Getting Started with Unix & Preparing for C

Introduction

The final third of this course introduces C, a powerful programming language which will be very useful in your future. C works a little different than what you have been exposed to with MATLAB so far.

In MATLAB, you will write scripts and functions that you can call and run at the click of a button, all within the Matlab program itself. MATLAB code can be *interpreted* and run on the fly. Interpreted languages typically translate programs one statement at a time as they are run. C, on the other hand, is what is known as a *compiled* language. When writing in a compiled language, an extra step is needed in order to translate the code to something a computer can understand. This process is known as *compiling*, where all statements written in a program are converted into instructions that the underlying processor can understand and put into a separate file.

After creating C code, it will have the extension '.c'. The next step will be to compile your file, which will then be ready to execute!

You will continue to write code when we transition to C, but in a different syntax and in a somewhat different interface.

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Unix is an operating system that has formed the foundation of many common operating systems that you probably already know of – including MacOSX, GNU/Linux, and Sun Solaris. Later on for homework #3, we will introduce you to some basic Unix commands (some will seem familiar from MATLAB!) and have you play around with using what is referred to as the command line (similar to MATLAB's!). In the meantime, we want you to be set-up for this early in the course so that you're ready to tackle homework #3 and hit the ground running when we begin learning C.

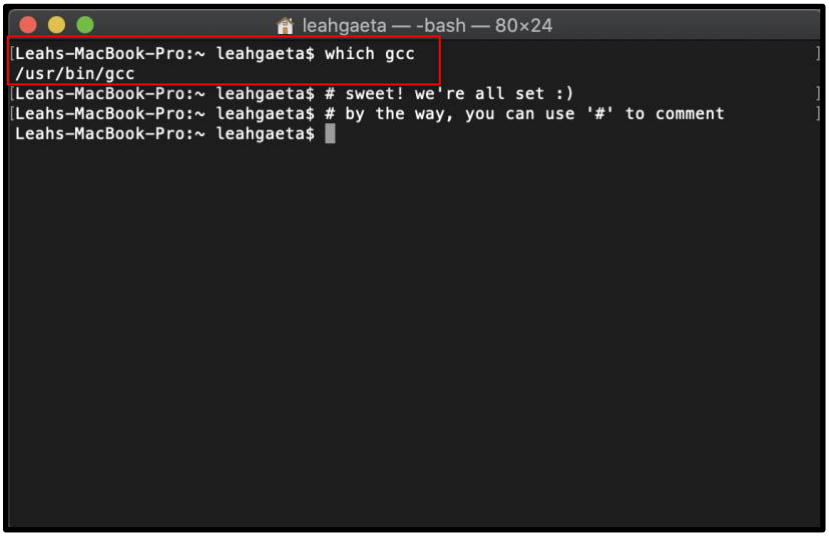
If you are a Mac user, please follow the directions on page 2.

Windows users, please follow the directions on pages 3 - 5.

… and if you want some extra fun, learn something new on page 6! ☺

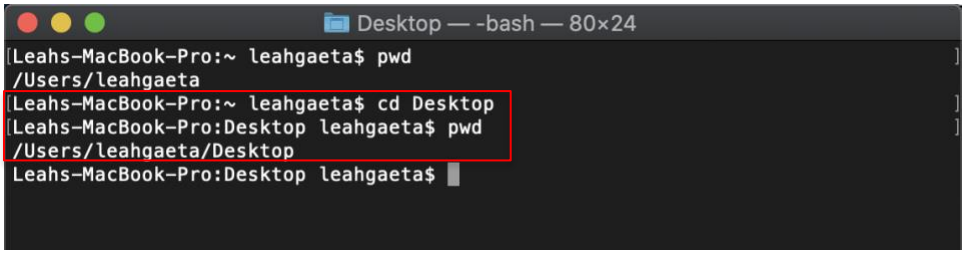
Getting to the Command Line & Terminal on a Mac

As a Mac OS X user, you automatically have access to the command line. You will need to launch the Terminal Application in order to access this. Go to Spotlight and search 'Terminal' if you don't know where to look. (Once you have Terminal open, we recommend right-clicking the app icon, selecting "Options," then "Keep in Dock." This will make it faster to open Terminal next time!)



It should look something like this! Also as a Mac user, you should automatically have GCC - the compiler we will be using - installed already. To check - type **which gcc** right into the command line in the terminal after the '$' that is already there and press Enter. If you see '/usr/bin/gcc', you are all set! If you do not see this returned - come see one of us in office hours so we can help you get it installed.

Navigating to your Desktop: For homework #3 you'll learn to navigate to a particular working directory, but for now let's practice navigating to the Desktop. After the '$' type **cd Desktop** then Enter (here the 'cd' means "change directory.") You can then type **pwd** which means "print working directory" to confirm that you're in Desktop! See the following image for reference.

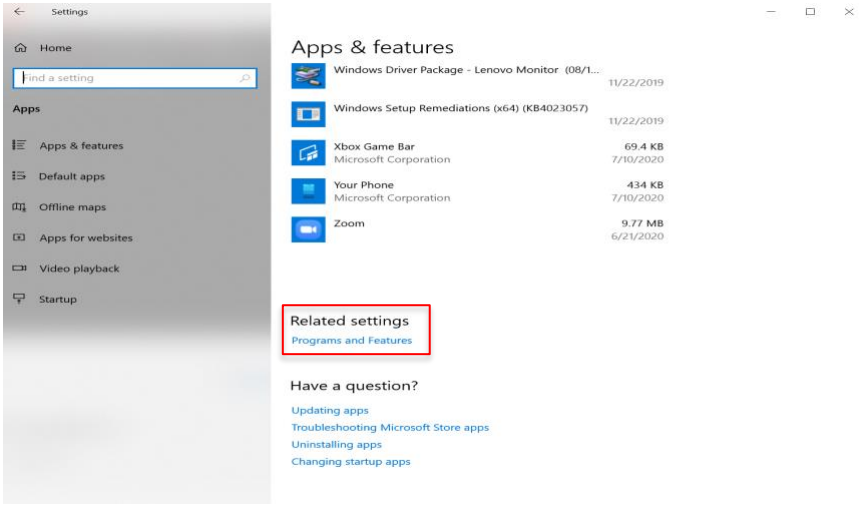


On Windows -

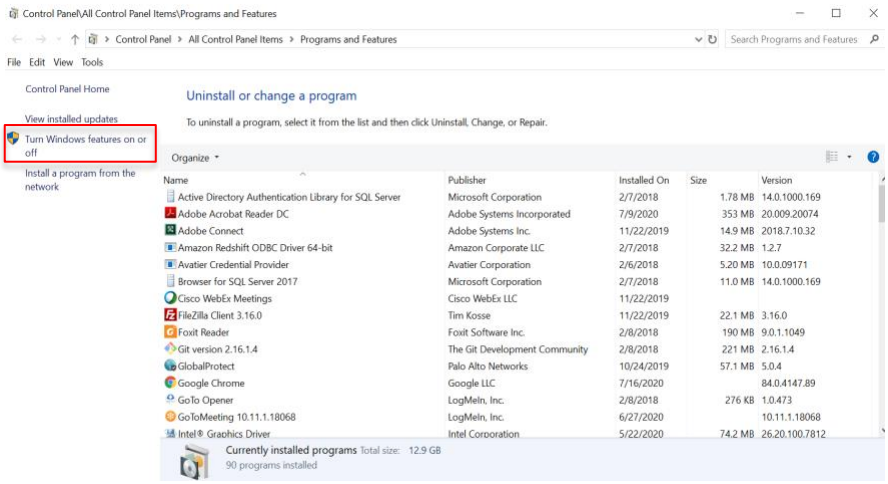
As a Windows user, you'll have to install an external terminal emulator on your computer. The terminal emulator we will use for this class is Ubuntu. Below are the necessary steps to download this program from the Microsoft store.

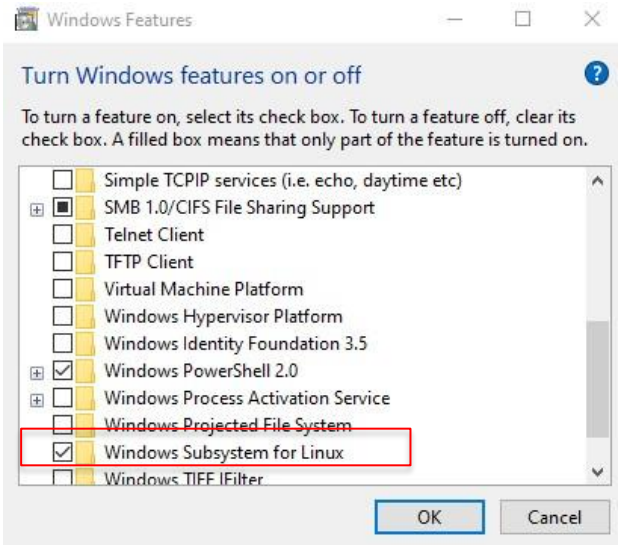
Downloading Ubuntu & Installing WSL:

1. First, you'll want to install the Windows Subsystem for Linux (WSL), which allows you to use the command line tools, text editors (such as SublimeText, Atom, Vim, etc.), and run Bash shell scripts written in C (as well as other languages). Go to "Settings" > "Apps" > and scroll to "Related Settings", then click "Programs & Features."

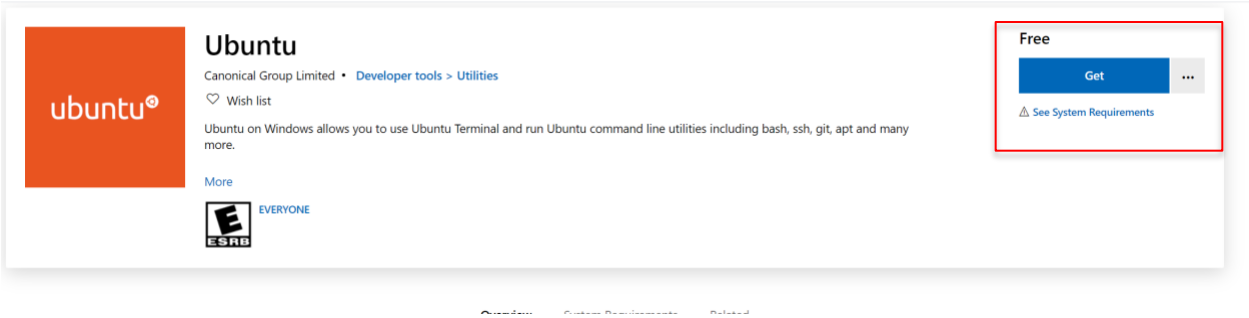


2. Select the "Turn Windows Features On or Off" and then check the "Windows Subsystem for Linux" option. Click "OK" and then "Restart now".

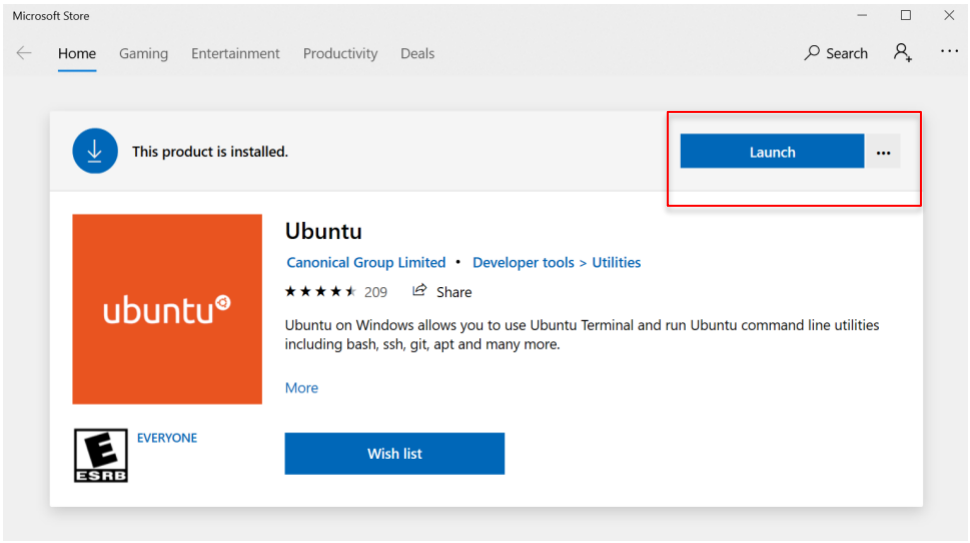




3. Once the restart is complete, click here to get Ubuntu from the Microsoft store. We call this a ‘distro’ which is just a distributed version of Linux software.



4. Select “Get” and then “Launch” once it is installed on your machine.



5. You'll then get a pop-up window of your Terminal. It may take a couple of minutes to install. (Note: If you are operating Windows 10 in S Mode, you will need to switch out as Ubuntu will not install. It's pretty easy; see this link.)
   It will create a username for this Linux distro, then press the Enter key. Next, create a password for the distro and press Enter. Finally, repeat the password you created and press Enter.

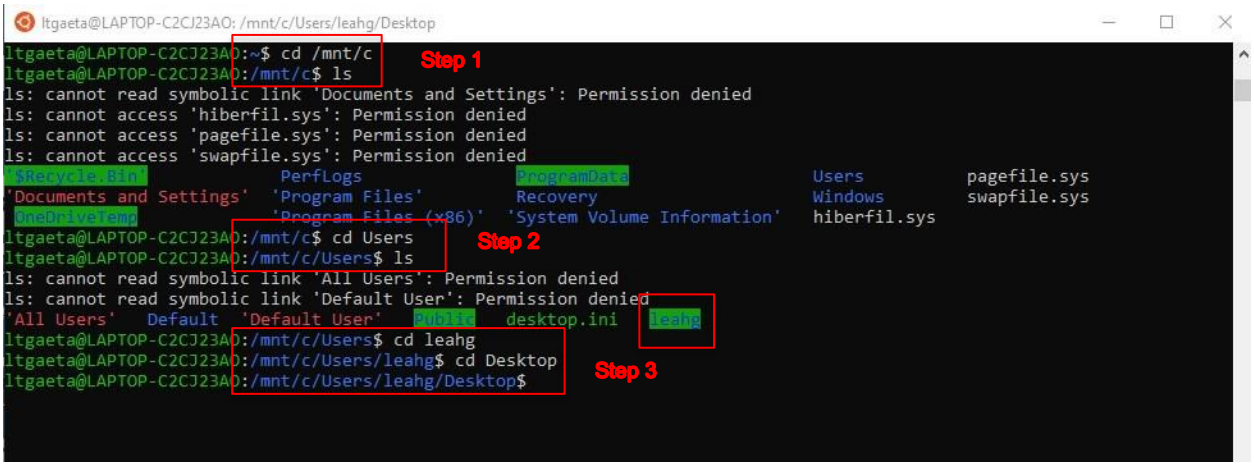
6. Now in your Ubuntu terminal type in **sudo apt update** after the '$' and then press Enter. You may need to enter your password again. Then, type in **sudo apt install gcc** and press Enter. If you're "Do you want to continue? [Y/n]" shows type 'y' then Enter.

You're now all set to use Ubuntu Terminal for Windows! Now, let's navigate to our Desktop.

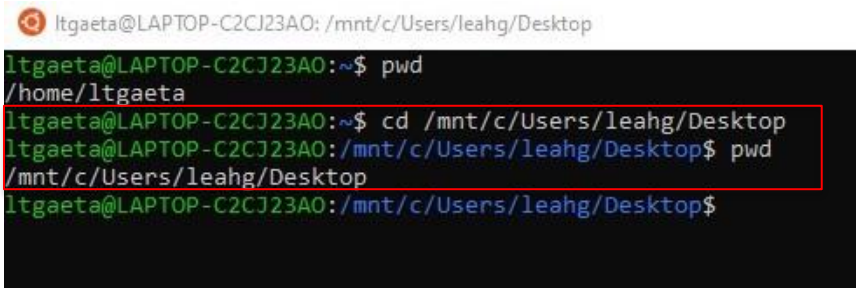
1. After the '$' type **cd /mnt/c** and then press Enter. After the '$' type **ls** (that's a lowercase 'l', as in 'list') which will list all files in the working directory. ('cd' means change directory)

2. Again, after the '$' type **cd Users** then Enter, then **ls** and Enter.

3. Find your username (highlighted in bright green). Next type **cd your_username** then Enter after the '$.' Finally, type **cd Desktop** and press Enter. You've successfully navigated to your Desktop! See the below image to help guide you through.



For next time, you can just type the following to navigate faster to the Desktop (replace with your username of course.) Then confirm by typing **pwd** which means "print working directory."



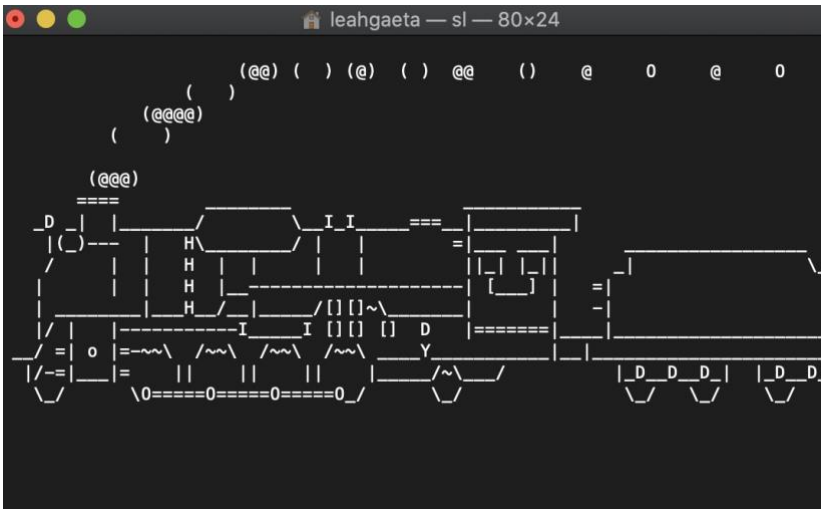
Just for Fun!

Install Homebrew here and follow the directions in Terminal. Then type in the following for some fun stuff ☺

A choo-choo train that moves across the window!

For MacOS: type in **brew install sl** after the $, then Enter. Then type in **sl** and press Enter.

For Linux: type in **sudo apt-get install sl** after the $, then Enter. Then type in **sl** and press Enter.



A friendly cow!

For MacOS: type in **brew install cowsay** after the $, then Enter. Then type in **cowsay moooo!**

For Linux: type in **sudo apt-get install cowsay** after the $, then Enter. Then type in **cowsay hi!**