CMPT 214: Programming Principles and Practice
Term 1 2016-17
Lab 3 - Programming style and even more UNIX

Before starting this lab exercise, pay attention to the presentation by the lab instructor explaining the operation of the `cut(1)`, `tr(1)`, and `tar(1)` commands, and giving some usage examples. Operation of these commands is also discussed in the textbook by Sobell; see pages 766–768, 987–989, and 968–972, respectively.

Perform tasks 1 - 4 below in a virtual terminal window. For each task, copy-and-paste the contents of your terminal window (including the commands that you typed, and any output produced by the commands you gave) into a text file called `lab3.txt`. However, do not include extraneous or superfluous commands or output; only include content relevant and essential to the specified task. Unless otherwise specified, all commands should be run on tuxworld using the `bash` shell. Additionally, with a text editor, add to `lab3.txt` your solution to questions 5 and 6 as well as **text and identifying information to clearly distinguish which commands/output/code correspond to each task or question.** Submit `lab3.txt` through moodle when done. This lab is out of a total of 11 marks, with each question (1, 2a, etc.) being worth one mark. Marks may be docked for extraneous, irrelevant, or superfluous content. The submission is due at 11:55 p.m. on Thursday, September 29.

1. Use a UNIX command to find out the name of the server on which the files in `/student` are physically stored. In your submission, also explicitly give what you think the name of that server is.

2. Create a subdirectory called `214lab3` in your home directory. Change your current working directory to this new subdirectory. Use this directory when completing steps 2, 3, and 4.

   (a) Create a directory called `dir1` and a directory called `dir2`, both within `214lab3`. Change your current working directory to `dir1`. Then use a UNIX command to copy the file `/etc/passwd` to `dir2`. In doing so, you must use a relative path, not an absolute path, to specify the destination directory.

   (b) Change your current working directory to be the `214lab3` directory you created at the outset. Use a UNIX command to create a compressed `tar` saveset called `dirs.tar.gz` containing `dir1` and `dir2` (and all the files in those directories). Finally, using the `echo` command and output redirection, create a text file in `214lab3` called `favourite_movie.tar.gz` containing the name of a favourite movie. Do not be concerned that the filename does not end in `.txt`.

   (c) Use a UNIX command to find out the file type of both `dirs.tar.gz` and `favourite_movie.tar.gz`.

3. (a) Place the output of the `w` command in the file `wtemp.txt` using output redirection. Then use a UNIX command to put all but the first two lines of `wtemp.txt` into the file `w.txt`. Finally, output the content of `wtemp.txt` and `w.txt` to your display.

   (b) Use the UNIX/LINUX `cut(1)` command to show just the username column of `w.txt`. Since the input file is space-delimited rather than tab-delimited, specify to `cut(1)` that it must use a space

character as its delimiter. You can specify a space character on the command line by enclosing it in quotes.

(c) Use the `tr` command to read `w.txt` and replace all instances of multiple, consecutive space characters by just one space. Have the output of this command go to the file `w1.txt`. Again, you can specify a space character as an argument to `tr` by enclosing it in quotes on the command line.

(d) Use a UNIX command to display the contents of `w1.txt` with the lines sorted in decreasing lexicographic order of the 5th column. You can assume that the default sorting criterion for `sort(1)` is lexicographic.

4. Download the ancillary file for this lab named `usernames.txt` from the moodle pages for this lab. Suppose that you wish to find out whether this file is already sorted in alphabetical order. The `sort` command's `-c` option allows you to check whether a file is already sorted; however, pretend for this question that this option does not exist. Use some combination of `sort` (with no options) and `diff` to find out whether the usernames in this file are already in alphabetical order. You will need to use more than one command. You can also make use of a temporary file. However, try to use as few commands as possible. Stop when you have sufficient information to make the decision and explicitly state that decision in your `lab3.txt` file.

5. Rewrite the following code using better programming style as per the guidelines given in lecture.

```
char *line;
bool is_quote;
...
is_quote = ( *line == '"') ? true : false;
```

6. Rewrite the following code in a more idiomatic form.

```
i = 0;

while (i <= arraySize - 1) {
     array[i++] = 1;
}
```