A Mini-Manual for GNUPLOT

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GNUPLOT is a useful program for creating charts of data for publication, frequently producing better quality charts than can be obtained with commercial statistical software. While GNUPLOT is a very sophisticated program, it turns out that simple charts can be created with it quite easily. To read a proper manual for the program and obtain a postscript version of it, point your browser at `http://www.gnuplot.org`.

1 Plotting Single Series

To plot a single series, simply use your spreadsheet or some other program to write the data in a text file as a single column of numbers. Let us call the file, say, `series.gd`, using the suffix .gd to signify that the series of numbers in the file are ready to be plotted with GNUPLOT. Then load the GNUPLOT program at the command line

```
gnuplot
```

and at the prompt type

```
plot series.gd with lines
```

and press `ENTER`. The series is plotted as a time series with the horizontal axis indicating the positions of the observations in the column—i.e., 1,2,3,4, etc.

To plot an xy-chart, put the data into two columns in a text file with the first column containing the series you want on the x-axis, load GNUPLOT and enter the command

```
plot series.gd
```

To plot a histogram, write the class frequencies to a text file, say `freqs.gd`, as a single column and with GNUPLOT loaded, enter the command

```
plot freqs.gd with boxes
```

2 Plotting Several Series in a Single Chart for Inclusion in a Document

When you need to plot more than one series at a time, or make a chart suitable for including in a document, the best procedure is to use a GNUPLOT command file, which we can signify with the suffix .gpt. But first you need to make .gd files for each of the series to be plotted.

Each series should be written to a separate .gd file containing two columns of numbers. The left column should be the time or ID column (assuming that you want the X-axis to contain something other than the order of the data point in the column of numbers). This column should simply be the year the observation occurred, or a series of numbers such as

```
1990.00
1990.25
1990.50
1990.75
1991.00
1991.25
.
etc.,
```

for quarterly data or

```
1990.00000
1990.08333
1990.16667
1990.25000
1990.33333
1990.41667
1990.50000
1990.58333
1990.66667
1990.75000
1990.83333
```

```
1990.91667
1991.00000
1991.08333
.
etc.
```

for monthly data. The rightmost column should be the series of data points associated with the time periods in the leftmost column as in, for example,

```
1990.00 225
1990.25 231
1990.50 249
1990.75 224
1991.00 218
1991.25 198
.
etc., etc.
```

The GNUPLOT command file, call it `myfile.gpt`, must take the following form

```
# Statement of what is in the file (GNUPLOT ignores lines
#   that start with the pound sign #)
#
#set terminal postscript eps
#set output  myfile.eps'
set noautoscale
set range [25:125]
set title  'MY FIRST CHART'
set xlabel  'year'
set ylabel  'Billions of Dollars'
set size 1.0 0.8
set xtics 1800,20,1990
set key 1920,55
plot [1800:1990] 'candat.gd' title 'Canada' with lines, \
'usdat.gd' title 'United States' with lines, \
'ukdat.gd' title 'United Kingdom' with lines, \
'jndat.gd' title 'Japan' with lines
#
#end of file
```

The first two lines tell GNUPLOT what kind of output to produce.

```
set terminal postscript eps
```

tells it to make an encapsulated postscript file and

```
set output  'myfile.eps'
```

tells it to give that file the name `myfile.eps`.

To view the graph on a screen, make sure that `#` characters are in front of these two lines and GNUPLOT will use the default terminal, which is VGA in DOS implementations and X11 in LINUX. If GNUPLOT does not know what terminal to plot the data in it will prompt you. After you are satisfied that the chart is ready for printing you uncomment the above two lines.

The two lines

```
set noautoscale
set range [25:125]
```

instruct GNUPLOT to let you set the scale for the y-axis and tell it the bottom and top of the range. To use automatic scaling, simply comment out these two lines by putting `#` characters in front of them.

The three lines

```
set title  'MY FIRST CHART'
set xlabel 'year'
set ylabel 'Billions of Dollars'
```

tell GNUPLOT the title to put on the chart and the labels to put on the x and y axes.

The line

```
set size 1.0 0.8
```

tells GNUPLOT how big to make the chart. The first number (1.0) is the width and the second (0.8) is the height (both as proportions of unity). Adjust these as the situation requires. As a first pass you should comment this line out and see what GNUPLOT does.

The line

```
set xtics 1800,20,1990
```

tells GNUPLOT to set the left end of the x axis at 1800 and the right end at 1990 and to make tics every 20 years (units). Again it is often not necessary to bother with this line—start by letting GNUPLOT do its thing.

The line

```
set key 1920,55
```

tells GNUPLOT to put the key-label for the chart at point above the horizontal axis at the year 1920 and a point to the right of the y-axis at 55 Billion dollars. Adjust these coordinates as the situation desires. If you comment out these lines, GNUPLOT will put the key in the upper right corner of the chart. If you do not want a key at all replace the line with

```
set nokey
```

The last set of commands tells GNUPLOT to plot the numbers in the first or ID column between 1800 and 1990 (even if the data run for a longer period) and to plot the four series contained in the four separate files `candat.gd`, `usdat.gd`, `ukdat.gd` and `jndat.gd`, with lines in each case and with the respective key-labels Canada, United States, United Kingdom and Japan.

```
plot [1800:1990] 'candat.gd' title 'Canada' with lines, \
'usdat.gd' title 'United States' with lines, \
'ukdat.gd' title 'United Kingdom' with lines, \
'jndat.gd' title 'Japan' with lines
```

To plot less than four series, simply delete the code pertaining to the file of the series you want to omit. To plot a single series, use only the code on the last line which, you should note, is the only one not ending with a comma, then a space, and then a \ character. The chart is then plotted or written to file, as the case may be, by entering the command

```
load 'myfile.gpt'
```

at the GNUPLOT command line, or simply entering

```
gnuplot myfile.gpt
```

on the DOS or Linux command line.

To make additional charts, simply write the data to appropriate .gd files, copy a previous GNUPLOT command file to a new name and change the relevant lines in the file as required.