Lab #2. More Linux Commands & Hands-on Linux Command-line Tools

- The TLCL book is publicly available at: http://sourceforge.net/projects/linuxcommand/
- HGU CSEE Standard on assignments:
  - Submitting assignments or program codes written by others or acquired from the internet without explicit approval of the professor is regarded as cheating.
  - Showing or lending one's own homework to other student is also considered cheating that disturbs fair evaluation and hinders the academic achievement of the other student.
  - It is regarded as cheating if two or more students conduct their homework together and submit it individually when the homework is not a group assignment.
- When you report the lab results to the TA, s/he may ask your answers to the following questions.

1. Read Chapter 6 of TLCL (pages 54-67) carefully and exercise all commands in the textbook thoroughly on the Peace server. Be prepared to answer each of the following questions and to explain how you find your answer.

a) *Cheolho* would like to list all files under /dev in long format and store the results as a txt file, with name *ls_dev.txt*, under her home directory. If there is an existing file with the same name, she wants to keep the existing one and append the new results to the end of the file. How does she write a command?

> ls -al /dev >> ~/ls_dev.txt

b) *Gahyeon* is testing a program called *simul* and collect all error messages coming from it in a separate local file, *simul.err*. Provided that she only wants to keep the error messages from the current program run, how does she write a command?

> ./simul 2> simul.err

c) *Duhwan* is planning to run a system benchmark overnight, and would like to collect all the output and error messages in file *nerdbench.log*. Provided the executable is accessible at */usr/bin/nerdbench*, how does he write a command?

> /usr/bin/nerdbench > nerdbench.log 2>&1

d) Commanding "`cp ./.* tgt_dir`" would raise error messages as the following, saying that it cannot copy directories:

```
$ cp ./.* tgt_dir
cp: ./. is a directory (not copied).
cp: ./.. is a directory (not copied).
```
> cp -f ./.* tgt_dir

Modify the command to suppress the error messages.

Explain what is going to happen if you give the following command in the command line.

e) $ ls /bin /usr/bin | sort | uniq -d   /bin과 /usr/bin 디렉토리의 파일을 나열하고, 그 목록을 정렬한 후 중복된 항목만 출력합니다. 이렇게 하면 /bin과 /usr/bin 디렉토리에 있는 파일 중에서 서로 중복된 파일들만 출력됩니다.

f) $ ls -1 /usr/sbin | wc -l

g) $ cat /etc/group | grep x | sort   /usr/sbin 디렉토리에 있는 파일을 한 줄씩 출력한 후, 출력된 라인의 개수를 세어 출력합니다. 이렇게 하면 /usr/sbin 디렉토리에 있는 파일의 수를 셀 수 있습니다.

/etc/group 파일을 읽어들인 다음, 그 중에서 "x"라는 문자열을 포함하는 라인만 출력한 후, 그 결과를 정렬하여 출력합니다. 이렇게 하면 /etc/group 파일에서 "x"라는 문자열을 포함하는 그룹들만 출력됩니다.

2. Read the following sections from the textbook:
- **Chapter 12 of TLCL (pages 141-161)**
- **The "'Configuring vim For Script Writing" part of Chapter 24 (pages 369-370)**
- **Chapter 19 of TLCL (pages 251-272)**

   (You may prefer the following video tutorial: https://youtu.be/4KwsijqA7tQ)

Be prepared to answer each of the following questions and to explain how you find your answer.

Open *vim* on a Linux terminal. On the other hand, open a Bible and turn to Psalm chapter 1.
   a)   Type in (insert) verses 1 through 3 on *vim*.

   b)   Make three empty lines. Then, type in verses 4 through 6 on *vim*.

   c)   Using the cut and paste functions, relocate verses 4 through 6 before verses 1 through 3. Now your version of Psalm 1 is displayed in the order of verses 4-6 and then 1-3.

   d)   Using the copy (yank) and paste functions, repeat version 1, 3 times. You may use the visual mode that is activated by hitting 'v'.   3p

   e)   Using the copy (yank) and paste functions, repeat version 2, 10 times.
                                                                                          10p

   f)   Using the copy (yank) and paste functions, repeat version 3, 20 times.

Download sched.txt using wget and the command below and open it using *vim*.
```
$ wget https://raw.githubusercontent.com/charmgil/HGU-OSSL/master/sched.txt
```

Answer the following questions. Make sure to be able to come up with proper *vim* commands.

   g)   Find and count all occurrences of "meet" in the file.   :%s/meet//gn

   h)   Replace all "am" to "AM" (lowercase to uppercase); Replace all "pm" to "PM".
                                                                           :%s/\v(am|pm)/\U&/g
   i)   Switch (swap) all "AM" to "PM", and vice versa.

      :%s/\v(AM|PM)/\=submatch(0)=='AM'?'PM':'AM'/g

Watch *An introduction to regular expressions in Vim* on YouTube (**https://youtu.be/4KwsijqA7tQ**) and answer the following questions.

   j)   Find all whitespace in sched.txt using regular expression.
                              :%s/\s
   k)   Find all words ending with "ing".   :%s/\<\w*ing\>//gn
                     grep -o '\b\w*ing\b' sched.txt   grep -E '\b\w*ing\b' sched.txt   grep -E '\b\w*ing\b' sched.txt   /\w*ing   /\w*ing\v(\n|\s)
   l)   Find all 2-digit numbers and take the summation of all. Note that the summation part should be done manually.
                     grep -Eo '\b[0-9][0-9]\b' sched.txt   :%s/\<\d{2}\>//gn
                                                                        /\d\d/

                     grep -Eo '\b[0-9]\{2}\b' sched.txt