CS2016/CS3D4

Practical 1

January 30, 2018

The object of this simple practical, worth 2%, is to get familiar with using Linux, both on a local machine using a Graphical User Interface (GUI) and using `ssh` as a connection to a command-line-only session — often called a Command Line Interface (CLI) session on a remote computer. The remote computer in this case is `stoker.scss.tcd.ie`, which is also running Linux.

Log in to Linux on the local computer using your SCSS credentials. The machine is running a recent version of Ubuntu Linux. Figure out how to:

- View files in your home directory, including hidden files, both using the GUI and the CLI.
- Download the `Hello World with Threads` sample program from *Blackboard*.
- Compile and run the sample program – you'll need to use the CLI for this.
- Establish a CLI session on `stoker`, making the connection with the "Secure SHell" – `ssh` – *client* program. Use something like:

  ```
  $ ssh username@stoker.scss.tcd.ie
  ```

- Compile and run the program on `stoker`.

The Unix CLI can be quite forbidding, but is actually very mature and stable, and extremely powerful. Here are a few useful commands (taken from `http://docs.getchip.com/#terminal-for-beginners-glossary`):

- `cd` – change directory. Open a folder. Example: `cd ~/Pictures` changes your current directory to the home `Pictures` folder, so you can easily access the files within.
- `mkdir` – make directory. Create a folder. Example: `mkdir Vacation` makes a folder named `Vacation` in the current directory. Example: `mkdir ~/Pictures/Vacation` makes a `Vacation` folder in the home `Pictures` directory.
- `ls` – list files in the current directory so you know what is in it. Some options are `ls -l` to list in long format to provide information about permissions, size, and date; `ls -a` to show hidden files that start with the `.` character.

- `mv` – move a file from one directory to another, or to give it a new name. Example: `mv this.one that.one` renames a file. Example: `mv this.one ~/Pictures/Vacation/` puts the file `this.one` into the `Vacation` directory.
- `cp` – copy a file from one place to another. Ex: `cp this.one this_01.one` will copy `this.one` to another file `this_01.one`. Add directories for more fun: `cp ~/Pictures/Vacation/saturn.jpg /Users/otherone/Pictures/Vacation/saturn.jpg`.
- `rm` remove a file. Delete it, and beware!. Use the `-r` to make it recursive to delete a directory. Example: `rm this.one` deletes that file. Example: `rm -r ~/Pictures/Vacation` to forget the good times.
- `pwd` – present working directory. In case you forget where you are. Not much to it: `pwd` will output the directory name, such as `/Users/home/chip/Pictures/Vacation/`
- `grep` is a tool used for searching through files. It's quite deep and can be complicated, but if you see the word grep in some command, you know it's searching for a match.
- | (pipe) is a command used to redirect data into an application.
- < (redirect) is a command used to redirect data into a file.
- `cat` ("conCATenate"). Used to append data to a file. Example: `cat "Last line of text" > sometext.txt`. Merge files: `cat append.txt > main.txt` will put all the text in `append.txt` into `main.txt`.
- `less` makes it so you can paginate and read a text tile. Example: `less longtext.txt` will fill the screen with the first part of the `longtext.txt` file. Use the space bar to view the next page. Type `q` to exit.
- `vi` (recommended) or `vim` or `nano` or `emacs` are text editors. You'll often see commands that call `vi` so you can edit a configuration. Example: `vi /etc/avahi/services/afpd.service` to edit the `avahi` Apple file service file.
- `find` looks for files in the filesystem. Example: `find ~/Documents -name particular.txt -type f` will look for the file with the name `particular.txt` in the `Documents` directory.
- `chmod` changes *mode*. Used for file permissions, which can be important when sharing things on the network, scripting actions, and many more reasons.
- `htop` displays the processes currently alive on the CPU. If things seem slow, or you want to see how much CPU or memory a program is using, just type `htop` to see a table of all running processes, then type `q` when you want to exit.
- `scp` Secure CoPy. Copy a file from one computer to another over a network. Example: `scp Pictures/Vacation/motel.jpg Pictures/Vacation/accident.jpg chip@otherchip.local:~/Pictures` copies a couple of jpegs to another computer on the network.

- `ssh` secure shell. Access another computer on the network and use the terminal commands to make changes and control it. Example: `ssh joe@stoker.scss.tcd.ie` to access `stoker`.
- `CTRL C` if you can't use the terminal because a process is taking too long, type `CTRL-C` on your keyboard to cancel the most recent command.