

# Gnuplot

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## 1 Marks Allocation

- Max 10 of available 20% for both worksheets
- If tasks one to three are done takes you to 5%
- If those are finished and you go on to attempt but not complete tasks four
- Five takes you to 7%
- On completing the worksheet takes you to the full 10%

## 2 Gnuplot

### 2.1 The basics

- Gnuplot is a plotting tool useful for generating graphs from numerical data such as you might create in your final year research.
- This worksheet will run you through the basics of using it.

### 2.2 Scripting

- Unlike other graph generation tools you may have used, like Excel or other wysiwig editors, gnuplot works through its own scripting language.
- This worksheet will walk you through the basics of using this language, and give you the opportunity to experiment with it.

### 2.3 Printing to screen

- Run the gnuplot as follows

```
gnuplot plotfile.plot
```

## 2.4 Saving your output to an image file

- Add this to your script (after the heading)

```
set terminal png
set output 'plot.png'
```

- change the filename as required, or output filetype if you want.
- The **.plot** extension is purely arbitrary, I'm not even sure if it's standard, it's just what I've always used. On Linux, file extensions rarely have any meaning. Sometimes they are omitted completely.

## 3 Preparation

- The plot files you need for the worksheet are in the gnuplot subfolder of the repository for this module. There are four subfolders, containing five scripts in total,

## 4 Task One

### 4.1 Sine and Cos

- This is a rather simple graph, demonstrating the inbuilt mathematical functionality of gnuplot. Run it, save an image of it, then replace these functions with others from the set included, saving an image of those.
- **Take images of the original and changed functions.**

## 5 Task Two

### 5.1 Decreasing Time Series

- The data shown in this graph is shown decreasing over time. The decrease is stable, so it might be representing annealing, if seen from a low resolution.
- Annealing does decrease smoothly, but the search for a stable state tends not to be smooth when examined closely.
- Again, save an image of this data, then adjust this data, or the way it is displayed (the form of the graph itself), and save a second image.
- **How you do this is up to you, but the more interesting the change, the higher your grade is going to be.**

## 6 Task Three

- The data for this task is a small sample of heart rate and blood pressure.
- It isn't terribly well displayed, can you improve it in any way?
- **How you do this is up to you, but the more interesting the change, the higher your grade is going to be.**
- **Take images of the original and changed form as before.**

## 7 Task Four

- This task, and the next one use data which comes supplied as standard to demonstrate the capabilities of Gnuplot.
- Here the data, when loaded, will display a hemisphere of dots. Your task is to manipulate this display in some way, alter some elements of the display. Try to make it look substantially different.
- **How you do this is up to you, but if you can, make it really different.**
- **Take images of the original and changed form as before.**

## 8 Task Five

- Find some original, and for preference quite interesting data, then using what you've learned from these previous manipulations, produce two graphs displaying this data in different ways.

## 9 Submission

- Either in a separate report or in a clearly delineated section of a larger one for all worksheets.