A Mini Manual for the Spreadsheet Calculator Program SC

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1 Command and Input Modes

At every point time SC is either in command mode or data input mode. When in command mode the label of the cell on which the cursor is resting— e.g., A1 B10 D0 etc.—will be present in the very top left corner of the screen. To the right of that cell label will be a format label in brackets ( ) and then further to the right the numerical entry in the cell in brackets [ ]. If, instead, there is a string entry (i.e., a word or other sequence of characters, some of which could be numbers) in the cell it will be in quotation marks following a left angle bracket $<$ if it is left justified or a right angle bracket $>$ if it is right justified or a vertical line | if it is centered.

To get into command mode, press `ENTER` until the top line of the screen takes the form just described. You can also get into command mode by pressing `Esc` repeatedly.

Once in command mode various letter commands—e.g., `x`, `ir`, `F` ...etc. to be described below—can be entered. Depending on the particular command, SC may go into input mode, in which case further entry from the keyboard will be necessary. Once that input from the keyboard is entered and the `ENTER` key pressed where required, SC goes back again into command mode, ready for the next command to be entered.

When entering commands, case (e.g. `F` as opposed to `f`) matters.

2 Getting Around the Worksheet

Use the arrow keys to move the cell cursor around in the worksheet. You can also use the following keyboard commands:

`h`	or	Ctrl+B	instead of the left arrow
`j`	or	Ctrl+N	instead of the down arrow
`k`	or	Ctrl+P	instead of the up arrow
`l`	or	Ctrl+F	instead of the right arrow

You must be in command mode to move the cell cursor.

3   How to Add and Delete Cell Entries

To enter a number into a cell, first enter the command = and then type in the number, hitting ENTER when finished.

To enter a string centered in the cell, first enter the command " (i.e., type a quotation mark) and then type in the string of characters. Complete the command by pressing ENTER.

To enter a left justified string first enter the command < (i.e., type a left angle bracket) and then type in the string of characters and press ENTER.

To enter a right justified string first enter the command > and type in the string of characters, pressing ENTER when finished.

To delete the contents of a cell press Esc (repeatedly if necessary) to get into command mode, move the cursor to the cell, and then enter the command x —the cell contents will be deleted without your having to press ENTER.

4   Modifying Cell Entries

Often, the easiest way to modify a cell entry is to delete it using the command x and then enter the new numerical or string entry. If the cell entry is a long string or a complicated number, however, it may be useful to edit the entry. To edit a string or text entry enter the command E; to edit a numerical entry enter the command e. Then move to the left along the command line by pressing the key h or to the right along the command line by pressing the key l. To replace the character under the cursor press the key r and then the key of the replacement character. To delete the character the cursor is on, press x. To enter one or more new characters under the cursor, press i and then the character(s) to be entered, followed by the Esc key when you are done. To enter one or more new characters immediately to the right of the cursor, press a and then the character(s) to be entered, followed by the Esc key when you are finished. When finished editing the command line, press ENTER to replace the entry in the worksheet with the corrected entry.

5   Formatting Cells

To format a particular cell, enter the command F and then a sequence of characters (which will appear on the command line along the top of the screen) in the following type of pattern:

```
"#####.0000"
```

(the quotation marks are essential) where the characters # denote the number of digits before the decimal point and the characters 0 denote the number of digits after the decimal point. The number of # characters need not match the exact number of digits to the left of the decimal point, but a number of decimal places equal to the number of 0 characters will always appear.

To format a range or block of cells, enter the command F followed by the range of cells to be formatted and then by a character pattern like the one above. The range is entered as the upper left element (or top or left element if the range is a row or column) followed by a colon : and then the lower right (or bottom or left) element of the block of cells to be formatted. For example, to format the cells C4, C5, C6, D4, D5 and D6 with the format used above you would enter

```
/F C4:D6 "####.00000"
```

To delete a format previously assigned to a cell by the command F, position the cursor on the cell and enter the command F again and then press the key x until all the 0's and #'s, but not the " character have been deleted from the command line along the top of the screen. Alternatively, you can simply delete the contents of the cell using the command x and the format will automatically be deleted along with it.

To set the default format for a column, enter the command f followed by three numbers separated by a space (e.g. 15 5 0) —the first number is the width of the column expressed in number of characters, the second number is the number of digits to the right of the decimal point, the third digit must be a 0 for fixed point notation (e.g. 22.04) or a 1 for scientific notation (e.g. 2204000e+02).

3

6 Adding and Deleting Rows and Columns

To insert a column to the right of the cursor, enter the command

```
ic
```

To insert a row immediately above the cursor, enter the command

```
ir
```

To delete the column the cursor is on, enter the command

```
dc
```

To delete the row the cursor is on, enter the command

```
dr
```

7 Hiding Rows and Columns

In big worksheets it is often useful to hide some of the rows and columns that you are not working on. This can be done by zapping them using the following commands.

To hide the column the cursor is on, enter the command

```
zc
```

To hide the column the cursor is on, enter the command

```
zr
```

To unhide previously hidden rows, enter the command

```
sr
```

To unhide previously hidden columns, enter the command

```
sc
```

8 Copying and Deleting the Contents of Cells and Blocks of Cells

To copy a single cell, place the cursor on the cell to be copied and enter the command `m`. Then move the cursor to cell to which the contents of that cell is to be copied and enter the command `c`.

To copy a group of cells, enter the command `/c`. Then enter the labels top left and bottom right cells, separated by a colon, of the range to which the cells are to be copied followed by the top left and bottom right cells, separated by a colon, of the range that is to be copied. For example

```
/c  E10:F12 C4:D6
```

would be entered to copy the four cells `C4`, `C5`, `C6`, `D4`, `D5` and `D6` into the cells `E10`, `E11`, `E12`, `F10`, `F11` and `F12`.

To delete the contents of an individual cell, place the cursor on that cell and enter the command `x`.

To delete the contents of a block of cells enter the command `/x` followed by the top left and bottom right cells of the range or block of cells to be deleted. For example, the entry

```
/x  C4:D6
```

would delete the contents of cells `C4`, `C5`, `C6`, `D4`, `D5` and `D6`.

9 Formulas

To add together the numbers in two cells and divide the result by 10, place the cursor in the cell where you want the answer to reside and enter the command `=` followed by, say,

```
(B4+B6)/10
```

To sum a column or row of numbers and divide the result by 100, place the cursor in the cell where you want the answer to reside and enter the command `=` followed by, say,

```
@sum(B4:B12)/100
```

This sums the numbers in the column of cells `B4` through `B12` and divides that sum by 100.

Additional operators are `*` (multiply), `^` (take to the power), `-` (subtract), and `/` (divide). For example, to enter the number 2 into the cell `B10` and the number 2 to the power 3 in cell `B11`, move the cursor to `B10` and type

```
= 2 <ENTER>
```

and then place the cursor on `B11` and type

```
= B10^3 <ENTER>
```

Alternatively, you could have made no entry in cell `B10` and, with the cursor on `B11`, typed

```
= 2^3 <ENTER>
```

Other useful functions are

```
@prod    (product of entries in a block)
@avg     (average of entries in a block)
@count   (number of entries in a block)
@max     (maximum entry in a block)
@min     (minimum entry in a block)
@stddev  (sample standard deviation)
@sqrt    (square root)
@exp     (exponent)
@ln      (natural logarithm)
@log     (logarithm to base 10)

@pmt(A,r,n)
        Calculates the per period payment to pay off an
        amount equal to A at interest rate r over n periods
        e.g. @pmt(60000,.01,360) computes the monthly payments
        for a $60,000 mortgage at 1% interest per month (12%
        per year for 30 years (360 months).

@fv(p,r,n)
        Calculates the future value of a series of payments p
        at interest rate r for n periods -- e.g. @fv(100,.005,36)
        computes the accumulated value of a investment of $100
        per month at .05% percent interest per month (6% per
```

```
      year) for 36 months (3 years).

@pv(p,r,36)
        Calculates the present value of a series of payments
        of $1000 per month at .015% per month (18% per year)
        for 36 months (3 years).
```

10   Saving and Loading Worksheets

To save a worksheet to a file enter the command `P` (for put) followed by the name of the file with double quotes around the file name. SC supplies the left-most double quote so you only have to supply the right-most one. The complete entry would be

<div align="center">

`P "myfile.sc" <ENTER>`

</div>

Always use the suffix `.sc` to denote the program though which the file was created.

To save only a particular range or block of data to a file, the file name must be followed by the range of data to be written to the file. For example

<div align="center">

`P "myotherfile.sc" A2:B5 <ENTER>`

</div>

To clear the existing worksheet data and load a file enter the command `G` (for get) followed by the name of the file in double quotes. For example

<div align="center">

`G "newfile.sc" <ENTER>`

</div>

To save a worksheet in ASCII text form identical to what appears on the screen enter the command `W` followed by the filename in double quotes followed, if you are not copying the whole worksheet, by the block or range of the worksheet to be copied to the file. For example

<div align="center">

`W "textfilename" A2:B5 <ENTER>`

</div>

To save a block of data from a worksheet in a form that can be copied into a Tex table or a LaTeX table, first set the `tblstyle` variable in SC by entering the command `S` followed by

<div align="center">

`tblstyle=tex`

</div>

or

```
tblstyle=latex
```

as the case may be. Then write the block of data to this special format using the command `T` followed by the file name and range of data. The complete entry would be, for example,

```
S tblstyle=latex <ENTER>
T "filename.tex" A1:D12 <ENTER>
```

It should be noted that the command `P` also saves the file in ASCII form but the file structure is of a special form that SC can read when the get `G` command is used.

To load a particular worksheet from the command line, simply enter

```
sc filename.sc
```

Only files saved with `P` can be read by SC.

11   Getting Data into SC

It is tedious to enter data into SC number by number, especially when data can be obtained in files over the web from, for example, the *Chass Data Center*. Accordingly, I have written three utilities to facilitate data entry.

The utility **mat2sc** loads a matrix of numbers from a text file—the file must consist of equal-length columns of numbers. The command line to enter such data, assuming that the DOS executable file `mat2sc.exe` (or `mat2sc` in LINUX) is present in an appropriate directory on your comuputer, is

```
> mat2sc datafile LC TR
```

where `>` is the command prompt, `datafile` is the file containing the data, `LC` is the column of the SC spreadsheet in which the left-most column of the matrix in the data file is to reside (e.g. `A`, `B`, etc.) and `TR` is the row of the SC spreadsheet in which the top row of the matrix in the data file is to reside (e.g. `10`, `25`, etc.). The entries should not extend to the right in the spreadsheet past column `Z`. The utility will produce a file `tempmat.sc` which can be merged into your spreadsheet using the SC command `M` as follows:

```
M "tempmat.sc"
```

The utility **text2sc** loads a column of text strings from a text file—the file must consist of rows of text. The command line to enter these data is

```
> text2sc datafile LC TR
```

where the items on the command line are as defined above. The utility will produce a file called `temptxt.sc` which can be merged into your spreadsheet using the SC command `M` in the same manner as above.

The utility **cdsst2sc** converts a comma delineated spreadsheet file into an SC spreadsheet file. The input spreadsheet file must have the following form:

```
 "entry","label","label","label"
 "entry", num   ,  num  ,   num
 "entry", num   ,  num  ,   num
```

where `entry` and `label` are text strings and `num` are numbers. All text entries must have quotation marks around them and the columns along any row must be separated by commas. Any of the elements can be blank—a blank space delineated by commas, keeping in mind that no commas are present on the left and right edges of the rows. This is the spreadsheet-form in which data retrieved from the *Chass Data Center* is saved. The command line entry is

```
> cdsst2sc datafile ECT
```

where `ECT` is the entry to be placed in empty cells—this can take the alternative values `NA`, `-1`, `-9999` or `0`. The output file is given the name `tempwks.sc` which, of course, can be changed appropriately.

12   Printing Worksheets

To print a worksheet or any part of a worksheet, save the worksheet or the relevant range using the `W` command and then either copy the resulting file directly to the printer or load it into a word processor for subsequent printing. Also, of course, the worksheet can be printed by incorporating it into a TeX or LaTeX file.

13   Sorting Data

To my knowledge, SC has no facility for sorting data quickly. This can be easily accomplished, however, by simply writing the column (or row) of data to be sorted to a file—call it `sortfile`—and then using the operating system's `sort` command. In DOS, the command is

```
> sort sortfile > sorted
```

and in LINUX,

```
> sort < sortfile > sorted
```

where `sorted` is the name of the file containing the sorted data.

14   Making Charts

SC has no plotting facility but quick and dirty plots can easily be made using the GNUPLOT program. To plot series of numbers, write time series to text files, one series per file, which should appear as a column, move your focus to another terminal window and enter the command

```
> gnuplot
```

at the DOS prompt (or command prompt in LINUX) to load GNUPLOT (which, of course, you must have installed on your computer). Then enter the command

```
> plot 'filename' with lines
```

To plot an XY chart in gnuplot, write the two columns of data, side by side, to a text file and after loading GNUPLOT enter the command

```
> plot 'filename'
```

When writing these data to files it is useful to give the files the suffix `.gd` to denote gnuplot-ready data.

Plotting histograms is not convenient with GNUPLOT but, fortunately, the information contained in a histogram can be absorbed equally well by observing the relevant frequency distribution. Unfortunately, as far as I know, the only way to create a frequency distribution in SC is to sort the data, pick appropriate classes, and count the elements by hand.

An alternative approach is to use the statistical program XLISPSTAT. If you have that program installed, you can read a data file such as `sortfile` into it with the command (see my not-so-mini-manual for XLISPSTAT)

```
> (def dataseries (read-data-file "sortfile"))
```

Then create a histogram of the data using the command

```
> (def hisplot (histogram dataseries))
```

which creates an object in memory called `hisplot`. You can then send that object a message to obtain a list of the number of elements in each class.

```
> (send hisplot :bin-counts)
(3 10 24 26 22 12 4)
```

The second line above illustrates the output to screen that will result from the command.

To make charts for inclusion in essays and other documents using GNU-PLOT, see my GNUPLOT mini-manual. Histograms can be made using XLISPSTAT or directly using LaTeX . The LaTeX approach is especially useful when more than one variable is being plotted.