alvin alexander

Just Be
Do every act of your life as though it were the very last act of your life.
Marcus Aurelius

"Just Be (Lite)" is a FREE mindfulness reminder app

categories

android (46)
best practices (63)
career (50)
cvs (27)
design (33)
drupal (91)
eclipse (6)
funny (3)
gadgets (108)
git (15)
intellij (4)
java (429)
jdbc (26)
swing (74)
jsp (9)
latex (26)
linux/unix (289)
mac os x (315)
mysql (54)
ooa/ood (11)
perl (156)
php (97)
postgresql (17)
ruby (56)
scala (136)
sencha (23)
servlets (10)
svn (6)
technology (84)
testing (13)
uml (24)

A collection of Gnuplot examples

By Alvin Alexander. Last updated: May 13, 2015

I needed to use Gnuplot a little bit over the last few days, mostly to create 2D line charts, and these are my brief notes on how to get started with Gnuplot. If you haven't used it before, it's a pretty amazing tool.

Jumping right in ...

table of contents [hide]

Installing gnuplot

Use MacPorts or Homebrew to install Gnuplot on Mac OS X systems:

```
sudo port install gnuplot
sudo brew install gnuplot
```

Sample data files

My examples use the following 2-column and 4-column data files:

```
# sample 2-column data file
# -------------------------
1     1
2     4
3     9
4    16
5    25
6    36
7    49
8    64
9    81
10  100
```

My four-column file is named *4col.csv*:

```
1,    1,   2,   5
2,    4,   4,  10
3,    9,   6,  15
4,   16,   8,  20
5,   25,  10,  25
6,   36,  12,  30
7,   49,  14,  35
8,   64,  16,  40
9,   81,  18,  45
10, 100,  20,  50
```

Note that the columns in the first file are separated by whitespace, and the columns in the second file are separated by commas (a CSV file). The latest version of Gnuplot works with both formats without requiring you to specify a column-separator.

Starting gnuplot

Start Gnuplot from your Mac Terminal:

```
$ gnuplot

gnuplot>
```

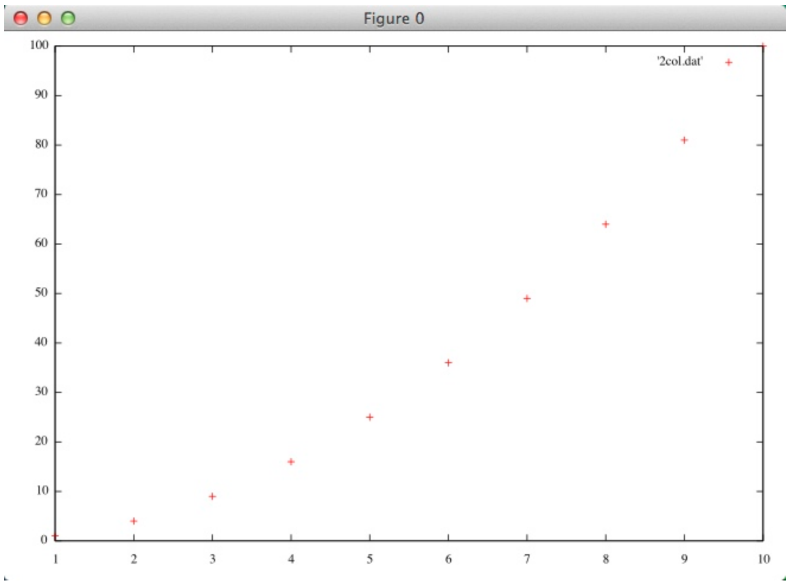
It prompts you with `gnuplot>` as shown, but I won't show that prompt in the examples below.

Simple plotting

Plotting the data from a two-column file is easy:

```
plot '2col.dat'
```

This creates the following graph:



Key points about this basic command:

- Assumes col1=x, col2=y; shows '+' at data points
- Does *not* connect points with a line
- Opens plot in an 'AquaTerm' on Mac OS X

From here you can do all sorts of fun things:

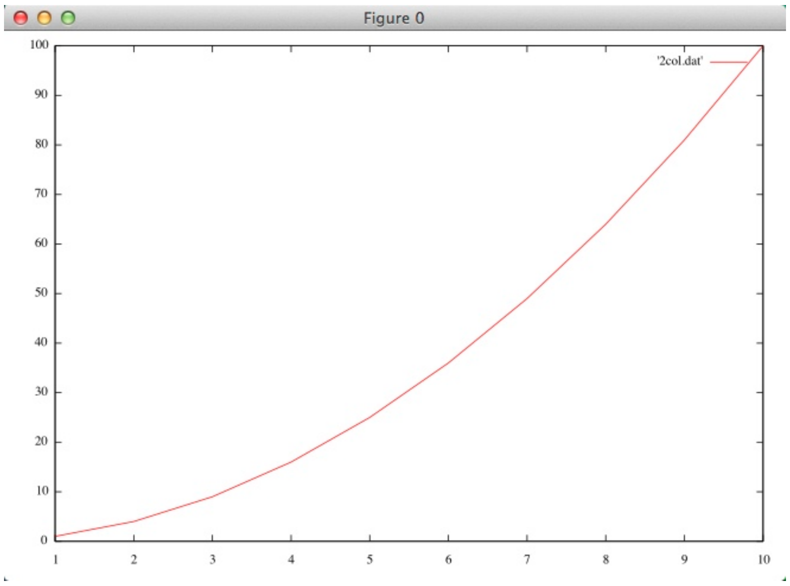
```
# simple plotting
plot '2col.dat'                              # assumes col1=x, col2=y; shows '+' at data points
plot '2col.dat' with lines                   # connect points with a line
plot '2col.dat' with linespoints             # line and points
plot '2col.dat' with points                  # just points (default)

# plot a subset of the data
plot[1:5] '2col.dat' with linespoints        # plot the first 5 elements
plot[3:7] '2col.dat' with linespoints        # plot only elements 3 thru 7
```

```
# add a title to your line
plot '2col.dat' with lines title 'my curve'    # this is really the line-title in the legend

# map the columns to the x- and y-axes
plot '2col.dat' using 1:2                      # 1=x, 2=y (this is the default)
plot '2col.dat' using 2:1                      # 2=x, 1=y (reverse the graph)

# abbreviations
plot '2col.csv' u 1:2 w l title 'Squared'      # 'u' - using, 'w l' - with lines
```

This command

```
plot '2col.dat' with lines
```

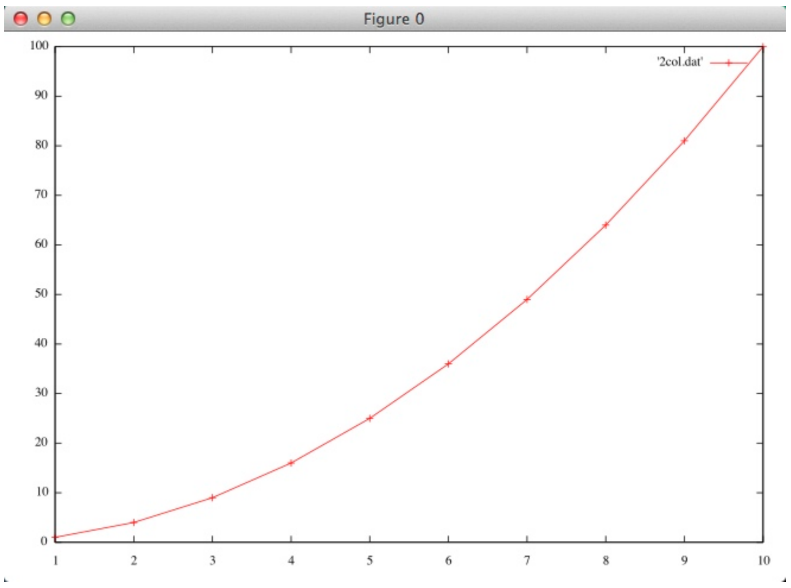
creates this plot:



And this command:

```
plot '2col.dat' with linespoints
```

creates this plot:



Titles, labels, legend, arrows

You can adorn your plots with titles, labels, legend, arrows, and more:

```
set title 'Hello, world'                        # plot title
set xlabel 'Time'                               # x-axis label
set ylabel 'Distance'                           # y-axis label

# labels
set label "boiling point" at 10, 212

# key/legend
set key top right
set key box
set key left bottom
set key bmargin
set key 0.01,100

set nokey     # no key

# arrow
set arrow from 1,1 to 5,10
```

Multiple curves on one plot

To show multiple curves on one plot, use the *4col.csv* file:

```
1,    1,   2,   5
2,    4,   4,  10
3,    9,   6,  15
4,   16,   8,  20
5,   25,  10,  25
6,   36,  12,  30
7,   49,  14,  35
8,   64,  16,  40
9,   81,  18,  45
10, 100,  20,  50
```

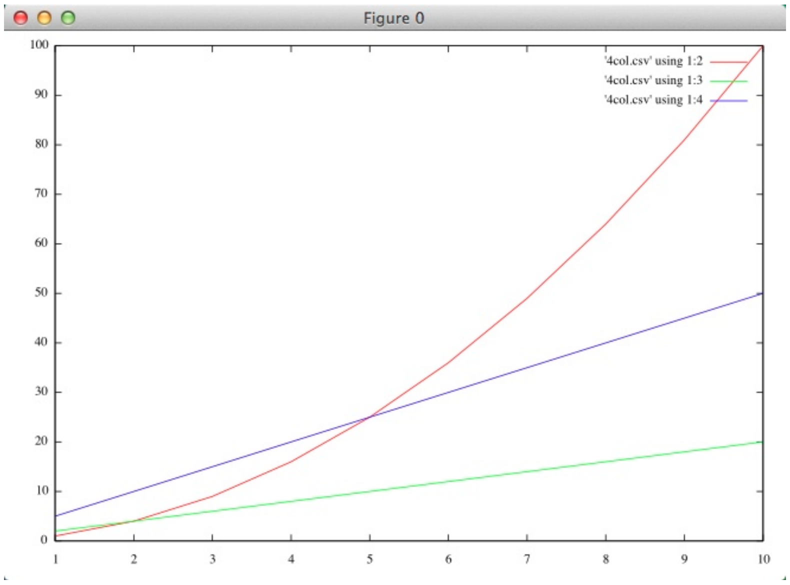
One curve using first two columns:

```
plot '4col.csv' with lines
```

Multiple curves:

```
plot '4col.csv' using 1:2 with lines, '4col.csv' using 1:3 with lines
plot '4col.csv' using 1:2 with lines, '4col.csv' using 1:3 with lines, '4col.csv' using 1:4 with lines
```

The second command shown creates this chart:



Add a legend:

```
plot '4col.csv' using 1:2 with lines title 'Square', '4col.csv' using 1:3 with lines title 'Double'
```

Use abbreviations:

```
plot '4col.csv' u 1:2 w l title 'Square', '4col.csv' u 1:3 w l title 'Double'
```

Multiple formulas:

```
plot sin(x) title 'Sine Function', tan(x) title 'Tangent'
```

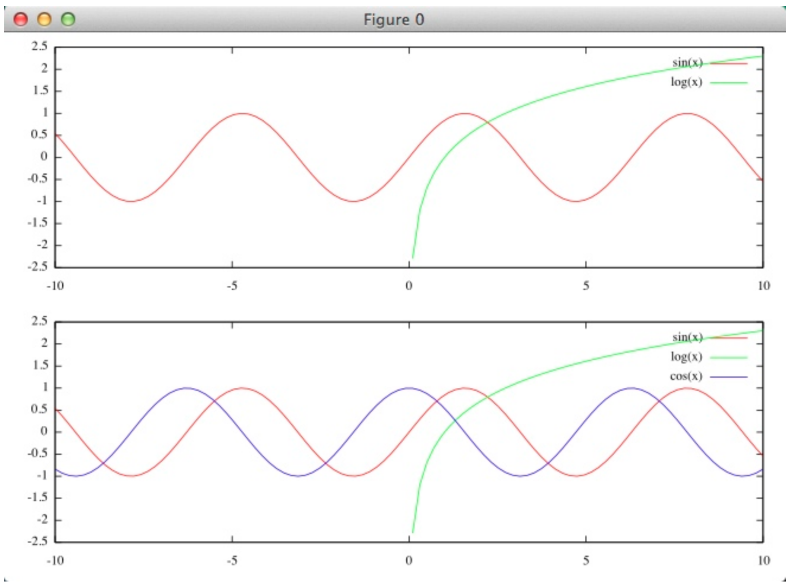
Multiple graphs (multiplot)

How to show multiple graphs in the output:

```
set multiplot                        # multiplot mode (prompt changes to 'multiplot')
set size 1, 0.5

set origin 0.0,0.5
plot sin(x), log(x)

set origin 0.0,0.0
plot sin(x), log(x), cos(x)
```

```
unset multiplot                     # exit multiplot mode (prompt changes back to 'gnuplot')
```

That series of commands creates this chart:



ASCII plotting

You can create ASCII plots in your Mac Terminal window:

```
set terminal dumb
plot cos(x)
plot sin(x) w lines cos(x) w lines
```

Plotting formulas

It's fun and easy to plot formulas with Gnuplot:

```
plot sin(x)
plot sin(x)/x

plot cos(x)
plot cos(x)/x

plot sin(x) title 'Sin', tan(x) title 'Tangent'
```

Plot your own formulas:

```
f(x) = sin(x) + tan(x)
plot f(x) with points
plot f(x) with filledcurves
plot f(x) with filledcurves above x1
```

Grid, tickmarks, axis ranges, log

It can be nice to have a grid on a chart, and it can also be nice to control the graph tickmarks, ranges, and origin:

```
# grid
set grid

# ranges
set autoscale                          # let gnuplot determine ranges (default)
set xrange [1:10]
set yrange [1:100]
set xr [0.0:10.0]
set yr [0:5]

# tickmarks

set xtics (1, 5, 10)
set ytics (1, 25, 50, 75, 100)
set xtic auto                          # set xtics automatically
set ytic auto                          # set ytics automatically
unset xtics

set ytics 400
set ytics (0,200,400,600,800,1000,1200)
set y2tics (-100,0,100)
set mytics 4
set mxtics 5

set xzeroaxis lt -1
set x2zeroaxis lt -1

# logarithmic scale
set logscale
set logscale y
```

Comment and column-separator characters

Set gnuplot file comment character(s):

```
set datafile commentschars "//"
```

Set gnuplot file column separator:

```
# see http://gnuplot.sourceforge.net/docs_4.2/node173.html

set datafile separator "\t"
set datafile separator ","
set datafile separator "|"

set datafile separator {"<char>" | whitespace}
```

Run shell commands

You can run shell commands from the Gnuplot command line:

```
# run shell command
!cat 2col.dat
```

Session management

When you work from the Gnuplot command line, you're working in a session:

```
reset     # reset everything
replot    # re-plot your data after making changes
```

Un-set the key/legend and re-plot:

```
unset key
replot
```

Real-world example

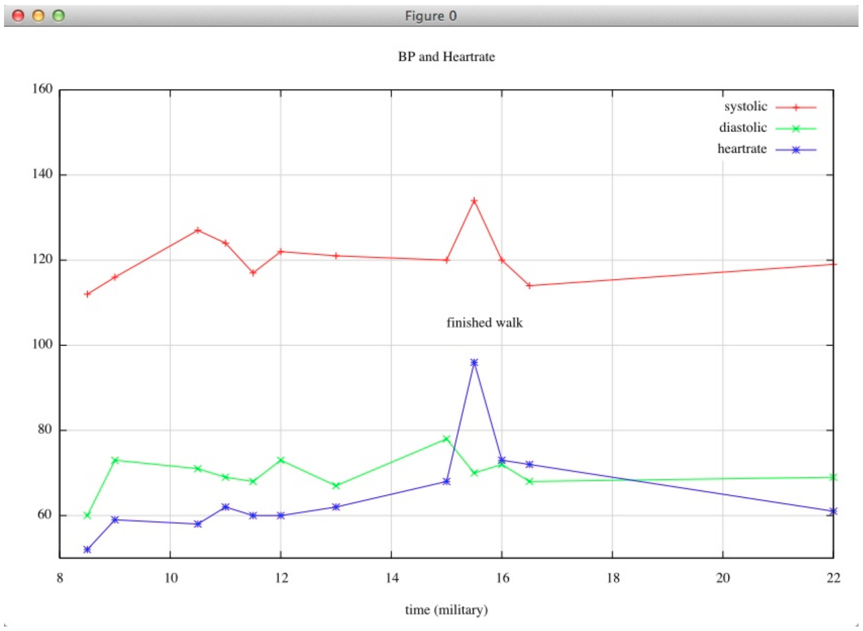
Here's a quick real-world example. I had this dataset of my blood pressure and heart rate from yesterday:

```
# time, sys, dia, hr
8.5, 112, 60, 52
9, 116, 73, 59
10.5, 127, 71, 58
11, 124, 69, 62
11.5, 117, 68, 60
12, 122, 73, 60
13, 121, 67, 62
15, 120, 78, 68
15.5, 134, 70, 96
16, 120, 72, 73
16.5, 114, 68, 72
22, 119, 69, 61
```

I then used this sequence of commands (including some trial and error that's not shown):

```
set grid
set title 'BP and Heartrate'
set yrange [50:160]
set xlabel 'time (military)'
set label 'finished walk' at 15, 140
unset label
set label 'finished walk' at 15, 105
plot 'bp-hr.dat' u 1:2 w lp t 'systolic', 'bp-hr.dat' u 1:3 w lp t 'diastolic', 'bp-hr.dat' u 1:4 w lp
```

to create this graph of my blood pressure and heart rate:



It would be better to put the blood pressure on the y-axis on the left, and the heart rate on the y-axis on the right, but I'm short on time, and haven't learned how to do that yet.

Resources

I mostly learned about Gnuplot from the following resources:

- http://gnuplot.sourceforge.net/demo/
- http://www.cs.hmc.edu/~vrable/gnuplot/using-gnuplot.html
- http://research.physics.illinois.edu/ElectronicStructure/498-s97/comp_in...
- http://people.duke.edu/~hpgavin/gnuplot.html
- http://gnuplot-tricks.blogspot.com/
- http://lowrank.net/gnuplot/datafile-e.html
- http://www.helsinki.fi/~jalaaman/gnuplot/index.html

Help

Help commands:

```
help
```

```
help terminal
```

Other notes:

- Don’t type a blank space after the line continuation character, ”\"
- Your data may be in multiple data files

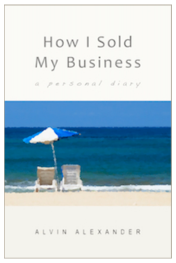
More to come ...

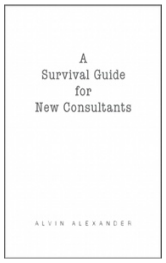
tags: chart gnuplot graphics plot technology

related

- How to use JavaPlot from the Scala REPL
- JavaPlot
- How to create an X/Y graph with JFreeChart and Scala Swing
- Wed, Jun 27, 2007 (Comments about John Edwards)
- Mac Terminal title - Change the Mac Terminal title from the command line
- vi end of line command

books i've written





new

- Good design: Quantity leads to quality (and iteration speed is vital)
- A nice example to show the differences between strict and lazy evaluation in Scala
- How to remove extended ASCII characters from Unix files with the 'tr' command
- The waste of time and energy that is “worry”
- "You have cancer"
- How to drop the first matching element in a Scala sequence
- How to sum the elements of a List in Java
- What does '???' (three question marks) mean in Scala?
- Scala best practice: How to use the Option/Some/None pattern
- Scala best practice: Eliminate null values from your code

more

alvin's blog

Post new comment

Your name:

Anonymous

E-mail:

The content of this field is kept private and will not be shown publicly.

Homepage:

Subject:

Comment: *

[✓] Notify me when new comments are posted

[● All comments] ○ Replies to my comment

Preview

java	unix	misc	other
java applets	man (help) pages	privacy policy	mobile website
java faqs	unix by example	terms & conditions	rss feed
misc content	tutorials	subscribe	my photos
java source code	**source code warehouse**	unsubscribe	life in alaska
test projects	java examples	wincvs tutorial	how i sold my business
lejos	drupal examples	function point analysis (fpa)	living in talkeetna, alaska
perl		fpa tutorial	my bookmarks
perl faqs			inspirational quotes
programs			source code snippets
perl recipes			
perl tutorials			