National Taiwan Normal University

CSC 9006 Real-Time Systems (Spring 2020)

Lab 0: Environment Setup

(100 points total; submit your results to Moodle; submission is due on 3/12/2020 5pm)

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Introduction

Throughout this semester, each student will complete assignments on a Linux operating system. Each student will maintain his/her own GitHub repository, and the course instructor will evaluate each student's code there. In this lab assignment, each student will go through the process of setting up the needed environment.

1. (40 points) Ubuntu Linux Installation

Follow the instruction on Ubuntu's website to download and install Ubuntu Linux Desktop 18.04 LTS on your PC/Laptop. I recommend installing via a USB flash drive. Note that you should NOT use virtual machines or WSL – in this course we will measure the timing of program execution, and the use of virtual machine may lead to a very different result.

Download link: https://ubuntu.com/#download

Installation guide: https://ubuntu.com/tutorials/tutorial-install-ubuntu-desktop?backURL=https://ubuntu.com/download/desktop/thank-you#1-overview

You might need to disable the "secure boot" option in BIOS in order to boot from your USB flash drive. Take a look at this guide: https://www.asus.com/tw/support/faq/1013015/   You may re-enable the secure boot after installation.

If you're trying to install Ubuntu Linux alongside with Windows 10 (if not, you may skip this paragraph), it might take some more effort to make it work. The following are steps that work for my Windows 10 laptop. Keep in mind that, depending on your hardware/software configuration, some extra steps may be needed:
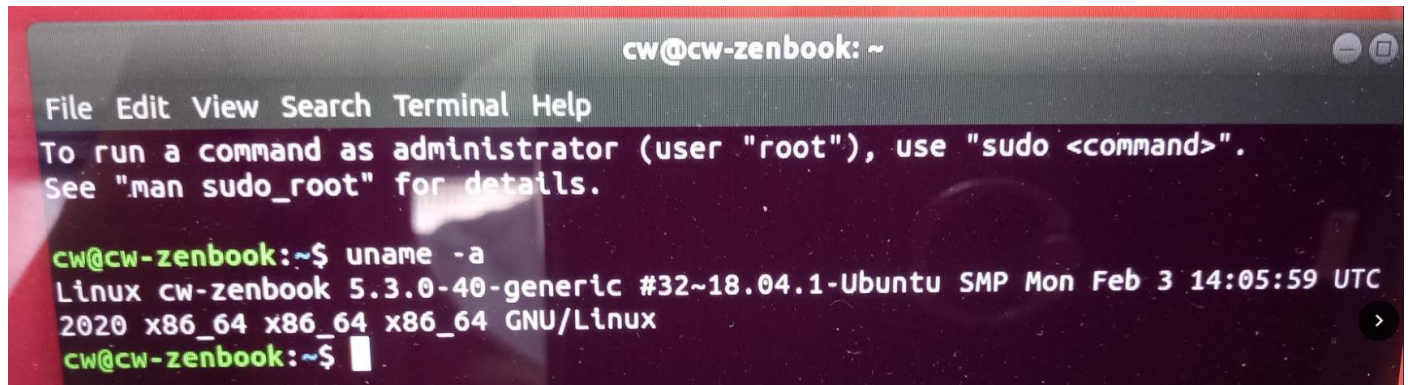
A. First, in Windows 10, either save the BitLocker recovery key (2:11-3:00 in the video) https://www.youtube.com/watch?v=exz3R6icsNk , or turn off the BitLocker: https://support.microsoft.com/zh-tw/help/4502379/windows-10-device-encryption

B. Follow the instruction to allocate some free disk space and set up for dual-boot. _Perform Step 1 only_: https://www.tecmint.com/install-ubuntu-alongside-with-windows-dual-boot/   For this course, 70GB free disk space is well enough.

C. Then follow the official installation guide: https://ubuntu.com/tutorials/tutorial-install-ubuntu-desktop?backURL=https://ubuntu.com/download/desktop/thank-you#1-overview
At step #6, different from the screenshot on the webpage, you should see an option saying "Install Ubuntu alongside Windows Boot Manager", which will install Ubuntu using the free space you allocated at Step B above.

D. After the installation, if your Linux machine froze before reboot, don't let it go. You may recover your machine by pressing some key combinations: https://en.wikipedia.org/wiki/Magic_SysRq_key

E. After the first reboot, if you found that you cannot log in Windows 10, don't panic. If you've saved the BitLocker recovery key, you may use the key to fix the issue. Otherwise, you may follow this video to reboot into the BIOS (0:25-1:02 in the video): https://www.youtube.com/watch?v=exz3R6icsNk   In the BIOS make sure you've re-enabled the secure boot.

Change the boot priority to boot Windows 10 first. Then you should be able to log in Windows again. Save the BitLocker recovery key, reboot into the BIOS, change the boot priority to boot Ubuntu first, and then upon reboot use the recovery key to fix the issue.

After installation, boot into the Ubuntu desktop, click "Activities" on the top-left corner, and type "terminal" to open a window of command-line interface. This is the environment we will work on throughout this semester!

Now, do the following three steps in the terminal, take photos of them, and submit your records to Moodle.
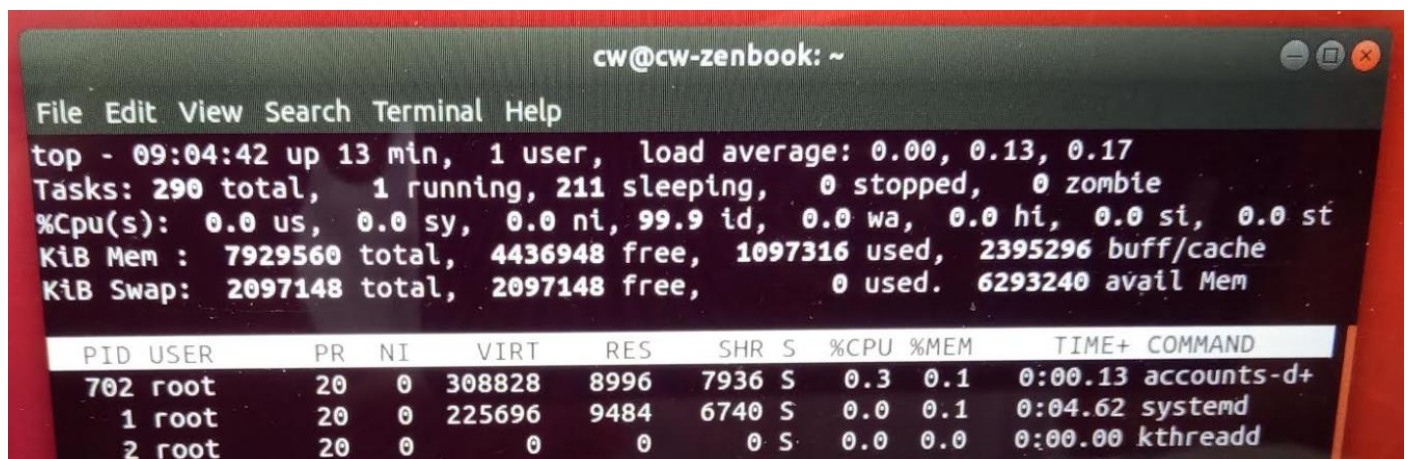
First, type "uname –a", hit the Enter key, and take a photo for the outcome. For example:
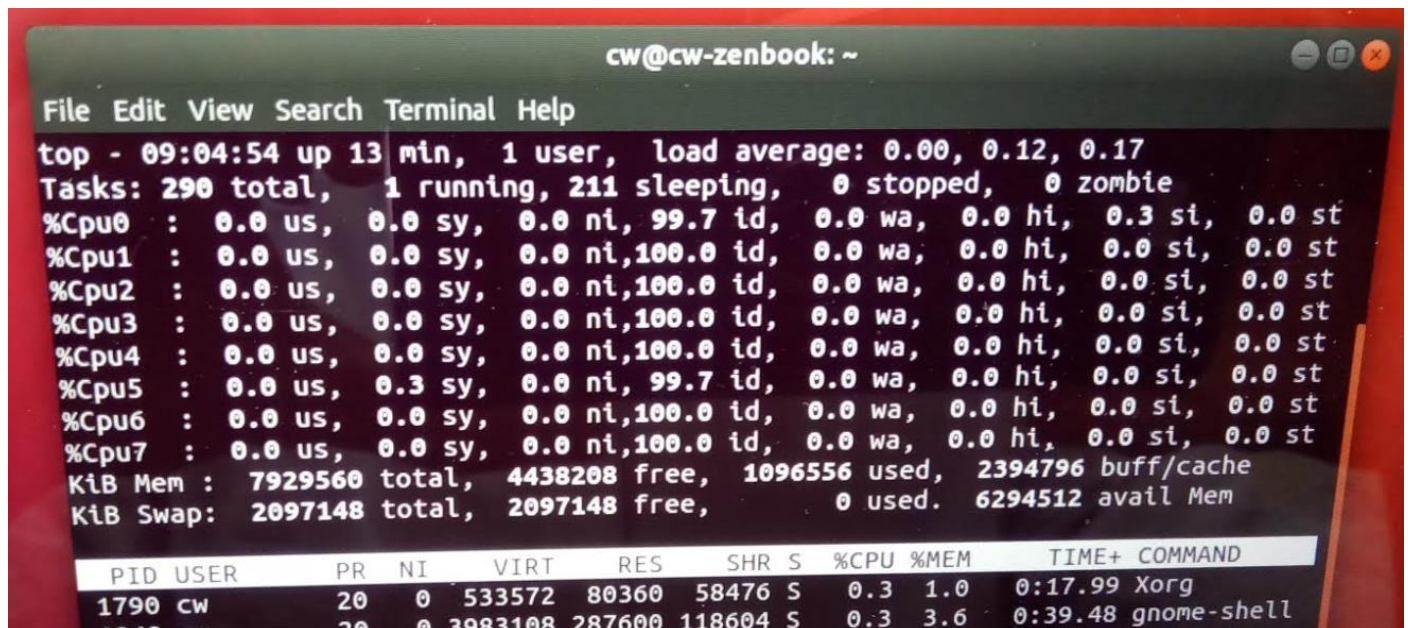
Then, type "top", hit the Enter key, and take a photo. For example:

Finally, type "1" and take a photo. For example:

You may exit the top utility by hitting the ESC key.

Type "man top" to learn more about this utility:

```
$ man top
```

2. (40 points) Creating Your Own GitHub Repository for This Course

First, create a free account on GitHub: https://github.com/

Then complete this tutorial: https://guides.github.com/activities/hello-world/   and create a repository for this course.

At your repository, on the right side of the page, hit the green button "Clone or download" and copy the URL and submit it to Moodle. This will be your repository for this course's lab assignments, and I will look up the code there for each lab assignment.

Now, in your Ubuntu terminal, type the following command to install Git:

```
$ sudo apt install git
```

Then clone your GitHub repo by typing

```
$ git clone [the URL to your GitHub repo]
```

Learn more about Git and its use online, e.g., https://backlog.com/git-tutorial/tw/intro/intro1_1.html

We will use Git for all of lab assignments.

Some example commands:

Add files to your local repo by typing

```
$ git add [filename]
```

Look up the current status of the repo by typing

```
$ git status
```

To undo the change made to a certain file that is not committed yet, you can type

```
$ git checkout [filename]
```

Commit your changes by typing

```
$ git commit -m "[your note message for this commit]"
```

Push to your GitHub repo your commit by typing

```
$ git push origin master
```

3. (20 points) Setting Up a Programming Environment and Pushing Your Code to the GitHub Repository

On your terminal, type

```
$ sudo apt install build-essential
```

Create your own hello-world C++ source code, name it as "hello.cpp", and compile it by typing

```
$ g++ hello.cpp
```

Make sure you can compile and run C++ code on the terminal. Commit and push your code to your GitHub repository.

You will receive 20 points by successfully doing so.

For any question, ask on Moodle or stop by my office during my office hours.