

CSCI 3215 (Advanced UNIX Command-Line Tools), Fall 2020

Homework 7

Credit: 20 points.

1 Reading

Be sure you have read, or at least skimmed, the readings for 10/21.

2 Programming Problems

This isn't exactly a programming problem (though in one sense it is), but I want your files by e-mail so I can confirm that they work on a semi-standard Linux system.

Submit your file(s) by sending mail to my TMail address with each file as an attachment. Please use a subject line that mentions the course and the assignment (e.g., "csci 3215 hw 7" or "UNIX hw 7").

1. (10 points) Use `gnuplot` to create a plot of one or more formulas.

It's up to you what to plot, but if nothing more interesting occurs to you:

You could do the kind of plot I often use in class to illustrate order of magnitude of functions, showing a few $O(N^2)$ and $O(N^3)$ functions (at least two of each) and specifying the x-range (starting at 0 and going up to whatever will make the plot meaningful).

Turn in a `.plotin` file that will create your plot, putting the result in a PNG file.

2. (10 points) Use `gnuplot` to create a plot of data.

It's up to you what to plot, but if nothing more interesting occurs to you:

A C program I used recently in CSCI 1312 estimates π using a so-called Monte Carlo method (comments in the program explain more):

[monte-carlo-pi.c](#)

The compiled program takes two command-line arguments, a number of samples and a seed for the random-number sequence. It prints the computed value and the difference between it and a library-computed value. Increasing numbers of samples should give better results, and different seeds should give somewhat different results.

You could use this program several ways to generate and plot data:

- You could run it several times with the same seed and increasing numbers of samples, and plot the results with a line connecting points.
- You could run it several times with the same number of samples and different seeds and plot the results as a bar chart.
- You could combine the above two options, i.e., choosing more than one seed and running the program with increasing numbers of samples for each seed, and plot the results either with a line for each seed or as some sort of histogram.

Try to use other things you've learned in this class to automate getting the program's output into a file you can use as data for `gnuplot`.

Turn in a `.plotin` file that will create your plot, putting the result in a PNG file, and all data files it needs.

3 Pledge

Include the Honor Code pledge or just the word “pledged”, plus *at least one of the following* about collaboration and help (as many as apply).¹ Text *in italics* is explanatory or something for you to fill in. For programming assignments, this should go in the body of the e-mail or in a plain-text file `pledge.txt` (no word-processor files please).

- This assignment is entirely my own work. (*Here, “entirely my own work” means that it’s your own work except for anything you got from the assignment itself — some programming assignments include “starter code”, for example — or from the course Web site. In particular, for programming assignments you can copy freely from anything on the “sample programs page”.*)
- I worked with *names of other students* on this assignment.
- I got help with this assignment from *source of help — ACM tutoring, another student in the course, the instructor, etc.* (*Here, “help” means significant help, beyond a little assistance with tools or compiler errors.*)
- I got help from *outside source — a book other than the textbook (give title and author), a Web site (give its URL), etc..* (*Here too, you only need to mention significant help — you don’t need to tell me that you looked up an error message on the Web, but if you found an algorithm or a code sketch, tell me about that.*)
- I provided help to *names of students* on this assignment. (*And here too, you only need to tell me about significant help.*)

4 Essay

Include a brief essay (a sentence or two is fine, though you can write as much as you like) telling me what if anything you think you learned from the assignment, and what if anything you found interesting, difficult, or otherwise noteworthy. For programming assignments, it should go in the body of the e-mail or in a plain-text file `essay.txt` (no word-processor files please).

¹ Credit where credit is due: I based the wording of this list on a posting to a SIGCSE mailing list. SIGCSE is the ACM’s Special Interest Group on CS Education.