COMPSCI 2211b
Software Tools and Systems Programming

Assignment #1

Working With Unix & Linux

Posted:	January 17th 2018
Due:	January 31st 2018 11:55PM
Total:	100 Points (5% of Final Grade)

Learning Outcomes

By completing this assignment, you will gain and demonstrate skills relating to:

- Using *ssh* and a remote Linux shell.
- Regular expression and *grep*.
- Navigating files and directories.
- File and directory permissions.
- Symbolic links.
- Piping and redirection.
- Copying, deleting and moving files.
- Using common Linux commands.

Instructions

For this assignment, an electronic submission is required through OWL. This submission should include a document in PDF format that contains answers for each of the questions listed in the following sections. Your PDF file should be named *"userid_assign1.pdf"* where *"userid"* is your user id. For example, if your UWO e-mail is *"dservos5@uwo.ca"* your file should be named *"dservos5_assign1.pdf"*.

Your answers should be clearly labelled with question and part numbers and include both the command you issued and the output you received. In addition to your answers, this document should also contain your full name, student number, UWO user id, the course code, date, and assignment number.

All Linux commands give must run correctly on the course server (cs2211b.gaul.csd.uwo.ca) in the Bash shell. A question will only be marked as correct if your output can be replicated on the course server.

You will be assessed on the following:

- Providing both the command and output for each question.
- Completion of each question correctly.
- Providing a PDF formatted file following the naming convention.
- Including your full name, student number, etc. as described above.
- Assignment submission via OWL.

Questions

Question 1: *ssh* and Basic Commands (12 Marks)

(a) Log in to the course server (cs2211b.gaul.csd.uwo.ca) using SSH as you would in the Lab. Give the full command you gave to log in (no output is required for this question).

(b) Issue a command to print the hostname of the server.

(c) Print a list of users currently logged into the server.

(d) Print the current date.

(e) Print the current working directory.

(f) Using your favourite editor, create a file named *helloworld.txt* in your home directory containing the text *"Hello World! My name is [Your Name]."* where *"[Your Name]"* is your real name (only give the command to open the editor/file and not the output for this question).

(g) Without using an editor, give a command to display the contents of *helloworld.txt* assuming your working directory is your home directory. Use relative paths (give both the command and output).

(h) Without using an editor, give a command to display the contents of *helloworld.txt* that will work for any current working directory (give both the command and output).

(i) Make a directory called *my_text_files* in your home directory.

(j) Copy *helloworld.txt* into *my_text_files* and name it *hello2.txt* (in one command).

(k) With your home directory as your current directory, rename *hello2.txt* (in the my_text_files directory) to *myhello.txt*. Use only one command.

(l) Change your current working directory to *my_text_files* and delete *myhello.txt* (give both commands).

Question 2: List Command (10 Marks)

On the cs2211b server change your working directory to */usr/bin*. This location stores the executable programs available to users on the server. Using only the *ls* command, display the following files names in */usr/bin*. Make sure you show both the command and output for each of the following parts.

(a) Files whose names are exactly 5 characters long.

(b) Files that have ***g*** as the second letter.

(c) Files that start with ***z*** or ***q***.

(d) Files that end with a number.

(e) Files that have a non-alpha character (not a letter) as the second last character (for example ***9***, **-** or **.** would all be valid second last characters).

Question 3: Redirection (14 Marks)

Go to your home directory and create a text file called letter.txt. Write 15 lines in this file, where each line will have just a number from the list 01, 02, 03, ..., 13, 14, 15 in this order.

Use the commands *cat*, *tail* or *head* for part B-F:

(a) Display the content of *letter.txt*.

(b) Display the last 5 lines of *letter.txt*

(c) Store the first 4 lines of *letter.txt* in *letter2.txt*. Provide the command and the contents of *letter2.txt*.

(d) Use the *sort* command to reverse the contents of *letter.txt* and both store the result in *letter3.txt* and display it to the screen (Hint: Check the manual page for *sort* and *tee*). The command should not alter the contents of *letter.txt* in anyway.

(e) Explain the difference between *cat < letter.txt* and *cat letter.txt*.

(f) Explain the difference between *echo cat* and *cat echo*.

Question 4: Pipes (16 Marks)

Give a command for each of the following and show the output you received on the cs2211b server. Each command should use a pipe. (Hint: Check the manual page for the *wc* command).

(a) Count the number of users currently on the server (it is ok to count users twice if they are logged in twice).

(b) Count the number of files in */usr/bin* that contain the word *"cat"* anywhere in the name.

(c) Display the 7th to 11th lines (inclusively) of *letter.txt* from Question 3 using the *head* and *tail* commands and a pipe.

(d) Display to the screen and store in *last10.txt* the last 10 lines of *.bash_history* (a file in your home directory) sorted and with duplicate lines removed (Hint: Check the manual page for *sort*). Provide the command and both your output and the contents of *last10.txt*.

Question 5: *grep* (18 Marks)

The file */usr/share/dict/words* contains a list of dictionary words separated by new lines (one word per line). Use this file and the *grep* command find/do the following:

(a) Count the number of words that do not contain the word ***mil*** anywhere in them (do not use the *wc* command).

(b) Count the number of words that end in ***ing*** (do not use the *wc* command).

(c) Display any word that contains 5 or more vowels in a row. The match should be case-insensitive (i.e. ***AAAAAA*** would match as would ***AeIou*** or ***eeeeeee***).

(d) Display any word that starts with the letter ***z***, ends with the letters ***ly*** and does not contain the letter ***f*** or ***t*** anywhere in the word.

(e) Display any word that starts and ends with the same two letters. For example, ***to***ron***to***, ***papa*** or ***er***as***er***. **You do not need to provide your output for this part.**

Question 6: File Permissions (15 Marks)

On the cs2211b server, accomplish the following tasks and provide the commands you used and the output you received:

(a) Create a directory called Top1 in your home directory and setup its contents like so:

- Under *Top1*, create a sub-directories *Dir1* and a regular file *File1*.
- Under *Dir1*, create directories *Dir3* and *Dir4*.
- Under *Dir3*, create a regular file *File3*.
- Under *Dir4*, create three regular files *File4*, *File5* and *File6*.
- Under *Top1* make *Dir2* a symbolic link to *Dir1/Dir4*.

(b) Set the permissions on the directory *Top1* such that all permissions are granted for the owner, and none are granted for others and group.

(c) Set the permissions on *Dir1* such that the owner has all permissions and only read and execute for others and group.

(d) *Dir3* should have all permissions set for the owner, read permission alone for group, and none for others.

(e) *File1* should have read permission alone set for all.

(f) *File5* should have execute permission alone set for others and group, and read and execute permission for the owner.

(g) Display the permissions of *Top1* and no other files.

(h) Display the permissions of *File4*, *File5* and *File6* with one command.

Question 7: Terminology (15 Marks)

Using the proper terminology (e.g., command, option, option argument, and command argument), identify the constituent parts of the following UNIX commands (you do not need to explain what the command does, just identify the parts):

(a) man man

(b) wc -l myfile.txt

(c) ls –all -l /usr/bin/*cat*

(d) grep -icv ?[aeio].* myfile.txt

(e) nano -w -o /gaul/s1/student/1985/dservos5 myfile.txt

Hint: It may be helpful to read the manual pages for these commands.