CSCI 3194 (Seminar (UNIX Power Tools)), Fall 2014
Homework 1

Credit: 60 points.

1 Reading

Be sure you have read the assigned readings for classes through 9/24.

2 Problems

Answer the following questions. You may write out your answers by hand or using a word processor or other program, but please submit hard copy, either in class or in my mailbox in the department office. Answers to most questions will involve experimentation on a UNIX or Linux system. You are free to use any appropriate system (unless a specific problem says otherwise); if you use something other than one of our classroom/lab machines please tell me what.

2.1 How to find out information

(You will learn more about this topic if you use the `man` and `info` commands rather than Google.)

1. (5 points)   When you are reading a `man` page, is there a way to search for particular text? What is it?

   (Hint: Look in the man page for `man` for mentions of a pager, and then read the man page for the appropriate other program.)

2. (5 points)   The Linux `date` command will, among other things, print today's date or a specified other date. How would you use this command to find out what day of the week you were born? (I.e., tell me the line or lines you would type in a terminal window to accomplish this.)

   (Hint: The info page for `date` may be more helpful than the man page.)

   (To observe how UNIX systems are sometimes *not* alike, try the same command on one of the department's OS X machines.)

2.2 Files and filesystem basics

1. (5 points)   On one of the lab machines, the command `ls -l /bin/vi` produces the following output:

   `-rwxr-xr-x 1 root root 770248 Apr 5 2012 /bin/vi`

   What does all of this mean? (I.e., what does the string of dashes and letters mean? The 1? The 770248? and so on.)

   (Hint: `man ls` and `info ls` may be helpful.)

2. (5 points)   What command(s) would you use to create a directory in your home directory called `KeepOut` to which you have full access (read, write, and execute), but no one else has any access?

2.3 Processes and job control

(a) (5 points) Suppose you have started a GUI application called `bigpig` that for some reason doesn't seem to be responding to any input. How do you terminate it without logging out or rebooting the machine? Describe as many ways as you can think of.

(Hint: `man ps` and `man kill`.)

2.4 Shell basics and customizations

(Answer the following questions for the `bash` shell.)

1. (5 points) When you type a command (e.g., `ls`), the shell has to find an executable (program) to run. Where does it look? How could you make it also look in your directory `MyPrograms` (in addition to wherever it looks now)? How could you make it look *only* in your directory `MyPrograms`?

2. (5 points) Give the command(s) you would use to define two aliases or shell functions: `delete` to move a file to be "deleted" to a temporary directory such as `$HOME/.trash`, and `undelete` to move a "deleted" file from the temporary directory to the current directory. (Examples of use: `delete myfile`, `undelete otherfile`.)

   (It's up to you to decide whether these should be aliases or shell functions. You might be constrained by the capabilities of aliases versus functions.)

   Notice that commands to define aliases or functions can be entered from the command line, in which case they apply to the current session only, or can be included in an appropriate initialization file.

2.5 Filter programs and other useful commands

1. (5 points) The `find` command is somewhat intimidating but also very powerful. How could you use it to find all files in your home directory (and all subdirectories) that are less than a day old and end with `.c`?

2.6 I/O redirection and pipes

1. (5 points) How would you invoke the `gcc` compiler if you want to be able to page through its output (both standard output and standard error) with `less`?

   How would you capture the error output only in a file called `gcc-ERRORS`?

2. (5 points) How could you make a one-line text file without using a text editor? Could you extend this idea to make a multiline text file? Tell me about as many ways to do this as you can think of.

3. (5 points) What would you type at the command line to get a sorted list, with no duplicates, of all the users running processes on the machine you're using?

4. (5 points) Answer/do one of the following:

   (a) What would you type at the command line to find out how many processes are being run by user `root`?

(b) Describe something you actually want to do (e.g., archive all files that have been changed in the last 24 hours, find a Janus machine that's up and connect to it with `ssh`) and a solution involving a pipe and at least one of the commands mentioned in the reading for this assignment.