Linux VM Environment

- You need a Linux environment for this course
  - If your laptop runs Windows, you need to
    - install a virtualization software
    - download a recent version of Linux distribution (e.g., Ubuntu)
    - Install Linux as a virtual machine (VM) on the virtualization software
  - If your laptop runs Mac, you could use the native Xcode (with some known issues). it is still recommended to install a Linux VM.
  - If your laptop runs Linux, it is still recommended to install a Linux VM
- Desktop virtualization software
  - VMware Workstation Player (Windows, Linux): free
    - https://www.vmware.com/go/downloadplayer
  - Oracle VirtualBox (Mac, Windows, Linux): free
    - https://www.virtualbox.org/wiki/Downloads
  - Commercial software is OK: VMware Workstation Pro, Fusion, etc.
- Linux
  - Ubuntu: http://www.ubuntu.com/download/desktop
  - CentOS: https://www.centos.org/download/
  - Debian: https://www.debian.org/CD/
- Ubuntu VM installation
  - VMware Workstation Player: https://www.youtube.com/watch?v=AlOcHa_KB0k
  - VirtualBox: https://www.youtube.com/watch?v=LIuRUvr03as&index=2&list=PLMhjbbkN7ahyejodIucz5h-mBruTctFS3

C/C++ IDEs on Linux

Eclipse CDT: http://www.eclipse.org/cdt/
Code:Blocks: http://www.codeblocks.org/
CodeLite: http://www.codelite.org/

C Tutorial

https://www3.ntu.edu.sg/home/ehchua/programming/cpp/c0_Introduction.html
https://www3.ntu.edu.sg/home/ehchua/programming/cpp/c1_Basics.html
http://www.tutorialspoint.com/cprogramming/index.htm

Install Eclipse CDT on Linux

You could use vanilla text editor to edit your C program, invoke gcc compiler in a shell, run gdb to debug your program, etc.

Alternatively, you can install an IDE to achieve all of the development work. One good IDE is Eclipse for C/C++, also called Eclipse CDT (C/C++ Developer Toolkit). To do so, please start a Terminal or XTerm in Ubuntu Linux.

In the Xterm, run the following command to install Eclipse CDT

```
% sudo apt-get install eclipse-cdt
```

You will be prompted to enter your (root) password. When you installed Linux, you should be the administrator.

It might prompt you to get all the Linux update before you can install Eclipse CDT. Please respond yes to proceed.

Alternatively, one can download Eclipse IDE for C/C++ developers (i.e., Eclipse + CDT) at http://www.eclipse.org/downloads/packages/eclipse-ide-cc-developers/neon2.

One can also download CDT itself without Eclipse at http://www.eclipse.org/cdt/.

Note: Eclipse requires Java. If you install eclipse-cdt via apt-get, openjdk will be installed automatically. If you install eclipse-cdt manually, you may need to install JDK separately. Please do the following to confirm that you have java already installed:

```
% which java
% java -version
```

C Compiler GCC in Linux

Ubuntu distribution comes with gcc. Please do the following to confirm that you have gcc already installed:

```
% which gcc
% gcc -v
```

The C++ compiler g++ is not needed.

Run Eclipse

Please do the following to start the Eclipse in Linux:

```
% eclipse &
```

Eclipse CDT Documentation

http://www.eclipse.org/cdt/documentation.php

Eclipse CDT Tutorial

Start Eclipse CDT

After you have installed Eclipse CDT and GCC toolchain, please start the Eclipse.

Create New Project

Click on File -> C Project to create a new project. Please enter a project name and use the default workspace location.

Next is to select a Project Type. Make sure you choose Executable -> Empty Project, or Executable -> Hello World Project.

Please make sure you choose Linux GCC on Linux as the Toolchain. Most likely you only have one toolchain installed. However, in some cases, you might have a cross-compiler installed for other classes or projects and be sure to pick the right one.

Import Existing C Files

Select the project on the left pane (Project Explorer). Click on File -> Import. When prompted with "Select an import source", please select General -> File System.

Then use Browse to first find where the target file directory is. Then you need to select the individual .h and .c files to be imported.

Build the Project

Select the project on the left pane (Project Explorer). Then click on the Project pull down menu on the top task bar. Select either Build All, which will build all the projects in the Project Explorer, or Build Project to build the selected project.

Run the Project

After project is successfully built, click on the Run pull down menu on the top task bar and select Run. The console access can be found at the bottom pane of Eclipse.

Additional Information

http://wiki.eclipse.org/Getting_started_with_CDT_development
http://help.eclipse.org/luna/index.jsp?topic=%2Forg.eclipse.cdt.doc.user%2Fconcepts%2Fcdt_o_home.htm&cp=9
http://max.berger.name/howto/cdt/
https://www3.ntu.edu.sg/home/ehchua/programming/howto/EclipseCpp_HowTo.html

CodeBlocks Tutorial

https://www3.ntu.edu.sg/home/ehchua/programming/howto/CodeBlocks_HowTo.html

CodeLite Documentation

http://codelite.org/LiteEditor/Documentation