# CS265: Advanced Programming Tools and Techniques

***Lab #2 – vi and Bash Shell***

**Before you start**

* Leverage the man or help utilities to access the manual pages for commands and really learn how commands work

**Setting Up the Lab**

As you work through the lab, questions will be denoted with a Q. Fill in your answers in a text file called lab2.txt.

* Make some appropriate subdirectory for this lab and go there e.g., ~yourid/cs265/lab2 Ensure your directory restricts access to other students.

$ mkdir cs265 (if you do not have it already, cd if you do)

$ chmod go-rwx cs265 (if you have not done this already)

$ cd cs265

$ mkdir lab2

$ cd lab2

$ chmod go-rwx lab2

**Part 1 - vi tutorial**

For a basic vi tutorial, just type:

vimtutor

This will open the vi tutorial in the vi editor and will teach you the basics of vi. When you run the program, it will open a file. The first time you run vimtutor save the file using

:w vi.txt (from the command mode)

You can now make your own edits to the file. Read the tutorial, make any recommended edits then save the file. If you need to stop and restart, you can now edit this file by simply typing this in the Linux command line

vi vi.txt

You will submit the file vi.txt as part of your lab work.

**Part 2 - Unix commands**

The echo command is used to display a string/line of text that is passed as argument. You can write the string into a file by using > filename to create the file (or overwrite the file if it exists already), and >> filename to append additional lines to the file. Create a file named list using these commands:

$ echo 'apple' > list   
$ echo 'pear' >> list

$ echo 'grape' >> list   
$ echo 'peach' >> list

Use the ls command to see that the file exists. Use the cat command to see the contents of the file. Use cat -b to see a line number next to each line. Make a copy of the file list to a new file list2.

$ ls list   
$ cat list

$ cat -b list

$ cp list list2

**Q1** - Try this command. What is the output?

$ wc -w list

**Q2** -   Try the following command. What is the output?

$ wc -w < list

**Q3** - Use ls and wc (with appropriate arguments) joined together with a pipe to count the number of files and directories in the current directory. Record the entire command you used. Record the output of the command.

**Q4** –Start vi on the file list. When the editor starts, press CTRL-Z to stop the vi process. Run the ps command to see the running processes. What is the output of the ps command?

**Q5** – Run the jobs command. What is the output?

**Q6** –What command can you use to resume the vi process?

**Q7** - Add a line to the end of list2

$ echo "apricot" >> list2

Type:

$ diff list list2

Explain the output

**Q8** – What do you see when you type

$ diff list2 list2

**Q9** - Create a file with numbers using these commands

$ echo '1' > numbers   
$ echo '110' >> numbers

$ echo '12' >> numbers   
$ echo '11' >> numbers

$ echo '21' >> numbers

$ cat numbers

Type

$ sort numbers

Was the output what you expected? Explain.

**Q10 -**   Type:

$ sort -n numbers

Was the output different? Explain.

**Q11**- Use the man command to access the manual for ls and sort. Try this:

$ ls -o | sort -k4 -h -r

For each option for ls and sort, write what the option means. When the full command is executed, in what order are the files listed?

**Q12**– Use the man command to access the manual for ls, cut and sort. Try this:

$ ls -oh | cut -f4 -d ' ' | sort

Show the output of this command. What does this command display?

For questions Q13-Q17, run each of the command given and describe the command’s three standard I/O channels (stdin, stdout, and stderr).

**Q13** - Execute the command cat (with no options). Enter some text, and press enter. Repeat that a few times. To exit, type CTRL+d. Describe the command’s input, output and error files.

**Q14** - Execute the command cat > file1. Enter a few lines of text and exit. Describe the command’s input, output and error files

**Q15** - Execute the command cat file1. Enter a few lines of text and exit. Describe the command’s input, output and error files.

**Q16**- Execute the command cat file1 > file2. Enter a few lines of text and exit. Describe the command’s input, output and error files.

**Q17**- Execute the command cat >> file1. Enter a few lines of text and exit. Describe the command’s input, output and error files.

**Q18** -   Provide a command that will show the 5 largest files in the /usr/bin directory. (Hint: See question 11). Run the command and show its output.

**Q19** – Create a couple of empty directories in your lab2 directory

mkdir testDir1

mkdir testDir2

mdkir testDir1/testDir3

Use a single find command to locate all empty directories starting from your home directory (recursively).

What is the command you used?

**Q20** – In the following two cat commands, you can stop command input from the standard input when a given word is given (e.g., EOF and THE\_END).

cat << EOF > part1

> Alabama

> Alaska

> Arizona

> Arkansas

> EOF

cat << THE\_END > part2

> California

> Colorado

> Connecticut

> THE\_END

Show the command that will combine the two files part1 and part2 into a new file part3.

**What to submit**

Submit your work in Blackboard by the deadline. After you finish the lab:

1. Submit vi.txt
2. Submit lab2.txt