13		RECEIVABLES	90000	22.5	135000	
14		INVENTORIES	200000	50	300000	
15						
16		TOTAL CURRENT ASSETS	300000	75	450000	
17		NET FIXED ASSETS	300000	75	450000	
18						
19		TOTAL ASSETS	600000	150	900000	@SUM(D16...D18)
20						+C21/C3*100
21		ACCOUNTS PAYABLE	40000	10	60000	+D21*C1/100
22		NOTES PAYABLE	10000	n.a.	10000	@IF(D22=0,C22,D22)
23		ACCRUED WAGE & TAXES	50000	12.5	75000	
24						
25		TOTAL CUR LIABILITES	100000	22.5	145000	@SUM(D21...D24)
26		MORTGAGE BONDS	150000	n.a.	150000	
27		COMMON STOCK	50000	n.a.	50000	
28		RETAINED EARNINGS	300000	n.a.	300000	
29						
30		TOTAL CLAIMS	600000	22.5	645000	@SUM(D25...D29)
31						
32		ADDITIONAL FUNDS NEEDED			255000	+E19-E30
33						
34		TOTAL ASSETS			900000	@SUM(E30...E32)

Figure 2

Formula one,in the BALANCE SHEET AS % OF 81 SALES column, takes the amount in the CASH row and divides it by the amount of 1981 SALES. It then multiplies by 100 to display the result as a percentage.

Place your cursor on D12 and type:

+	prepares the coordinate to accept a numeric expression
C12	coordinate containing cash
/	divides
C3	coordinate containing 1981 sales
*	multiplies
100	number used to display result as a percentage
RETURN	enters the formula

Formula two in the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column, takes the cash percentage and multiplies it times the PROJECTED SALES 1982 figure. The resulting amount is then divided by 100 to convert it to a dollar amount.

Place your cursor on E12 and type:

+	prepares the coordinate to accept a numeric expression
D12	coordinate containing cash percentage
*	multiplies
C1	coordinate containing projected sales 1982
/	divides
100	number used to convert result to dollar amount
RETURN	enters the formula

Your next operation is to copy the formulas just entered, down the columns, using the REPLICATE command.

Place your cursor on D12 and type:

/R	starts REPLICATE command
E12	copies all entries down the columns D12 to E12

RETURN	prepares to receive additional information
D13	first coordinate where you wish to copy the formulas down the columns
.	ellipsis . . . indicating from-to
D17	last coordinate where you wish to copy the formulas down the columns
RETURN	executes the command and prepares to receive additional instructions
R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

R
N

NOTE

You have just deleted your dashed line on row 15. To replace it, place your cursor on D15 and type:

/—	starts REPEAT LABEL
—	label to be repeated
RETURN	executes the command

Now place your cursor on E15 and type:

/—	starts REPEAT LABEL command
—	label to be repeated
RETURN	executes the command

You will now have a continuous dashed line in row 15.

Formula three, in the BALANCE SHEET for 1981 column, adds the TOTAL ASSETS.

Place your cursor on D19 and type:

@SUM(	adds values in the list

D16	first coordinate in the list
.	ellipsis . . . indicating from-to
D18	last coordinate in the list
)	closes the list
RETURN	enters the formula

Your next operation is to copy, using the REPLICATE command, the formula just entered, across the row, into the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column.

Place your cursor on D19 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in D19
E19	coordinate where you wish the formula to be copied
RETURN	enters the formula
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula four, in the BALANCE SHEET AS % OF 81 SALES column, in the ACCOUNTS PAYABLE row, takes the ACCOUNTS PAYABLE FOR 1981 and divides that by SALES FOR 1981. The resulting value is then multiplied by 100 to convert it to a dollar amount.

Place your cursor on D21 and type:

+	prepares the coordinate to accept a numeric expression
C21	coordinate containing accounts payable 1981
/	divides
C3	coordinate containing sales for 1981
*	multiplies
100	number used to convert result to dollar amount
RETURN	enters the formula

Formula five, in the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column, in the ACCOUNTS PAYABLE row, takes the ACCOUNTS PAYABLE AS % OF 81 SALES and multiplies that time the PROJECTED SALES 1982 figure. The resulting figure is then divided by 100 to convert it to a dollar amount.

Place your cursor on E21 and type:

+	prepares coordinate to accept a numeric expression
D21	coordinate containing accounts payable as % of 81 sales
*	multiplies
C1	coordinate containing projected sales 1982
/	divides
100	number used to convert result to dollar amount
RETURN	enters the formula

Your next operation is to copy, using the REPLICATE command, the formulas just entered, in the same column into the ACCRUED WAGE AND TAXES row.

Place your cursor on D21 and type:

/R	starts REPLICATE command
E21	coordinate containing formula to be copied
RETURN	tells the command to copy the formula in E21
D23	coordinate where you wish the formula to be copied
RETURN	enters the formula
R	tells the command to copy the coordinate address in the formula relative to its new location
N	tells the command to copy the coordinate address in the formula in its new location without change

R
N

12 EXERCISE

Formula six, in the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column, NOTES PAYABLE ROW, uses the IF logic function to generate the values. If the notes payable for 1981 equal 0 (any label generates an 0 value) then use the 1981 figure. If not, use the NOTES PAYABLE as a % of 1981 SALES figure.

NOTE

> IF logic function contains three expressions separated by commas. The first expression generates a true or false value as a result of a logical operation. If the value is true, the IF .selects the value generated by the second expression. If the value is false, the IF selects the value generated by the third expression.

Place your cursor on E22 and type:

@IF(	starts IF logic function
D22	part of the first expression which generates the first value to be compared
=	LOGICAL OPERATOR, compares the first value against the second and results in the logical value of true or false.
0	second value to be compared
,	comma-separates expressions in IF function
C22	coordinate containing value. Second expression in the IF function, which will be selected if the first expression is true
,	comma-separates expressions in the IF function
D22	coordinate containing value. Third expression in the IF function, which will be selected if the first expression is false
)	closes IF logic function
RETURN	enters the formula

Your next operation is to copy, using the REPLICATE command, the formula just entered, in the same column, into the MORTGAGE BONDS, COMMON STOCK and RETAINED EARNINGS rows.

Place your cursor on E22 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in E22
E26	first coordinate where you wish the formula to be copied
.	ellipsis . . . indicating from-to
E28	last coordinate where you wish the formula to be copied
RETURN	executes the command and prepares to receive additional instructions
R R R	tells the command to copy the coordinate address of the formula relative to its new location

Formula seven, in the BALANCE SHEET AS % of 81 SALES column, TOTAL CUR LIABILITIES row, adds the percentage total of current liabilities.

Place your cursor on D25 and type:

@SUM(	adds values in the list
D21	first coordinate in the list
.	ellipsis . . . indicating from-to
D24	last coordinate in the list
)	closes list
RETURN	enters the formula

Your next operation is to copy, using the REPLICATE command, the formula just entered, in the same row, into the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column.

Place your cursor on D25 and type:

/R	starts REPLICATE command

RETURN	tells the command to copy the formula in D25
E25	coordinate where you wish the formula to be copied
RETURN	enters the formula
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula eight, in the BALANCE SHEET AS % OF 81 SALES column, TOTAL CLAIMS row, adds the total percentage of claims.

Place your cursor on D30 and type:

@SUM(	adds values in the list
D25	first coordinate in the list
.	ellipsis . . . indicating from-to
D29	last coordinate in the list
)	closes the list
RETURN	enters the formula

Your next operation is to copy, using the REPLICATE command, the formula just entered, in the same row, into the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column.

Place your cursor on D30 and type:

/R	starts REPLICATE command
RETURN	tells the command to copy the formula in D30
E30	coordinate into which the formula is to be copied
RETURN	enters the formula
R R	tells the command to copy the coordinate address in the formula relative to its new location

Formula nine, in the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column, ADDITIONAL FUNDS NEEDED row, subtracts TOTAL CLAIMS from TOTAL ASSETS to calculate the additional funds needed.

Place your cursor on E32 and type:

+	prepares the coordinate to accept a numeric expression
E19	coordinate containing total assets
—	subtracts
E30	coordinate containing total claims
RETURN	enters the formula

Formula ten, in the PRO FORMA BAL SHEET FOR PROJ. SALES 82 column, TOTAL ASSETS ROW, adds the TOTAL ASSETS in that column.

Place your cursor on E34 and type:

@SUM(	adds values in the list
E30	first coordinate in the list
•	ellipsis . . . indicating from - to
E32	last coordinate in the list
)	closes the list
RETURN	enters the formula

Now that your worksheet formating is complete, you may wish to print the formulas for later use.

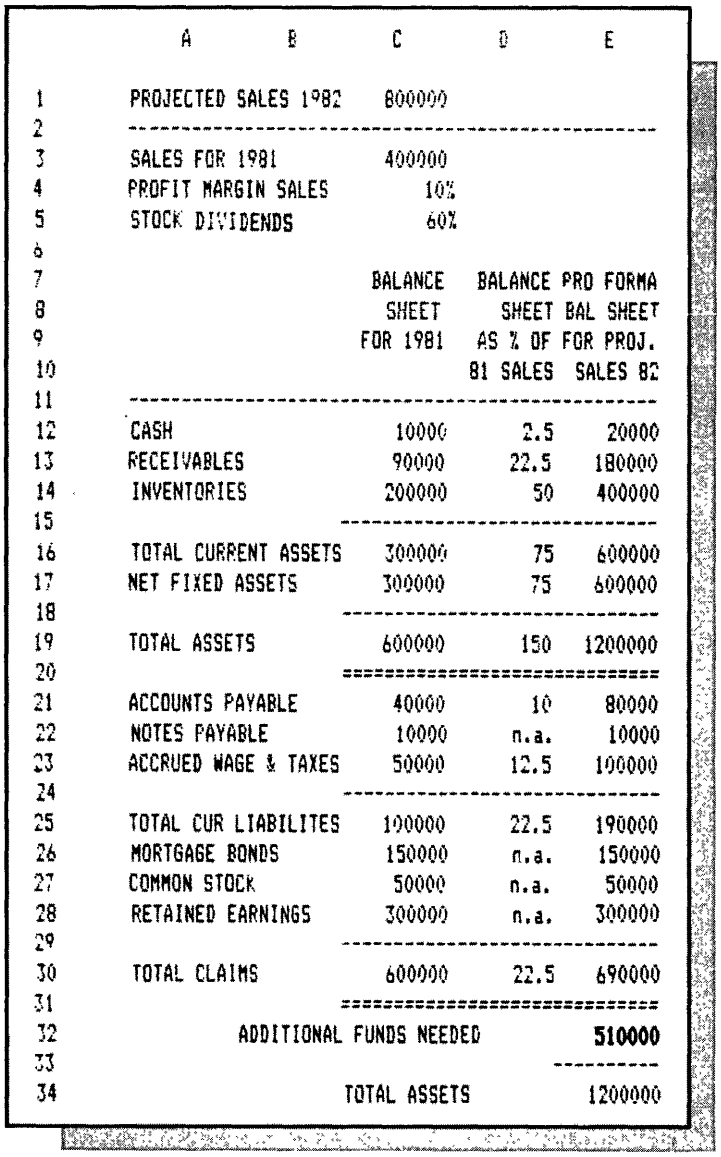
To print the formulas, type:

/S	starts STORAGE command
S	saves
•PRINTER	prints the file
RETURN	executes the command

MAKING WORKSHEET ENTRIES

Now your worksheet is complete and ready to be updated. You are able to update the financial worksheet and forecast by changing any of the variable values. To illustrate this, we have changed the value of PROJECTED SALES 82 as illustrated in Figure 3. This simultaneously updated the values in the PRO FORMA column. You may also make any other entries which may be pertinent to your PRO FORMA projections.

12 EXERCISE



	A	B	C	D	E
1	PROJECTED SALES 1982		800000		
2					
3	SALES FOR 1981		400000		
4	PROFIT MARGIN SALES		10%		
5	STOCK DIVIDENDS		60%		
6					
7			BALANCE	BALANCE	PRO FORMA
8			SHEET	SHEET	BAL SHEET
9			FOR 1981	AS % OF	FOR PROJ.
10				81 SALES	SALES 82
11					
12	CASH		10000	2.5	20000
13	RECEIVABLES		90000	22.5	180000
14	INVENTORIES		200000	50	400000
15					
16	TOTAL CURRENT ASSETS		300000	75	600000
17	NET FIXED ASSETS		300000	75	600000
18					
19	TOTAL ASSETS		600000	150	1200000
20					
21	ACCOUNTS PAYABLE		40000	10	80000
22	NOTES PAYABLE		10000	n.a.	10000
23	ACCRUED WAGE & TAXES		50000	12.5	100000
24					
25	TOTAL CUR LIABILITES		100000	22.5	190000
26	MORTGAGE BONDS		150000	n.a.	150000
27	COMMON STOCK		50000	n.a.	50000
28	RETAINED EARNINGS		300000	n.a.	300000
29					
30	TOTAL CLAIMS		600000	22.5	690000
31					
32		ADDITIONAL FUNDS NEEDED			**510000**
33					
34		TOTAL ASSETS			1200000

Figure 3

SAVING

Now that you have made the worksheet entries as illustrated above, you may wish to save the entire report for later use or print it for filing or distribution.

To save the entire worksheet, type:

/S	starts STORAGE command
S	saves

FIN.STA	name of file; do not type spaces between words
RETURN	executes the command

PRINTING

To print a portion or all of your report, place your cursor on A1, the upper-left coordinate of the worksheet area rectangle that you wish to print and type:

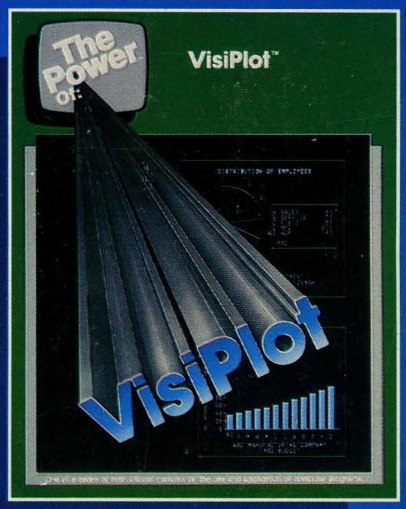
/P	starts PRINT command
P	printer
E34	the lower-right coordinate of the worksheet area rectangle that you wish to print
RETURN	executes the command

INDEX

FUNCTIONS USED

COMMANDS USED

Note: Some of the functions and commands appear in more pages than listed in the above index.



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