

In this homework, you will need to work on the `eniac-l.seas.upenn.edu` server. If you need help logging in to this machine see the following webpage: <http://www.seas.upenn.edu/cets/answers/remote.html> (note: you need to swap `eniac-l.seas.upenn.edu` for `eniac.seas.upenn.edu`).

You should do all work for this assignment using emacs. In some questions below, you will be asked to enter some command with some set of arguments. Depending on the command, there may or may not be output generated. For each command, you should use your mouse to highlight the command (including the prompt) and the output (if there is any) and use emacs to copy it to a separate text file. Obviously, when you make mistakes, you should not copy the text. You should also copy the question to the text file as well.

When you are finished with the assignment, attach the text document to an email and send to [mcorniss@cis.upenn.edu](mailto:mcorniss@cis.upenn.edu). The subject of the email should be "cse399 - hw5" (without the quotes). The homework is due by the beginning of Monday's class. Total points: 50.

1. Preliminary.

- (a) Change your location to the 'cse399' directory you created in homework 1 (or create it again if you deleted it). Copy the directory `/home1/m/mcorniss/teaching/cse399/hw5` and all its subcontents to your current location. Change your location to this new directory (hw5).

2. [12 Points] Environment.

- (a) On the command-line, define an environment variable `SEAS` and set it to "`eniac-l.seas.upenn.edu`".
- (b) On the command-line, define an alias 'e' for emacs. Afterwards, when you type 'e &', bash should open emacs.
- (c) Make the alias from the previous exercise permanent. That is, everytime you login, the alias 'e' should work. Describe your solution.
- (d) Add an environment variable `SEAS_S` to your `.profile`. Set `SEAS_S` to "`eniac.seas.upenn.edu`". Reload the changed `.profile` without logging out and logging back in.
- (e) Print out the environment.
- (f) Print the environment, but only select the `OSTYPE` variable.

3. [20 Points] Compiling and makefiles.

- (a) Compile the program `helloworld.c` using `gcc` and the debugging flag. Separate compilation into two steps: 1) compiling the source file to an object file and 2) linking the object file to create an executable.
- (b) Build a makefile for compiling `helloworld`. Your Makefile should use the following variables described in the lectures: `CC`, `LD`, `CFLAGS`, `LDFLAGS`, `OBJS`, and `PROG`. Your makefile should also provide a rule to clean up any files generated by the makefile.
- (c) Change your location to the directory 'prog'. In this directory there are three C files: `main.c`, `foo.c`, `goo.c`. `main.c` depends on `main.h`, `foo.c` depends on `foo.h`. `goo.c` depends on `goo.h`. Compile these `.c` files and build an executable called 'prog'.
- (d) Build a makefile, like the one in the exercise 3(b) (using the same variables and a clean rule), for this program.
- (e) Change your location to the directory `../bad-make`. In this directory there is a makefile for compiling a program. It contains five mistakes, which you should find and describe.

4. [18 Points] Installing new software.

- (a) In this exercise, you will install a new version of bash in the directory `~/cse399/hw5/bash`. The source files are stored within `bash-3.0.tar.gz`. Extract these files, and then using the file `bash-3.0/INSTALL` as a reference, figure out how to install the program. You also might find the following webpage helpful: <http://www.ee.surrey.ac.uk/Teaching/Unix/unix7.html>.

5. About this assignment.

- (a) Approximately, how long did it take you to complete this homework?
- (b) Would you classify this assignment as easy, straight-forward, or difficult?