

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).

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 copy it to a separate text or word document. Obviously, when you make mistakes, you should not copy the text. You should also copy the question to the text or word document as well.

When you are finished with the assignment, attach the text or word document to an email and send to mcorniss@cis.upenn.edu. The subject of the email should be "cse399 - hw2" (without the quotes). The homework is due by the beginning of Monday's class. Total points: 50.

1. [14 Points] Piping and redirection.

- (a) Change your location to the 'cse399' directory you created in homework 1. Copy the directory /home1/m/mcorniss/teaching/cse399/hw2 and all its subcontents to your current location. Change your location to this new directory (hw2).
- (b) Below is one approach to sorting input from a file and printing the first 10 lines of the sorted input.
prompt\$ sort file > newfile
prompt\$ head -n 10 newfile
Write one command to do this (hint: using piping).
- (c) Print lines 50-75 of the file 'file' and sort them.
- (d) Use 'cat' to send input from the keyboard to the file 'foo' (using one command).
- (e) Redirect all output (including errors) from the command 'ls *.txt *.jpg' to files.
- (f) Why is there no output from the command 'head -n 20 file | tail -n 10 > newfile | sort'?
- (g) Why is there output from the command 'head -n 20 file | tail -n 10 > newfile | sort < file'? Why is the output more than 10 lines?

2. [20 Points] Process management.

- (a) In these exercises, we'll use a new command 'sleep'. What does 'sleep' do?
- (b) Type 'sleep 300' and hit the enter key. Now move this process to the background. Describe your solution.
- (c) Kill the process from the previous exercise.
- (d) Again, sleep for 300 but this time alter the command so that the process immediately goes to the background.
- (e) Print out the process information for the command in the previous exercise. Your command should not print out process information for any other command.
- (f) Print out the job information for all currently running jobs, including the process from exercise (d). Kill the process from exercise (d).
- (g) Start up three different sleep processes in the background. Then print the job information for all three of them. Next, move the second sleep process to the foreground. Kill the process without suspending it. Kill the other two processes using the 'kill' command. Describe your solution.
- (h) Again, start up three sleep processes, but this time suspend all three of them. Move the first job to the background. Kill all three processes using the 'kill' command. Describe your solution.
- (i) Start up a sleep process. Kill the process, but using the job number rather than the PID.

- (j) Start up a sleep process. Kill the process using the highest kill level.
3. [10 Points] New command: *top*.
- (a) Describe what the command 'top' does.
 - (b) What key do you use to view processes sorted by CPU utilization?
 - (c) What key do you use to view processes sorted by memory usage?
 - (d) How do you view only one user's processes in top?
 - (e) How do you kill a job in top?
4. [6 Points] Using google. Google (like man) is an important resource for finding information about Unix and Linux commands. Use google to solve the following exercises. For each problem, answer the question and also list the search key words you used as well as the web page you found that provided the question.
- (a) How can redirect standard error to standard output?
 - (b) After redirecting standard error to standard output, how do you redirect the output to a file?
 - (c) How do you pipe standard error to a unix command?
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?