M U L T I P L A N

E X E R C I S E S

Ver 1.02

By Herbert Schlesinger

Member:

Great Lakes Computer Group,Inc.
P.O.Box 152
Roseville, MI 48066-0152

Chicago TI User's Group
P.O.Box 578341
Chicago, IL 60657

LA 99ers Computer Group
P.O.Box 7746
Torrence, CA 90504

MULTIPLAN EXERCISES

is the result of finding a book in the local library which I thought explained the use of MULTIPLAN in a very understandable format. It was, however, written for the PC and it was also out of print.

Like the history professor who took five books to his mountain retreat and came back with six, I want to acknowledge that this work is a combination of the MANUAL provided by TI; the book by Alan Simpson, "The Best Book of Multiplan", published in 1984 by Howard W. Sams & Co.,Inc of Indianapolis, IN.; and much revision and testing on my part. There were many errors of reference in the book which I believe have been corrected. I do recommend that if a copy of this book is located in a used book store, or elsewhere, grab it. In spite of the fact that it was written for the PC, the illustrations, which I have had to place on disk for viewing while the text is read from a printout, are excellent.

There is much more to learn about MULTIPLAN. Study the manual; but so many of us are in a hurry and this tutorial will get the novice started and will review the most used features for the regular user of Multiplan.

Geneve users will find that the TAB and the ARROW keys work and that the DELETE key acts as the HOME key. F9 must still be used as the backspace and the other F keys can also be used. Page UP and DOWN do not work so the CTRL X and E will have to be used.

Herbert Schlesinger
27384 Strawberry Lane
Farmington Hills, MI
48334

If you find that this work has been helpful a donation to the author will be appreciated.

Note:To avoid printing these first two sheets, use PRINTEXT as file to start printing.

MULTIPLAN EXERCISES

By Herbert Schlesinger

The purpose of this paper is to help the infrequent MULTIPLAN user become familiar with the possibilities of MULTIPLAN.

At all times if the "?" question mark key or FCTN 7 (HELP) is pressed, HELP screens will appear applicable to the screen or command you are in at that time. More later on this.

On this disk are the following files:

The first thing to do is to print out this file. You will be using it as an instruction sheet to go with the screens provided by the other files. As a general rule you will start with a named file and will end with the screen looking like the screen brought up by the named file plus an additional number: such as CELLS and CELLS1 or something like that.

It is necessary to have the following configuration for your system:

Console
PE Box
32K expansion card
The Multiplan cartridge and disk
Printer (not needed if this file is printed out for you.

ENTERING MULTIPLAN:

Put the MULTIPLAN screen on your monitor as follows:
1> Place the MULTIPLAN Cartridge in the console; the MP disk in drive 1 and select "2> Multiplan" from the options on the title screen. When the disk stops turning the MULTIPLAN screen will instruct you to press <ENTER>. A screen will form which has certain features:

There is a series of numbers down the left margin; also numbers across the top. These are the ROW and COLUMN numbers. Actually there are more columns and rows than you see on your screen. Using the ARROW keys (FCTN S D E X) you can scroll to 63 columns and to 255 rows.

In the upper left corner is a highlighted #1 about which more later. (Page 25 &26)

Just below Row number 21 is a COMMAND LINE. This says: Alpha (hylited) Blank Copy Delete etc. As the space bar (also the TAB key on the Geneve) is used the hylite (EDIT CURSOR) moves from one of these commands to the next; or, if the first letter(the capital) is pressed, that command is entered. Beneath this command line are the instructions:

"Select option or type command letter.

The bottom line looks like this:

R1C1 (see note below) 100% Free Multiplan: TEMP
(also page 7 & 22)

" CONTROL = " brings back the command line and cancels a command if you made an error or changed your mind.

The cell at R1C1 (ROW1 COLUNM1) is hylited with the CELL POINTER and this lower left corner will always tell you which cell is the active cell. As you use the arrow keys notice that this indicator changes. The next item tells how much space is left in the Multiplan memory. As the amount indicated gets closer to 0% the entire operation becomes slower since the program has more work to do. The last of the notations is the name of the file on which you are working. If the file is unnamed it is called TEMPorary. The space between the cell notation and the % left will show the contents of the hylited cell; figures,a formula or alpha if anything is in that cell.

2> The Cell Pointer is moved by using the "ARROW" keys, FCTN E S D or X, or by using the COMMAND "Goto". As the right arrow key (FCTN D) is pressed the cell pointer moves to the right; when it reaches the right border of the screen it moves to the next column and the leftmost column disappears from the screen. It's not lost, just hidden from view. As the left arrow key is pressed, the "pointer" moves back until it reaches "C1" (column 1). If the down arrow key is pressed we move from R1 (row 1) down the "page" and on reaching the bottom of the screen continue as far as row 255 if we wish. Of course the top rows scroll off the screen as we add more rows to the bottom.

When we wish to enter a command, there are two choices: A> Each press of the spacebar (or TAB key on the Geneve) will cause

the MENU POINTER to move to the next option. When the desired option is hylited, press <ENTER>. Or, B> type in the first letter of the option you want and it is there immediately.

Suppose we want to move the CELL pointer using the Goto command. Press the space bar six times to Goto and then press <ENTER>; or just press G. The bottom of the screen will then show the Goto options:

```
GOTO:Name Row-col Window
Select option or type command letter
```

The menu pointer hylites the Name option.

To get to any cell from anywhere in the sheet, move the pointer to Row-col ; press <ENTER>, or type "R" and the screen will look like this:

```
GOTO row: 1 column: 1
Enter a number
```

Now if you want to go to, say, R15C12 ; merely enter 15 at the hylited 1 and then PRESS CTRL A (TAB KEY) which will shift the pointer over to the column field, Thus:

```
GOTO row: 15 column 1
Enter a number
```

Type 12 at the hylite and press the <ENTER> key, the cell pointer moves to that position and the indicator at the bottom left of the screen reads R15C12.

All the commands work on the same principle: whatever your hylite is on in the command line, upon pressing <ENTER> you are in that command situation. Or just press a letter.

DATA:

There are three types of data used in the spreadsheet:

a> ALPHA--- Letters or numbers NOT used in calculations: names,dates,addresses etc.

b> NUMBERS- Numbers used in calculations such as quantities, scores, dollar amounts.

c> FORMULA- Which perform the calculations as summing, multiplying, dividing, or other combinations.

LET'S TRY THIS OUT:

!!!! Put the "GRADES" file on the screen. To put any file on the screen we must use a certain proceedure:

From the command line press TRANSFER. The options then are:

```
TRANSFER: Load Save Clear Delete Options Rename
Select option or type command letter
```

Select LOAD and enter the Filename (do not enter the Dsk #

just the file name) in Capitals or press an arrow key to see the choices (Directory of files on the disk). Move the hylite with the ARROW keys and then Press <ENTER>. When the file "GRADES" has been loaded there is a list of names and grades; add a name or two to those already there:

ENTERING DATA:

Move the cell pointer to the cell you want data entered in.

Select "ALPHA " from the command line by pressing "A" or by just pressing <ENTER> since that option is already hylited. A prompt at the bottom of the screen invites you to enter the desired information - in this case a name, say James.

After typing the name, using Upper or Lower case or a mixture, you can enter it into the cell area (the hylited cell) by either of two methods: 1> Press <ENTER> which enters your data AND brings back the entire command line. OR 2> press the right arrow (FCTN D) key or any other arrow key you wish. In this case the data is entered into the hylited cell and the hylite moves in accordance with the key pressed. The Command line then looks like this:

ALPHA/VALUE:_

ENTERING FORMULAS:

If the next thing you type starts with a number, this command line will shift to "VALUE", but if a letter is entered, it shifts to ALPHA.

Getting back to our example: enter a few names and give each some scores in columns 2 and 3.

Here is how we do it: Using the arrow keys place the cell pointer in the CELL you want to enter something in; Press <ENTER> (or "A") to get Alpha and enter a name (James); Press the down arrow and you are in position to enter the next name. The first is in the cell you wanted it in. To enter a score place the Cell Pointer where you want it and, after entering an amount, press an arrow to go in the direction desired.

Next we would like to know what the average grade is for each student so we will use a formula:
AVERAGE=Sum of grades/number of grades (in this case 2). Using the arrow keys place the cell pointer at R1C4 and enter = (the equal sign). The bottom of the screen will show:

VALUE: enter a formula

Enter the formula: (R1C2+R1C3)/2 and press <ENTER>. The result immediately appears in the hylited cell (R1C4). Do this for each student, but note that the formula must state the correct cells - R2 for the second row, R3 for the third,etc.

Notice that the contents of each cell is shown at the left

lower portion between the cell name and the % of space left.

TO END A SESSION ; and save what you have been doing, if you wish to save it, follow this proceedure: Press <ENTER> to bring up the command line if it is not already there, OR press "CTRL =" to accomplish this whenever you want the command line; Press Transfer and at the option offered press "S" or move the hylite to Save and Press <ENTER>. Now you are offered:

```
TRANSFER SAVE filename: GRADES or whatever file name
Enter a filename                    is present,if any
```

Type in a name or use the default you find there and then press <ENTER>. If you choose a filename already on the disk you will be asked:"Overwrite existing file? ". If you wish to overwrite press "Y", otherwise press any other key and you are back on the command line. If an unused filename is entered the warning is not given.

TO LEAVE MULTIPLAN:

Hylite Quit or press "Q" from the command line which will bring up - Enter Y to confirm. So, if you wish to leave press "Y". Pressing any other key will return you to the command line.

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If you have not left Multiplan, and wish to continue the session: Press "T" (transfer); "C" (clear); and then "Y" to confirm. Otherwise bring up a blank screen as on page 4.
We shall use this to illustrate the Functions which follow.

FUNCTIONS:

Using functions will allow manipulation of the data entered into the spreadsheet. Remember - ALL functions require an ARGUMENT. This means that the function needs something to operate on. Hylite R1C1 and type in this formula: SQRT(36).

This formula appears at the bottom of the screen, but Multiplan displays "6", the square root of 36, in the active (hylited) cell. Here the argument is 36 which is enclosed in parentheses. Since all functions are a formula, or part of one, it is necessary to type in the equal (=) sign which will bring up the VALUE notation at the bottom of the screen. It is not necessary that the argument be a number. It can refer to another cell which in itself is a number: (Enter 100 in R1C4) and place the cell pointer in R4C1 and enter:

```
SQRT(R1C4) the number 10 appears in R4C1
```

If you now goto R1C4 and change that number to another you will notice that R4C1 changes in accordance. If the contents of R1C4 is not a perfect square, the fractional root will show in R4C1. Try all this.

The cell refered to must contain a number capable of being an argument. Functions can be used as arguments for other functions. Example - if R1C1 held the figure -100 (negative 100) and you asked Multiplan to take its SQRT - you would get an

"Error message". The cell would show #NUM! indicating an error because there is no square root of a negative number. However if you asked for:

SQRT(ABS(R1C1)) Square root of Absolute R1C1

you would get 10 in the hylited cell. Notice that every opening parentheses must have a matching closing parenthesis.

!!!! Clear the screen and bring up the file " GRADES1 "

If we place our cell pointer in a cell beneath a column of numbers, as at R8C4 and label it "AVERAGE" in R8C1,and then enter SUM(R1C4:R6C4) the sum of those six numbers would appear there. The colon (:) between the two cell names separates the beginning and the end of a Range. What that formula really said was "In this cell place the sum of all the cells from Row 1 Column 4 (R1C4) to Row 6 Column 4 (R6C4)". Don't forget that if we want the class averaage we must divide this sum by the number of members in the class.

IMPORTANT:

Usually when starting to use Multiplan for a spreadsheet, the first thing to do is select "Options" and change "Recalc" from yes to NO by pressing the space bar and then pressing <ENTER> so that the entire sheet will not be recalclated each time a figure is entered. If this is done, the work is recalculated by pressing FCTN 8 when finished with a series of entries or when leaving MP or saving a sheet. In these exercises this should not be done because so few cells are involved, but if the screens do not do the calculations, press FCTN 8 (the RECALC key).

LIST OF FUNCTIONS:

MATHEMATICAL FUNCTIONS

ABS(N)	Returns the absolute value of a number.
EXP(N)	Returns the exponent (antilog), the base of the natural logarithm to the power of the argument. If R1C5 contains the value 1, the formula EXP(R1C5) displays 2.7182818.
INT(N)	Returns the integer equivilent of N, truncating (not rounding) the decimal places. Thus 123.999 becomes 123 using INT(CELL)
LN(N)	Returns the natural logarithm. If R1C1 contains 2.7182818 the formula LN(R1C1) displays 1.
LOG10(N)	Returns base 10 logarithm.
MOD(N1,N2)	Returns the modulus (remainder) of N1 divided by N2
ROUND(N1,N2)	Returns the number N1 rounded to N2 decimal places.
SIGN(N)	Returns a number indicating the sign of the argument 1 is postive ,0 is zero, and -1 if

negative.

SQRT(N) Returns the square root of the argument.

SUM(R) Displays the sum of a range of numbers.

BUSINESS FUNCTIONS

DOLLAR(N) Converts the argument to a dollar amount rounded to two decimal places, displayed with a dollar sign.

NPV(N,R) Returns the Net Present Value of an investment where N is the interest rate and R is a range of cash flows.

STATISTICAL FUNCTIONS

AVERAGE(R) Returns the average of a group of numbers.

COUNT(R) Counts number of cells containing numeric values.

MAX(R) Displays the largest number in a range of values. Example: If rows 1 thru 5 of column 1 contain the values 80,62,75,90,and 70, the formula MAX(R1C1:R5C1) displays 90.

MIN(R) Displays the smallest value in a range. Using the example above the formula MIN(R1C1:C5C1) will display 62.

STDEV(R) Returns the Standard deviation of a range of numbers. Using the same numbers as above, STDEV(R1C1:R5C1) will display 10.526158.

LOOKUP FUNCTION:

Sometimes there is no direct mathamatical relationship between a value and the desired result. Such a case is in figuring taxes where some entries must be looked up in a table. Multiplan can LOOKUP data in a table on the spreadsheet.

LOOKUP(N,R) Looks up the value of N in the first row or column in range of cells(R)> If it can not find the exact value of N, it selects the closest lower number. Example: Columns 1 and 2 on the spreadsheet contain these values:

	1	2
1	0	0
2	10000	0.1
3	20000	0.2
4	30000	0.3
5	40000	0.35
6	50000	0.4

The formula LOOKUP(45000,R1C1:R6C2) displays 0.35, since 40,000 is the next

smallest number below 45,000 and 0.35 is the associated percentage figure.

!!!! Using the method shown on page 5 bring the file "TAXES" to the screen.

We have a series of labels in column 1 with only "Income" entered, and a lookup table occupies columns 4,5 and 6. We will ask Multiplan to figure the tax on the income of 9500. (The $ signs and all that will come later). First we must find the "base tax" so place the pointer in R4C2; press = , and enter the formula: LOOKUP(N,R) where N is the amount to be found on the chart and R is the range describing the chart itself. We have:

Value: LOOKUP(9500,R2C4:R12C5)

Upon pressing the down arrow or <ENTER>, 112.5 appears in cell R4C2. This is the closest to the full amount in the chart without going over. We then place our pointer to R6C2 and subtract the table amount from the full salary - thus: 9500-LOOKUP(9500,R2C4) and 500 appears in R6C2. Next place the pointer in R5C2 and use the lookup function to read the last column of our table: LOOKUP(9500,R2C4:R12C6). MULTIPLYING our shortfall (R6C2) by the percent in R5C2 is done by doing just that: Place pointer in R7C2, enter the formula (R6C2)*(R5C2) gives the amount in R7C2. By placing the pointer in R9C2 and entering the formula (R4C2)+(R7C2) gives the total tax due. All this is done by formulas which you can see if you select FORMAT: Options and select formulas:(Yes) instead of the default (No). What we have done here has already been saved as " TAXES1 " which we shall use shortly for more refining. In the meanwhile:

LOGICAL FUNCTIONS

These are used to make decisions in the spreadsheet. IF is the key. What we have is the IF function:

IF (something is true, do this, otherwise do this)

The IF function uses operators:

Operator	Meaning
<	Less than
<=	Less than or equal to
>	Greater than
>=	Greater than or equal to
=	Equal
<>	Not equal to

Example: IF(R1C1>0,90/R1C1,0) -- This means "If the value in R1C1 is greater than 0, then display 90 divided by the contents of R1C1, else display zero. The commas in the argument determine the decision and the outcome.

AND(N1,N2) Determine whether or not two conditions are true

simultaneously. If R1C1 contains the number 0, and R1C2 contains the number 100. The formula IF(AND(R1C1>0,R1C2>0),R1C1/R1C2,0) Zero will be returned because while it is true that R1C2 is greater than zero, it is not true that R1C1 is greater than zero.

IF(N1,N2,N3) Makes a decision. N1 must be a comparison as: (R1C1>0 or R20C4<>100). If the comparison is true the number or formula in N2 is displayed in the cell. If the comparison is false then N3 is displayed in the cell.

OR(N1,N2) Compares two conditions to see if either is true. Example: R1C1 contains 100, R1C2 contains 0. The formula IF(OR(R1C1>0,R1C2>0,R1C1+R1C2,"both zero") will display 100 (sum of the two cells) but if both had contained the number zero, the formula would have displayed the message "both zero".

Other functions for trig, formatting, testing formulas and handling Alphas will be discussed later. Now lets do some work:

!!!! Bring the file " SALES " to the screen.

The names and amounts are already there but the total is not. To put these amounts on the screen (and in the spreadsheet); position the cell-pointer at R10C2. To get the total in this cell press = and then enter a formula: SUM(R3C2:R8C2) and the sum will appear in the hylited cell after <ENTER> or an arrow key is pressed.

To get the statistics (the headings are already there) position the Pointer (we will call it that from now on) in C6 opposite the label "Count", press = and type in the formula COUNT(R3C2:R8C2) and then press the DOWN arrow key. Press = and type in the formula for the next item in the statistics chart:
MIN(R3C2:R8C2) press the DOWN ARROW key again and do the same for the remaining formulas which are:
MAX(R3C2:R8C2)
AVERAGE(R3C2:R8C2)
STDEV(R3C2:R8C2)

These formulas can also be written with the range : in the row portion alone, in the column portion alone or with the range in both parts. Example: STDEV(R3:8C2)

Now play around with the numbers in column 2. Each change you make will affect the total and the statisttics. (If you changed the Options command to NO, the changes won't be made until FCTN 8 is pressed.). It is more fun on a screen such as this to have the RECALC(Yes) on so the changes are automatic.

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FORMATTING

!!!!Bring the file " TAXES1 " to the screen.
a. Aligning Cell Data
The screen will show the spreadsheet after formating.
1.Positon the cell pointer to R1C4.
2.Select Format from the command menu. A submenu is displayed:

FORMAT: Cells Default Options Width

3.Select Cells from this menu. Another submenu appears:

FORMAT cells:R1C4 align:(D) C G L R--
cd:(Def)Cont Exp Fix Gen Int $ * % - # of decimals: 0

4.Press the colon (:) key, and type in R1C6. Room for this is provided. Then press CTRL A. Now we have:

FORMAT cells:R1C4:R1C6 align:(D) C G L R--
cd:(Def)Cont Exp Fix Gen Int $ * % - # of decimals:0

5.Press C so that the menu pointer moves to the " center " option.
6. Press <ENTER>. The titles will shift to the center of the columns.
Other options from this submenu are:

Setting	Example	Description
D (Default)	What's there	
C (Center)	Salary 22	Both Alpha and numbers are centered in the cell.
G (General)	Salary 22.55	Labels are left-aligned; Numbers are right-aligned.
L(eft)	Salary 123.45 22	Both labels and numbers are are left-aligned.
R(ight)	Salary 123.45 22	Both labels and numbers are are right-aligned.

To right-align the labels in column 1:
1.Place the cell pointer to R2C1. Select Format from the command line menu.
2.Select Cells:

FORMAT cells:R2C1 align:(D) C G L R-
cd:(Def)Cont Exp Fix Gen Int $ * % -# of decimals:0

3.Press colon (:), type R9C1 and press Ctrl A to get this:

FORMAT cells:R2C1:R9C1 align:(D) C G L R-
cd:(Def)Cont Exp Fix Gen Int $ * % - # of decimals:0

4.Select R for right-alignment, and Press <ENTER>.

Using the same methods the numbers can be aligned on the sheet. But let's go further with the numbers.

DISPLAY FORMATING

Cell appearance can be formated as well as the alignment:

1> Position cell pointer on the first number in the Column to be formated (R2C4).
2> Select FORMAT, select CELLS, type ":" to select a RANGE and then type in the last cell in the block (or column) to be formated (R12C5).
3> Press CTRL A to tab over, CTRL A again to get to the (cd) "format" code options, select "$" and then press <ENTER>

Column 6 contains percentages so we again place the cursor on the starting cell,(R2C6), select FORMAT, CELLS, press : and then type R12C6 press CTRL A (the TAB key) twice and then press (%). Next press CTRL A to move to where you are asked for the number of decimals. Enter "2" and then <ENTER>.

The options offered on the format code line:

format code:(Def)Cont Exp Fix Gen Int $ * % # of decimals: 0

CODE	MEANING	DESCRIPTION
Def	Default	Displays cells in default format. That is what is there when no formating is done. It also undoes previous formats.
Con	Continuous	Labels which are too long for a cell are extended into the next cell(s) overwriting what is there. Used for putting long titles or labels on a spreadsheet.
Exp	Expotential	Numbers are displayed in scientific notation, like 1E+6. Use the "# of decimals" to set the number of decimals in this notation.
Fix	Fixed decimal	Numbers are rounded to a fixed number of decimal places as you select using "# of decimals".
Gen	General	Numbers are shown with as much accuracy as possible. Very large or small numbers are shown in scientific notation.
Int	Integer	Numbers are rounded to integers, no decimals
$	Dollar	Numbers shown in monetary ($564.32) format.
*	Bar Graph	Displays a series of stars, no numbers. One star for each integer value in the cell. ((if the value falls between 4.5 and 5.5, five stars are displayed).

%	Percent	Shows all numbers as percentage figures with the % sign. Use "# of decimals" to set the display.

Contrary to the general computer usage, commas can be displayed in the thousands place by following this instruction:
1. Select Format which will bring this up:

FORMAT: Cells Default Options Width

2. Spacebar twice, <ENTER>, or press " O " selecting Options which shows:

FORMAT OPTIONS commas:Yes(No) formulas:Yes(No)

3. Typing "Y" will change the commas option to YES. Press <ENTER>.

Now your spreadsheet will have some cells containing #### in place of figures. This means there is not enough room to display what should be there. So we must widen the column, thus:

1. Place the pointer in the column to be widened. (Here C 4)
2. Press Format, and then select Width. We have:

FORMAT WIDTH in chars or d(efault):d Column 4 through 4

Change the " d " to 12; press <ENTER>. The resulting screen was saved as the file "TAXES2".

To change the width of several columns at the same time, use the same steps as above, but after entering the desired width press CTRL A and move to the next option: column. Enter a number here or pass by using CTRL A again taking you to through. Enter the desired column number and then press <ENTER>. Actually it is not necessary for the pointer to be in one of the columns you wish to narrow or widen but if you are, the column: option will default to that column. You may enter any column in either of the locations. Notice that these changes can not skip columns. The affected columns for each Format must be contiguous. If the letter "d" is entered for the width, the width will revert back to the original (default) setting of 10 spaces.

FORMULA DISPLAY:

Refer to the previous command line illustration: if, instead of Enter we had pressed CTRL A , formulas: Yes(No) would have been hylited. Pressing "Y" and then <ENTER> will cause some changes - all columns are widened to 20 spaces, and the formulas rather than their results are displayed on the screen.

!!!! To see this; use Transfer; Load " PRINT_SS " will show the tax table in this form.

CHANGING THE DEFAULTS:

Defaults are the settings previously given to each cell, row and column either by the program itself or by a change you may

have made in the FORMAT DEFAULT: Cells Width

The options offered are exactly the same as the Format Cells you have previously used except the (Def) is missing. The default is hylited as you will see and changes are made by letter or spacebar for alignment and, after CTRL A, in the format code. The default is in parentheses.

To change the width default, merely shift (CTRL A) to the width option and enter the number of spaces you want as a default. All columns will be changed EXCEPT those already set by the Format cells option.

RANGES and COPYING:

!!!! PUT " COMMISSION " on the screen.
A block of cells, in one column or in more than one column is called a range. We previously designated a range by typing a colon : after the starting cell and then typing in the last cell of the "range".

We are now going to draw a range:
1. Move cell pointer to R3C2, the top of the numbers to be formated.
2. Select FORMAT ; then select Cells ; Type in a colon :

You then have:

FORMAT cells:R3C2:_

Instead of typing another cell reference, press the down arrow key four times - R7C2 will then show after the colon. Press the CTRL A key twice; select the $ option and then press <ENTER>. The data in the range which you "drew" will show the dollar sign and two decimals.

What we did was "draw" the range of the cells to format. This works with any command requiring a range. Here are the rules:

1. Place the cell pointer on the top or upper left corner of the range you want to work with.
2. Select the command you wish to invoke.
3. When the command asks for a range of cells; press the " : " key.
4. Move the cell pointer to the bottom right or bottom cell of the range you want to use.
5. Press the <ENTER> key.

USING RELATIVE CELL REFERENCE:

Ranges are most convenient when used in formulas: to figure the commissions column on the screen we would have to use R3C2*R3C3 for row three and for row four the formula is R4C2*R4C3 and so on down the column. Here is how to do it by ranges:
a. Cell pointer on R3C4.
b. Press the = key.
c. Use the left arrow key to move the pointer to R3C2 (two cells left). Here is what we have:

VALUE: RC[-2] _ (Notice the [] brackets)

d. Press the * key (for multiply) and the cell pointer jumps back to the original cell; and the screen looks like this:

VALUE: RC[-2]* _

e. Move the cell pointer to R3C3 by pressing the Left arrow key once. Now we have this screen:

VALUE: RC[-2]*RC[-1] _

f. Press <ENTER>. The calculation then appears in R3C4.

The formula we are using, instead of R3C2*R3C3 is:

RC[-2]*RC[-1]

What this says is: This row (R), two colunms to the left (C[-2]) times this row (R) one column to the left (C[-1]). Now what we can do with this is copy the formula to the other rows.

COPYING FORMULAS:

The copy option from the main menu allows us to copy labels, numbers and formulas. Mostly we use it for formulas since the others don't often repeat themselves. Here is how it's done:

a. Place the cell pointer in R3C4 (the cell with the formula we want to copy.
b. Select COPY from the main menu, and you get:

COPY: Right Down From

c. Select Down. Then you have these options:

COPY DOWN number of cells:_ starting at: R3C4

d. Type 4 (to copy downward four rows).
e. Press <ENTER>.

Now the commission for each row will be in the proper cell; but if all you got was the same figure down the entire column, you had previously asked the OPTIONS option not to recalculate. In that case, press the RECALC key (FCTN 8) and the proper amounts are entered in the cells. You can also see that the formulas are in the proper cells by printing out the sheet using the Formulas option in the Options part of the Print option of the main menu. (See display of formulas, page 14).

Formulas using the RC[-n] notation are called relative cell reference. This could also be used as R[-n]C. What we are doing is basing the formula on a cell and referring back to that cell to make it work.

When we use the standard formula RxCx*RxCx we are using the absolute cell reference. There is no way these formulas can be

used for other rows or columns.

!!!! Now let's use some of this knowledge; bring up the file " TENYEAR ". Remember how?

From the main menu-(T)ransfer ; (L)oad ; type "TENYEAR "; <ENTER> and there it is. Remember, if you don't know the file name, press an arrow key after the "L" , the screen reminds you that you can do this, and move the hylite to the desired filename and press <ENTER>.

First, notice that the top line is continuous across the screen. This is done by placing the cell pointer in the home (R1C1) position; select FORMAT; then CELLS: type :R1C8 as the cells to format; press CTRL A twice to get to the format code section; select Cont; and press <ENTER>. Now select Alpha; type in the label and press return. The other labels are typed in at their proper places: The sheet looks like this:

```
#1        1         2         3         4         5         6
   1 Ten Year Projection for Commercial Real Estate
   2
   3 Tenant      Rate
```

Place the pointer in R3C3; press the = key and enter the formula;

```
1984+COLUMN()-3
```

Press <ENTER> and R3C3 should show 1984.
Select Copy from the main menu;select Right; type in 10 for the number of cells; Press <ENTER>. The years 1984 to 1994 will appear in the columns three thru thirteen. You can check this by scrolling over to the hidden columns. Here's what happened: in R3CR we placed the formula 1984+COLUMN()-3. COLUMN() returns the column number the cell is in so it returned three. So then we had 1984+3-3. As we copied to the right we had 1984+4-3 or 1985, then 1984+5-3 or 1986 etc.

Data to enter:

```
#1     1       2         3         4 etc
  1 Ten Year etc
  2
  3 Tenant    Rate     1984      1985      etc.
  4
  5 ABC Co.   0.15    12000
  6 Zepco     0.17    10000
  7 B-Tree    0.16     9500
  8 Byte Co.  0.17    10000
```

The data in column 1 are labels; column 2 is the annual rate of increase and the third column is the starting yearly rental for each company.

Using the copy command we can enter the rents for each succeeding year by using this formula:

this year = last year + (rate * last year)

To enter the formula properly, do this:

1. Position the cell pointer in R5C4
2. Press the = key.
3. Press the left arrow key so the menu displays RC[-1].
4. Type + so that the formula reads RC[-1]+ and the cell pointer jumps back to R5C4.
5. Type R5C2* (this is the increase rate. We must do this by absolute reference not by moving the cell pointer which would be by relative reference.) The formula now should read RC[-1]+R5C2*.
6. Press the left arrow key, now we have RC[-1]+R5C2*RC[-1].
7. Press <ENTER>.

The final formula, RC[-1]+R5C2*RC[-1] means " this cell contains the column to the left of this one (C[-1]) PLUS R5C2 (the increase rate) times the column to the left of this one. OR Last year plus the increase times last year.

This will show on your screen in R5C4. now we must copy this for the ensuing 9 years: Place the pointer on cell R5C4; select copy from the main menu; select Right from the Copy menu; type in 9 as the number for cells for the next prompt; and press <ENTER>. You will see the calculation for all of the years enter automatically. Scrolling to the right will display this to you.

We must do the same thing for each of the other companies, but we can not merely copy this using the Copy option because we used an ABSOLUTE reference in our formula. We must change the formula for the other tenants by using R6C2 , R7C2 AND R8C2 in place of the R5C2 we used for the first tenant. You can see that if we did not, the rate of increase would be the same (would always refer to the R5C2 cell) instead of the correct amount as indicated in the proper cells for each tenant.

In a case like this it is unnecessary to have the dollar signs and the two decimal places found in the money mode. Format the cells in the range R5C5:R8C13 into Integer Format, using the Format and Cells commands. This whole area is really dollar amounts, but that would clutter up our chart, and are readily understood without the extra symbols. We can embed commas into the amounts which helps make them clear. Do this by selecting the Format Options command (select Yes for the commas option.)

Now lets pretty up the chart:

1. Place the cell pointer at R9C3
2. Select FORMAT; then CELLS; type in the colon (:) and press Fctn 1 (the END Key). The cell pointer will move to the 1994 column and the range will show R5C3:R8C13.
3. Press CTRL A twice to get to the Format Code menu; type C for "continuous" ; press <ENTER>.
4. With the pointer still in R9C3; press = to enter a formula; type in the formula REPT("-",110) ; and

press <ENTER>.

Here is what we did: We made Row 9 continuous; then we told Multiplan to repeat the hyphen (-) 110 times across the sheet.

Next type "Total" into R10C1. Calculate the totals thusly:

1. Place the cell pointer in R10C3, in the 1984 column.
2. Press = to enter a formula.
3. Type in the formula SUM(
4. Press the Up-arrow key 5 times so the formula is expanded to SUM(R[-5]C.
5. Press ": " so that the colon is added to the formula and the pointer is back at R10R3.
6. Press the Up-arrow key twice so that the formula now reads SUM(R[-5]C:R[-2]C. Add a closing parenthesis and press <ENTER>. Formula now looks like: SUM(R[-5]C:R[-2]C).

The sum of the column appears in R10C3. Place the cell pointer in that cell; select the Copy option from the main menu; select Right from the copy submenu; enter 10 for the number of "cells to copy to" and press <ENTER>. If you originally elected to HAVE the automatic recalc the proper sums appear across the sheet. If you DID option (NO) for automatic recalc the sums shown across the sheet are the same as the 1984 column. Press FCTN 8 and these figures will change to the proper amounts. WHY? Because we used Relative References in our formula. At this point the sums may be made into integer figures as above, or even this row only into dollar figures.

If you now want to change one or more of the figures you can "what if" all over the place and the figures will change to reflect your entries, either automatically or by the use of FCTN 8 (recalc).

To save this sheet in its present form use Transfer and then Save. If you want to save it under the same name you will notice the program enters that for you. But without a change in the name it asks:"Overwrite existing file? ". If this is what you wish press Y (Yes) and this file will replace the previous one with that name. I suggest that a different name be used so that if necessary you could pass this disk on to some one else and they would be able to build the file as you have done. Here we saved this finished sheet as "TENYEAR1" to be used later.

Recap: We have covered a lot of material in this section of the program. A) We "drew" ranges by moving the cell pointer in developing formulas. B) We copied formulas using the Copy command. C) We used the COLUMN() and the REPT commands and also used the Cont subcommand to use a row continuously instead of laborously cell by cell. D) We learned a little more about Relative and Absolute references.

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EDITING:

Now lets look at EDITING the spreadsheet. If you make a mistake in typing and have already pressed <ENTER> your mistake appears in the spread sheet. To correct this, simply re-enter that cell with the correct entry. Now the cell on the screen should hold the proper information. If you catch the mistake before it is entered you may press FCTN 9 to backspace over what you have writen. This erases what was there and you may retype the proper entry. OR you can simply press CTRL = to cancel what you have started. This brings back the main Command Line and you start over. However, this section concerns Editing so if we find an error of spelling or of a formula we can select Edit from the main command line:

!!!! Bring up the screen "NAMES "
When you finish this exercise on Editing your screen will look like "NAMES1".

Note the first label is "Principle" which is the wrong spelling.

1. Place the cell pointer in the cell containing the error.
2. Press E(dit) from the main menu by pressing " E ".

The contents of that cell will appear in the menu area surrounded by quotation marks, thus:

EDIT: "Principle"_

Press the backspace key (FCTN 9) three times and you will have:

EDIT: "Princip_

Type in the correct letters (al) and the line is

EDIT: "Principal_

Remember to close the quotes and when the line looks like this:

EDIT: "Principal" PRESS <ENTER>

Using the same method of placing the cell pointer on the cell which needs editing, selecting the Edit option, we can correct numbers and formulas. Neither of these need quotation marks, only text is so enclosed. Now to the matter at hand: We see that the Payment in R5C2 is a negative number. This can not be right; so we Edit that cell and the screen shows:

(In order to get the caret ^ to show we had to redefine another character to print this out. See the text on screen.)

R1C2*R2C2/(1-(1+R2C2) ^ R3C2)

This is not easy to correct but first write down the formula for calculating a payment on an ordinary annuity,

$$PAYMENT = PRINCIPAL * \frac{INTEREST}{1-(1+INTEREST)^{-TERM}}$$

Our spread sheet stores the Principal in R1C2, the interest in R2C2, and the Term in R3C2 the formula is:

$$PAYMENT = R1C2 * \frac{R2C2}{1-(1+R2C2)^{-R3C2}}$$

OR as a formula for the spread sheet:

```
R1C2*R2C2/(1-(1+R2C2)^-R3C2)
```

The error is that the rightmost calculation. R3C2 should be negative. Make the correction by backspacing over that part of the formula and typing it in again after placing a - sign. Easier, in this case, simply change the term in R3C2 to a minus quantity and the formula need not be changed.

Once you make the correction, press <ENTER> and the formula is now altered.

Here is a chart of the editing keys:

Task	4A	Geneve	What it does
Character Left	FCTN 4	F4	Moves the cursor left over a character without erasing it.
Character Right	CTRL 4		Moves the cursor to the right a character without erasing
Word Left	FCTN 5	F5	Moves cursor one word left without erasing
Word Right	CTRL 5		Moves cursor right a word not erasing
Backspace	FCTN 9	F9	Moves cursor back one space erasing as it moves
Cancel	CTRL =		"Undoes" any editing, returns the original content to the cell
Delete Forward		F10	Deletes as cursor moves to right

Please note that the spreadsheet we have been working on does calculate the payment for a loan, but NOTE well that the interest is the rate per PERIOD, not per year; and the period or term is the number of PAYMENTS, not the number of years.

USING THE INSERT OR DELETE OPTION OF THE MAIN MENU:

!!!! Bring up the screen " INSERT "

INSERT A ROW:

We have a list of six names as labels as well as the cell labeled "Total". Now suppose we want to insert the name "Clement" in its proper alphabetical order:

1. Place the cell pointer to R4C1, where we want the name to appear.
2. Select the Insert command; there are two options on the screen:

```
INSERT: Row Column
```

3. Select R(ow). Then the screen asks for more information:

```
INSERT ROW # of rows:1          before row: 4
     between columns: 1           and: 63
```

This says that Multiplan is going to insert 1 row, before row 4, for all columns (1 through 63).

4.Press <ENTER> and all the rows will move down a notch.

Now type the new data: Clement 1111.11

Before we made the insertion R7C2, the total, showed a formula: SUM(R[-6]C:R[-1]C and after the insertion it automatically adjusted to include the new row. It now shows: SUM(R[-7]C:R[-1]C. (this is shown on the bottom line of the screen between the hylited cell name and the % of Multiplan used. See pages 4 and 7.)

TO INSERT A COLUMN:

Place the cell pointer to the place you want to insert the column, select the Insert and the Column commands and answer the prompts. Certain defaults are there and, unless changed, will be the extent of the insert. DELETEs are done exactly the same way. Just be sure of the number of rows or columns you want to insert or delete.

Be careful of the number of columns you are inserting or deleting as you can screw up a sheet by off-setting figures which are moved or not moved if the wrong numbers are used. Also note that while a formula adjusts itself if a row or column is inserted in the center or bottom of a group, if row 1 or column 1 is inserted, the adjustment is not made. Always check the formulas by using the Format Options command which will let you see the formulas instead of the figures in the spreadsheet. Sometimes you may delete a cell that was referenced by a formula while doing a delete. In that case the cell will display a message: #REF! which means that the cell the formula refers to does not exist. In that case you must re-enter the formula to make the proper references.

MOVING ROWS AND COLUMNS:

!!!! Place " MOVECOL " on screen.

The Move command allows the moving of rows or columns:

Suppose on our sample sheet, "Davis" marries and changes her name to "Baker", so we wish to put this name in its proper position.

1. We place pointer on the row to be moved, here Row 6
2. Select the Move command from the menu and we see:

MOVE: Row Column

If you select Row you get:

MOVE ROW from row: 6 to before row:6 # of rows: 1

3. Select row six (the default because we are on row 6) by pressing CTRL A (or CTRL2) the TAB key, which switches us over to the next option "before row:"
4. Type in 2 since Baker will before Bell. Leave the # key as it is.
5. Press <ENTER>

Davis will be moved to the new location and you may then Edit the name. (Change it to Baker)

Columns can be moved in just the same way. Try it by moving col 1 to the left of col 3. The submenu looks like:

MOVE COLUMN:1 to left of column: 3 # of columns 1

Go further, move both of these columns into cols 4 and 5:

MOVE COLUMN from column:1 to left of column:6 # of columns: 2

Even more complex moves can be made using the copy command.

!!!! If it is not already there, put " MOVECOL " on screen.

There are too many rows on this sheet to be able to see them at once so we are going to use the COPY command to "split" them into two columns which we can show on one screen. Since there are 30 rows it is natural to split them at 15. Here is how:(This works better on a 90 col Geneve than the 4A)

1. Position pointer in the cell you want to move the data to, here we use R1C4.
2. Select the Copy command giving us three options:

COPY: Right Down From

Select From (by depressing the space bar twice. Remember?) Or press F.

3. The next options are: (since our pointer is in R1C4)

COPY FROM cells:R1C4 to cells: R1C4

Change the cells to copy from to R16C1:R30C2. Do this by

either typing or using the cell pointer to the cells in the range.
4. Press <ENTER>.

Notice that the cells in Rows 16 through 30, columns 1 and 2 will move to the new area, however we will have trouble when we perform the cleanup in the next section - the figures for the total should show an error - #REF!. This can be corrected by placing the cell pointer at R15C5 and entering this formula:

SUM(R1C2:R15C2)+SUM(R1C5:R14C5)

We are merely adding the two parts into which we split the spreadsheet. But since we copied rather than moved this data we must "clean up" our work.

CLEANING UP:

Using the BLANK command from the menu allows you to remove by erasing unwanted cells or groups of cells.

1. Place the pointer in the upper left corner of the range you wish to remove (R16C1).
2. Select the Blank command ,and you have:

BLANK cells:R16C1

3. Press the colon : key for a range.
4. Move the pointer to the end of the group of cells in the range (here it is the bottom row of the second column).

BLANK cells:R16C1:R30C2

5. Press <ENTER>.

The specified cells will be erased and your spreadsheet will look like screen "MOVECOL1". NOTE that if the error of the total label was not taken care of before, it presents itself at this point.

To clear the entire spreadsheet from the screen use the Transfer and Clear options from the menu. You will be asked to confirm this so press " Y " if you want to clear the screen. If you do this all the data is lost forever unless you first Transfer-Saved it under some name.

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WINDOWS:

!!!! Bring up the file "TENYEAR1" on the screen. (Use Tranfer and Load commands, remember?) For this exercise it will be best if the Options from the main menu calls for Recalc(Yes)No so that changes will show automatically. If you have set this for No, go back and change it. See page 8.

Move the pointer to R5C2, ABC Co's increase rate, and change the 15% figure to 12% (.12). The sheet will show the resulting changes at once all across the board. The rental and the totals

for each column from 1984 t0 1994 will adjust themselves. To see this we must scroll the screen to the right - but when we do this we lose the indentifying labels on the left edge of our sheet. To help us with this problem we shall use a Window to Freeze the labels so that they do not scroll.

FREEZING TITLES:

The Window-Split-Titles command will allow the titles in column 1 to be frozen on the screen. Here's how:

1. Move pointer to R1C1.
2. Select Window command which gives these options:

Split Border Close Link
Select Split
3. You then see:

Horizontal Vertical Titles
Select Titles
4. Now the screen shows:

# of rows: 0 # of columns: 0

5. Press the Tab (CTRL A) key to select 0 rows since we are going to freeze a column. Type 1 for number of columns.
6. Press <ENTER>. Notice that a #2 is hylited indicating window #2.

Now when you press FCTN 1 (the END key) to get to the other end of the projection, column 1 will remain in place with the labels so you can see what each figure means. Some of the Long Titles will be shortened or truncated.

If you wish to freeze a row of titles follow the same proceedure, but remember to position the cell pointer BELOW the row of titles (actually place it on the first row you want to be free to scroll.) To unfreese the titles, select Window and Close options and press the <ENTER> key.

SPLITTING THE SCREEN:

Rather than scrolling to reach from one end of sheet to the other, there is another way - Split the screen. Here's how:

1. Pointer to the first row or where you want the screen to split. Try row four (R4C4).
2. Select Window from the menu: there are four options:

Split Border Close Link
Select Split
3. Then we have:

WINDOW SPLIT: Horizontal Vertical Titles
Select Vertical.
4. Resulting in these options:

WINDOW SPLIT VERTICAL at column: 4 linked: Yes(No)
Press <ENTER>. Column 4 is the default because we put our pointer there before we started this operation.

The screen will split into two windows each with its number in its upper left corner. The pointer is active in the window with the hylited number.

We can scroll around in window #2 and examine the figures while the Titles and the first years figures are also on the screen. Now if you change ABC Co's rate, the change at the far end of the projection can be seen as it changes. Use CTRL 6 (change window key) to change the pointer from one window to the other. If there are more than two windows, pressing this key causes the active window to be rotated. In order to view more of the sheet at once, Close the existing window by selecting the commands Window Close and then pressing either 1 or 2 since we have only two windows open at this time. Now we are back where we started. Next move the pointer to the line below Total which in this case is row 11. Now select the Window command, Split, Horizontal and then press <ENTER>. The screen will split at row 11, window #2 will be hylited, but it is empty as you see.

To put the later years in window #2, move the cell pointer to R3C9. The easiest way is to use the Goto command. (Page 5.) But here it is again:

From the command line, press the space bar six times and press <ENTER>, or press "G". The bottom of the screen will then show the Goto options:

```
          GOTO:Name Row-Col  Window
          Select the option or type command letter
```

Press "R".

```
          GOTO row: 1 column:  1
          Enter a number
```

Enter a 3 , then tab to the column and enter a 9. Press <ENTER>

The columns you asked for are now in window #2. Scroll as you wish in this window. Now if you switch to window #1 and change a rate of increase or the 84 rental figure, you can watch the changes all across the years.

WINDOW BORDERS:

Things can be made clearer if you outline the windows with borders. Realize that these take room and you may find that you are better off without them. However, to place the borders:

1. Move the pointer to window #1 (use the Fctn 6 Key)
2. Select the Window and Border commands.
3. Multiplan will ask:

```
        WINDOW change border in window number: 1
  Press <ENTER> to border window 1
```

4. Move the cell pointer to window #2.(Use Fctn 6).
5. Select as 2 above specifying #2
6. Press <ENTER>

When you tire of the borders repeat the above. Notice that the commands are to change the border: if it's not there you get a border and if it is there it goes away.

LINKING:

When you are scrolling in one window the other is not affected UNLESS the windows are Linked. Linking causes the windows to have the same movement in both at the same time; if you move vertically in a horizonally split situation, or horizontally when the windows are split vertically, the relative position of the data remains the same:

WINDOW SPLIT HORIZONTAL at row: XXXX linked: Yes(No)

The "at row" is the pointers present position. The "linked" is always NO. To Link windows, specify the row, press TAB (CTRL 2) and then select Yes and press <ENTER>.

Whenever you call for the window command the option to Link appears on the submenu:

WINDOW LINK window number: 1 with window number: 2
linked:(Yes)No

Use the TAB key to select the windows to link and Yes to have them link. Repeat the process to unlink by pressing No.

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PROTECTING CELLS

!!!! On this spreadsheet which is "TENYEAR1" most of the input are formulas; only columns two and three use Input Data, data which we must type in to the screen. All the information in columns four thru 13 are provided by the formulas we have entered. To make sure that we don't erase a formula by mistake, or some one else using the spreadsheet does not make that error, we can use the Lock command to protect the formulas:

LOCK Cells Formulas

Select Formulas. You are then asked:

Enter Y to comfirm

So enter a Y.

After locking the formulas the pointer can move about as before, but if you attempt to erase or change a "formula" cell you will receive the warning:

Locked cell may not be changed

To UNLOCK all the formula cells move the pointer to the Home position,(R1C1) with CTRL 1 . Use the Lock command from the menu and then the Cells option:

LOCK CELLS: R1C1 status:Locked(Unlocked)

Indicate the entire spreadsheet by pressing (:) to make a range and then the End key (FCTN1). Then tab (CTRL2) to the status section and select "unlocked". Press <ENTER> and the entire spreadsheet is unlocked. Move to any cell and change it as you wish.

You are not limited to formulas in cell protection. You can lock all cells which are not to be changed. This can be done by locking each cell individually as above, before we made a range out of the command, OR we may lock the entire sheet and then release the "input cells" individually or by ranges. Look here:

1. Move the pointer to "Home" (R1C1).
2. Select Lock; select Cells.
3. Type in the colon (:) and press the Lower Right key (FTCN 1)
4. Tab over to the status option.
5. Select "Locked" and press <ENTER>.

In the sheet we are working on we must unlock the input cells:
1. Place the pointer in R5C2 (the first increase rate)
2. Select the Lock and Cells options from the menus.
3. Define the range you want to unlock as R5C2:R8C3.
4. Press the tab key (CTRL A or CTRL 2)
5. Move the parentheses to Unlock by pressing the space bar or the letter "U" and then press <ENTER>.

You can now only change the cells which should be able to be changed.

There is another key which we haven't discussed. CTRL 3 is the "Next Unlocked Cell " key. Its purpose is to make it easier to move around a spreadsheet which has many locked cells. This allows you to go from one unlocked cell to another, without bothering to "try" cells which are locked.

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SORTING:

!!!! Bring up the file " Sorting ".

You can sort the sheet anyway you wish by using the SORT command:

1. Place the pointer on the first name in the column to be sorted. (R3C1)
2. Select the Sort option from the menu, and you get:

SORT by column: 1 between rows: 2 and: 255 order:(>)<

3. Tab over to "between rows".
4. Type in 3 so that the label and the underline will not be included in the sort.
5. Press <ENTER>.

The > shows that the sorting is in ascending order. If we had wanted to go from Z to A, or from a lower to a higher number, we would have selected (<) in the command.

To re-sort by floors, for example, move the pointer to the top of the floor column, again beneath the title and underline, (R3C3). Select the Sort command which will then show:

SORT by column: 3 between rows: 2 and: 255 order:(>)<

Tab over and change "between rows" to 3 and then <ENTER>.

SORTING WITHIN A SORT:

Notice that the first names of the Smiths are not in alphabetical order. To correct this, sort by the "First names" and then again by the last names. Once a list is sorted, re-sorting by another criteria will not change the previous sort's order.

These sorting capabilities make Multiplan a good medium for mailing list management. Last names in C1, first names in C2, addresses in C4, etc will allow sorting by name, by city, by zips for bulk mailing. Adding names is no problem - add them at the end and re-sort.

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USING NAMES FOR CELLS AND RANGES:

!!!! In the file " NAMES1 " we had a formula:

R1C2*R2C2/(1-(1+R2C2)^-R3C2)

Using named cells rather than cell references, the formula becomes:

Principal*Interest/(1-(1+Interest)^-Term)

A formula in words such as this is much easier to understand and there is less likelihood of entering a wrong cell reference.

NAMING A SINGLE CELL:

Naming a single cell; here the "principal" cell:

1. Pointer to R1C1 (where the word principal is located).
2. Select the Name command :

NAME: define name: Principal to refer to:R1C1

3. To use the name "Principal" (the default since the pointer is in that cell), press the TAB key (CTRL 2) and the pointer moves to the "refer to" option.
4. Press the right arrow key to move the pointer to R1C2 and the submenu changes:

NAME: define name: Principal refer to:R1C2

Now press <ENTER>, and the cell in R1C2 has the name "Principal".

Place the pointer on the word "Interest" (in cell R2C1) and repeat the above for the cell R2C2. And again for "Term" (in cell R3C1) so that R3C2 has the name "Term". Note that while the cells in Column 1 have the "Labels", the cells in Column 2 have the "Names".

Now put some figures in column 2. The cell named "Principal" should have 1000 entered into it. Place 0.1 in the cell named "Interest" and 12 in the cell named "Term"(R3C2). Thus to calculate the payment on the loan place the pointer in cell (R5C2) which is labeled payment and press the = key. Enter this formula:

Principal*Interest/(1-(1+Interest)^-Term)

Press <ENTER> and the result, the payment, appears in R5C2. As always on a properly constructed spreadsheet, change a figure in one cell and the others respond with a new result.

GROUPS OF CELLS:

!!!! Load the file " CHECKING ".

A name can refer to a single cell, to a row, a column or even a range (group of cells). Let's set up a sheet for the keeping of a bank balance:

1. The "Beginning Balance" is typed into R1C2.(Format the cell wider if it is necessary).
2. Deposits are entered into column 1 below the label."Deposits"
3. Checks are entered into column 2 below the "Check" label.
4. Ending Balance is shown at R1C4 beside its label.

The Formula we are going to use is this one:

Beg_Bal+SUM(Deposits)-SUM(Checks)

Since Multiplan does not allow blank spaces in cell names we must insert an underline character between Beg and Bal. Now we must name the cells and ranges we are going to use:

1. Place the pointer over the label "Deposits" (R3C1).
2. Select the Name command and we see:

NAME: define name: Deposits to refer to: R3C1

3. Press the Tab key (CTRL 2) to move the pointer to "refer to".
4. Press the down arrow key so that the submenu refers to row 4 of column 1, like this:

NAME: define name: Deposits to refer to: R4C1

5. Press the colon key : to begin a range and then the down arrow key ten times, or as many as you wish, so that we have:

NAME: define name: Deposits to refer to: R4C1:R15C1

6. Press <ENTER>.

Now the cells below the "Deposits" label are, collectively named "Deposits". To name the cells under the "Checks" label, place the pointer to R3C2 and follow the steps above. You may need more spaces for checks than for the deposits.

The single cell R1C2 needs to be named by placing the pointer in it's "label" cell R1C1, except type in the name

"Beg_Bal" as that is the name we want to use in our formula.

To calculate the ending balance, place the pointer in R1C4, press the = key and enter our formula:

```
Beg_Bal+SUM(Deposits)-SUM(Checks)
```

Press <ENTER>. Any data put into the Deposit column or the check column will be calculated into the Ending Balance at R1C4. You will notice that after each entry there is a lapse of time while the sheet is being refigured. As mentioned on page 8, using the Options option to Recalc(No) will speed things up, but when you want the final result you must use the Recalc key (FCTN 8).

REVIEWING CELL NAMES:

When you have many cells named or even when you just forget the names you have used, the names can be reviewed by using the Name command. Select the Name option and a cell name will appear with the cell or cells it refers to. Use the right arrow key to "scroll" through the names on the sheet. When you have found the one you are looking for, or seen all of them press <ENTER> to return to the main menu. You may also JUMP to named cells by using the Goto command. Its submenu offers Name as the first option. If you select Name, <ENTER> you are offered a name which will respond to "scrolling" as above by using the right-arrow key. When the desired name appears, press <ENTER> and the pointer will jump to the named cell or the upper left cell in a range. If you wish you may type in the name of the cell you want and press <ENTER> without scrolling through a list of NAMES.

RULES FOR NAMING CELLS

1. Maximun name length is 31 characters.
2. Names must always begin with a letter,A-Z.
3. After the first character there may be digits,periods or the underline character.
4. No other punctuation is permitted.
5. Do not include combinations of characters resembling cell addresses (such as R2C5).

Defaults are offered in the displays as proposed entries, but if what is there is not what you want, either type in the proper response or point to it.

To eliminate cell names, select the name command; put the name to be removed in the "define name" slot; Tab over to the "refer to" position and remove the reference. If, when you press <ENTER>, the " refer to " is blank, the name is no longer active.

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PRINTING:

It's a good idea to save copies of your worksheet on paper, especially those printed out with the formulas. In case of the loss of the disk you would have a record to reconstruct your

work. Multiplan allows you to place a copy of the worksheet into a wordprocessing environment for editing or for inclusion in another document.

1. Bring up the sheet to be printed on the screen.(See page 5).
2. Align he paper so a perferation is just above the print head and TURN ON the printer.
3. Select the Print command (press "P" or space over and press <ENTER>. We now have:

PRINT: Printer File Margins Options

Select Printer. If the sheet is too wide for the carriage of the printer, the work will be printed in sections for later assembly.

If what is printed out is not to your liking (apparent double spacing or some other flaw) you will have to change some of the defaults in this section of Multiplan. After making such changes, if the sheet is Transfer Saved , these new designations will be the new defaults for that file.

Select Print , then Margin to get:

```
PRINT MARGINS: left: 5   top:6     print width:70
               print length:54     page length:66
```

If you are printing on wider paper, or using Condensed type, change the "print width" accordingly (Condensed used 132 for the 10X printer). Press <ENTER> when you have finished your changes and then the Printer command as above.

The "Left" option lets you set a wider left margin if desired. "Print width" is the maximum characters on a single line. The "print length" is the maximum number of lines on a single page and the "page length" determines when the program moves to a new page.

Print Options allow modification of other characteristics of the printed worksheet. When you select Print Options, this:

```
PRINT OPTIONS: area:              setup:
               formulas: Yes(No)  row-col numbers: Yes(No)
```

"Area" option allows you to print a portion of the work sheet. Just show a range in the space provided; if more room is needed, Multiplan automatically provides the extra space.The "formulas" option, if YES, prints out the formulas for any cell rather than the result of the calculation. The columns will be widened out to 20 spaces and all text appears in quotation marks. "Row-col numbers" is just that. If Yes is selected the row numbers and the column numbers are printed out with your worksheet. Notice that both of these last two are defaulted to NO.

"Setup" allows special codes to be inserted so that signals to the printer may be placed here. The printer manual will provide the code for, say, condensed print (for the 10X it is "Esc B 3" or CHR$(15)). Entered here, along with PIO if you have a parallel printer will do the job .

To use the PRINT on file command, merely enter a drive and then the filename you wish use to preserve the sheet. This saves a D/V 80 file, allows editing and also permits the file to be incorporated into a word processor document.

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LINKING SPREADSHEETS:

!!!! Bring " MEN'S " to the screen, and when you have dealt with that, then " WOMEN'S " and after that, " CHILDREN'S"

Spreadsheets can be of two classes: " supporting spreadsheets" and " dependant spreadsheets". Supporting sheets are independant spreadsheets which are complete in themselves for the information they contain, such as a department, accounts payable, accounts receivable, or whatever. But these sheets can be Linked to a dependant sheet which takes figures or information from the supporting sheet(s) and co-relates the information. As an example we will set up four sheets linked together: " HERB'STORE " for Herb's Store; " MENS "; " WOMEN'S "; and " CHILDRENS " as departments of the store. These departmental sheets will be the supporting sheets and HERB'STORE is the dependant sheet which brings data from each department together for analysis.

These sheets have been set up under those names on the disk and in this case they should be printed out using the Printer options mentioned previously so that they are at hand for reference; since only one of them can be on the screen at a time, the others in hard copy will be handy.

Any data which will be transfered to the dependant sheet must be named (use the Name option from the main menu) so that the dependant sheet can easily call for that information. Understand that when the dependant sheet is "loaded" the supporting sheets are also checked to be available for the depenant sheet even though you can not reference them in that way. In this case the items which must be named are " Gross Profit on Sales " and " Total Expense ". To do this place the pointer in cell R7C2 (on MEN'S dept sheet) and, using the Name command, type in Sales as the name for this cell. Move the pointer to R15C2 and name that cell Expenses. Do the same for the other two department sheets.

!!!! Now bring up the dependant sheet HERB'STORE and this is what you have:

```
          1         2         3              4         5       6
1                           HERB'S STORE
2                           Department Summary
3
4                 Mens       Womens        Children      Combined
5
6  Sales
7  Expenses
8             ---------------------------------------------------
```

```
9  Profit
10
11 Percent
```

Format the sheet so that the numbers: R6C2:R9C5 are set for currency ($), and R11C2:R11C4 are formatted for percent (%) display. Labels in R4 should be centered, and R1C3:R2C4 are formatted as continuous (Cont).

Row 9 will have the formula R[-3]C-R[-2]C copied into columns 2,3,4 and 5. Row 11 will calculate the percentage of the entire profit by dividing the departments profit by the combined profit in R9C5. Use R[-2]C/R9C5. The "combined column" uses the formula SUM(RC[-3]:RC[-1] for each of the two cells involved. The profit cell in C5 was figured as the others. When all of this is done, the totals show $0.00 and the percent shows an error (#DIV/0!). This is because we have divided by zero (R9C5), BUT as soon as some figures are entered in the cells, this will correct itself.

That should get anyone started with MULTIPLAN. There are so many uses for a spreadsheet: Mailing lists; Checking accounts; Tax forms; Investment records - the list is endless. If you have questions you could send me a letter, but your best bet is to ask someone in your Group. Usually there is at least one person who will know. As a last resort, READ THE MANUAL. Its a lot to plough through, but most of the answers are there. Good luck! Herb.