CS 246 Spring 2017 - Tutorial 0

April 29, 2017

1 Summary

- General Administration Stuff
- CS Undergraduate Environment
- Configuring your system for the course
- Basic Commands
- .profile
- Git

2 General Administration Stuff

- Course E-mail: `cs246@uwaterloo.ca`
- Use `Piazza` for most questions
  - Questions containing potential solutions should be private or asked in office hours
  - If your question is made private by an instructor - keep it that way
- E-mail the course account or post on Piazza about topics you would like to see in upcoming tutorials
- This course uses `git` (a version control system). `git` is the mechanism that this course will use to distribute assignments, lecture examples, tutorial material, and other related files.
  - Details on `git` are presented in A0 but we'll talk a bit about it later

3 CS Undergraduate Environment

- To log into the CS Undergrad Environment, you need to set up a password that is separate from your WatIAM/Quest password
  - Go to `https://www.student.cs.uwaterloo.ca/password/` to set up your password
- The Undergrad Environment requires the Internet to access (and can sometimes be a little slow) but it has several benefits:
  - Regular backups of your files
  - Required software is pre-installed
  - Compatibility with our testing framework (Marmoset)

4 Configuring your system for using the Undergraduate Environment

4.1 Linux

- Most Linux distributions come installed with typical applications that you will need (e.g. vim, ssh, scp)
- To log in to the Undergrad Envrionment:
  - Open a terminal
  - Execute the command `ssh userid@linux.student.cs.uwaterloo.ca`
  - Enter your CS environment password when prompted (you won't see the characters)
  - Done.

4.2 Mac

- Every Mac has a Terminal application which runs a text interface for Unix. You can just follow the same steps as for Linux.
- Note that most modern Mac's come pre-installed with a version of bash that is *mostly* compatible with the CS environment but not entirely. Use it at your own risk.
- You will need to install XQuartz[1] for later assignments.

4.3 Windows

- You only need to use one of the following options
- Putty
  - An ssh client which can be downloaded for free here: `http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html`
  - Use the host name `userid@linux.student.cs.uwaterloo.ca`. It is ideal to save this session so it does not have to be typed in each time.
  - If using Putty, you will likely want to install programs on your local machine: Xming and WinSCP. Xming [2] will be used later in the course for some assignments. WinSCP [3] is used to copy files (like assignments) from your Linux account to your local machine.
- Cygwin [4]
  - A Unix-like environment and command-line interface for Windows
  - If you want to work remotely, just install the ssh package.
  - In the case that you want to work locally, when installing Cygwin, you will need to be sure to install a number of packages including: x11, vim, g++ (at least version 5), gdb, make and git.

[1] `http://xquartz.macosforge.org/landing`
[2] `http://sourceforge.net/projects/xming`
[3] `http://winscp.net/eng/index.php`
[4] Downloaded for free here: `https://cygwin.com/index.html`.

- Bash on Ubuntu on Windows (Beta)
  - For Windows 10 Anniversary Update and later
  - A Ubuntu subsystem on Windows
  - Installation instruction:
    `https://msdn.microsoft.com/en-us/commandline/wsl/install_guide`
  - See Cygwin section for the packages needed.
- Other solutions
  - Use a virtual machine
  - Dual-boot Windows and Linux
  - Use one of the labs on campus
- Note: You may need to separately install git if you want to checkout a local version of the repository.

5 Basic Commands

- Shell commands versus System Commands
  - Shell commands are executed by the shell
  - System commands are called by the shell (versus executed by the shell)
- Some basic commands that you may need for A0:
  - `cd`: Change directories. Followed by a path. ex: `cd cs246/1175`
  - `pwd`: Displays absolute path to your present working directory.
  - `exit`: terminates the shell session
  - `echo`: write arguments, separated by spaces and terminated with a newline
  - `cat`: prints the contents of files
  - `ls`: Lists contents of the current working directory.
    - The `-l` option will cause `ls` to print a detailed list of the contents of the current working directory.
    - The `-a` option will cause `ls` to print hidden ("dot files") and non-hidden files
    - Hidden Files are denoted with a dot at the start of the filename and are typically configuration files

6 .profile

- When you log into the CS environment there are a number of files that get executed. One of these files is `.profile`, which configures your ssh session to behave how you like it (e.g., what your prompt looks like) and executes any additional code that you add to it.
- For your own convenience you should modify your `.profile` to execute the command `source /u/cs246/setup` every time you log in.
- To modify your .profile, do the following:

  - ssh into the CS environment
  - Execute `vim .profile`
  - Add the command `source /u/cs246/setup` to the bottom of the file
  - Save the file
- Note that your `.profile` may be empty, this is fine. There are several other configuration files that will have other details in them (i.e., `.bashrc`)

7 Text Editors

- For this course, you will need to use some kind of text editor that is not Microsoft Word or Notepad
  - Word is not usable since it is more complicated than just text, we want just text.
  - Notepad is just text but is not particularly useful due to limited functionality (and saves files in a Windows format)
- For this course, you should familiarize yourself with either `vim` or `emacs`. Both have a great deal of functionality – choice of editor will likely be preference.

8 Gitting up to Speed

- `git` is a popular revision control system that was developed by Linus Torvalds (*the Linux guy*)
- Why are we using `git` rather than Subversion (SVN) or CVS?
  - It has become somewhat of an industry standard (aka good for you to know)
  - The functionality is largely the same as any other revision control system
  - You get a client-side repository that you are free to modify, which allows you to rollback changes, branch code, etc
  - SVN/CVS do not allow this functionality, you are only able to modify the repository shared by everyone
  - Note that you cannot modify the global CS246 repository; only course staff can
- You should start by logging into the undergraduate environment and going to your cs246 directory (you may have to make it)
- You are then free to issue

  ```
  git clone ssh://linux.student.cs.uwaterloo.ca/u/cs246/pubrepo/1175/.git
  ```

  in your cs246 directory on the undergraduate environment
- Once you've checked out the repository then you should typically expect to issue `git pull` from within the cs246/1175 directory every lecture/tutorial day (times may vary).
  - This will update your local copy of the repostiory to reflect any global changes that course staff have made
- To modify your local copy and take advantage of version control, you should look into the commands: add, commit, rm, checkout, revert (**Note: checkout and revert will overwrite the working area, hence discarding any uncommited/unstaged changes.**)

- The Course Notes have a nice demo showing how to modify a local repository
- Note that any attempt to push your local repository to the global one will fail. You should never need to execute a push command to the 246 repository.
- However, you can create your own repositories on the UW git server that will allow you to push and pull to your heart's desire.
  - This is at your own discretion and is not necessary to complete the course. Accordingly, we offer no meaningful support for it
  - See `git.uwaterloo.ca` for additional information
- If you wish to make a repository on the UW git server, it must be set to private.

9 Tips of the Week

- Press on the up arrow to see previous commands
- The command `clear` will clear the terminal
- When typing in a command or file name, you can press tab to autocomplete the word if the remainder of the word is not ambiguous. Otherwise, it will fill in part of the word and pressing tab again will show the options for what word it could be.
- **Every directory under the student environment has a hidden subdirectory called `.snapshot` where the hourly,daily and weekly backups are stored. To recover a deleted file, simply find the file within `.snapshot`, and `cp` it out. For details, see** `https://cs.uwaterloo.ca/cscf/howto/snap`