CS 162 LAB #1 – Setup, and Review

Each lab will begin with a brief demonstration by the TAs for the core concepts examined in this lab. As such, this document will not serve to tell you everything the TAs will in the demo. It is highly encouraged that you ask questions and take notes.

In order to get credit for the lab, you need to be checked off by the end of lab. You can earn a maximum of 3 points for lab work completed outside of lab time, but you must finish the lab before the next lab. For extenuating circumstances, contact your lab TAs and the instructor.

This lab is worth 10 points total. Here's the breakdown:
- Part 1: Getting Setup   (Individual work: 2 pt)
- Part 2: C++ Basics: Conditionals and Loops   (Group work: 3 pts)
- Part 3: Review References and pass-by   (Group work: 3 pts)
- Part 4: Submit your work to TEACH   (Individual work: 2 pts)

Show your completed work and answers to the TAs for credit. You will not get points if you do not get checked off!

(2 pt) Part 1: Getting Setup

In part 1 of this week's lab, you'll make sure you're able to access the College of Engineering servers using SSH to edit, compile, and run code on those servers. Your TA will help you with this if you're not able. **This is an individual exercise: you'll do it on your own, not in a group.** Here's what you must do:

1. Log into TEACH to see if you have an ENGR account. **If you do not have an ENGR account**, then you will need to create one by clicking on the link at the bottom of the login page that says: Create a new account (Enable your Engineering resources).
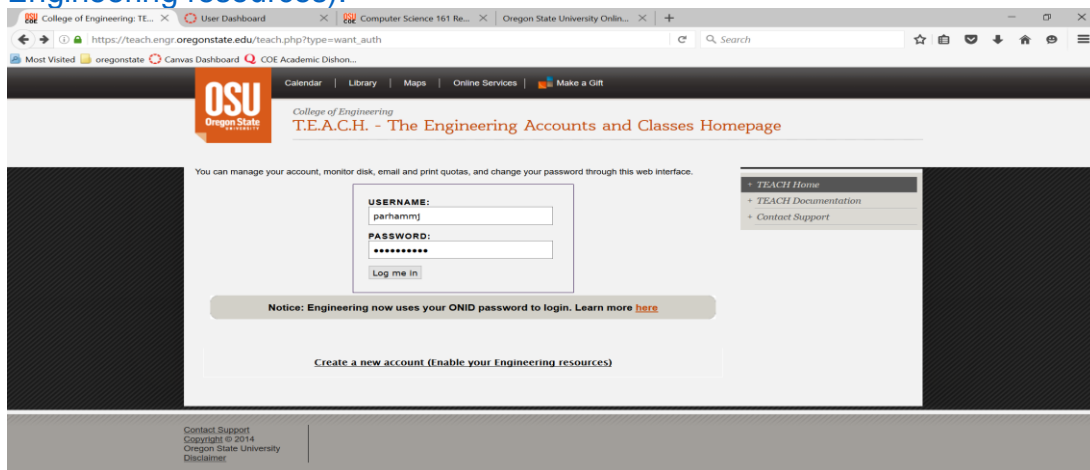
2. Use your favorite SSH program (e.g. [PuTTY](#) or [MobaXterm](#) on Windows or the `ssh` terminal command in MacOS or Linux) to log in to the server `flip.engr.oregonstate.edu`.

   However you're most comfortable, upload/download the start code for this lab onto `flip.engr.oregonstate.edu`:
   https://classes.engr.oregonstate.edu/eecs/spring2023/cs162-010/labs/lab1.zip

3. There are a few different ways you can do this. One possibility is to download the file onto your laptop and then upload it to `flip.engr.oregonstate.edu`, e.g. using SCP command or a program like MobaXterm or [Filezilla](#). Another possibility is to use the `wget` terminal command directly from your SSH connection to `flip.engr.oregonstate.edu`.
   i.e., wget https://classes.engr.oregonstate.edu/eecs/spring2023/cs162-010/labs/lab1.zip

4. Unzip the lab1.zip using
   `unzip lab1.zip`

5. Change directory into `lab1`. Either on your local machine or using a terminal-based editor like vim or emacs within an SSH session to `flip.engr.oregonstate.edu`, edit `test.cpp` to replace the phrase "PUT YOUR NAME HERE" on line 9 with your actual name. If you made this change locally, make sure to upload your edited file to `flip`.

6. Once you have the `test.cpp` program edited and stored somewhere on `flip.engr.oregonstate.edu`, use the g++ compiler to compile it on `flip` into an executable called `test`:
   `g++ test.cpp -o test`

7. Run your compiled program:
   `./test`

That's it for Part 1! Now you know you can compile and run code on the ENGR servers, so you should be all ready to work on the programming assignments for this course.

(3 pts) Part 2: C++ Basics: Conditionals and Loops

In part 2, you will be working **in a group** to review the conditionals and loops in C++.

1. Files needed for this part: `ex1.cpp, ex2.cpp`
2. As a group, without executing the programs, trace though the code and determine the purpose of `function()` in each program.

a. For ex1.cpp, you may write down the program output in a text file or a document
b. For ex2.cpp, you may use a few test inputs, and write down their corresponding outputs in a text file or a document
3. Individually, add comments to the program to explain what the program is trying to accomplish:
4. Compile and run both ex1.cpp and ex2.cpp, see if the outputs you wrote down match the actual output.

(3 pts) Part 3: C++ Reference

In part 3, you will be working **in a group** to review the references in C++ and the difference between pass by value vs. pass by reference.

Files needed for this part: sentence.cpp
Revisit References:
Suppose our main function is as follows:

```cpp
int main() {
    string sentence;

    get_sentence(sentence);
    cout << sentence << endl;

    return 0;
}
```

Based on the function call above, notice that `get_sentence()` is a void function because we don't do anything with the function call (it is on a line by itself). It has a string as an argument in the function call (between the parenthesis is sentence). Therefore, the prototype for this function is as follows.
void get_sentence(string s);

You may have already noticed that we can use the string inside the function, but we cannot change the value of the string inside the function. In order to change the value of the string inside the function, we need to add an ampersand (&) in front of the parameter.
void get_sentence(string &s);

Before moving on, here are a couple of questions to think of:
1. What is indeed passed into the function if an ampersand (&) is added in front of the parameter?

2. Can we change the value of the string inside the function if we change the function prototype to:

void get_sentence(string &sentence);

3. What is the difference between pass by value vs. pass by reference?

(2 pts) Part 4: Submit your work to TEACH

Since you have to upload your assignments from your local computer or the ENGR server to TEACH, then we should practice now☺ It is easy to upload files from your local computer to TEACH, as long as you remember where you save it!!! ☺ However, it is not as easy for you to upload files from the ENGR server to TEACH.

Two ways to upload the file from ENGR to TEACH.

- **Transfer Files from ENGR to local computer**

You can transfer the file to your own computer, then upload it to TEACH:

Windows Users: MobaXterm already has a sftp client installed. Notice the windowpane on the left with folders and files. You can drag and drop a file to your local desktop to select on TEACH.

Note: If you are unable to download the file from MobaXterm by "drag and drop", you need to Map a Network drive instead. See "Map a Network drive" below.
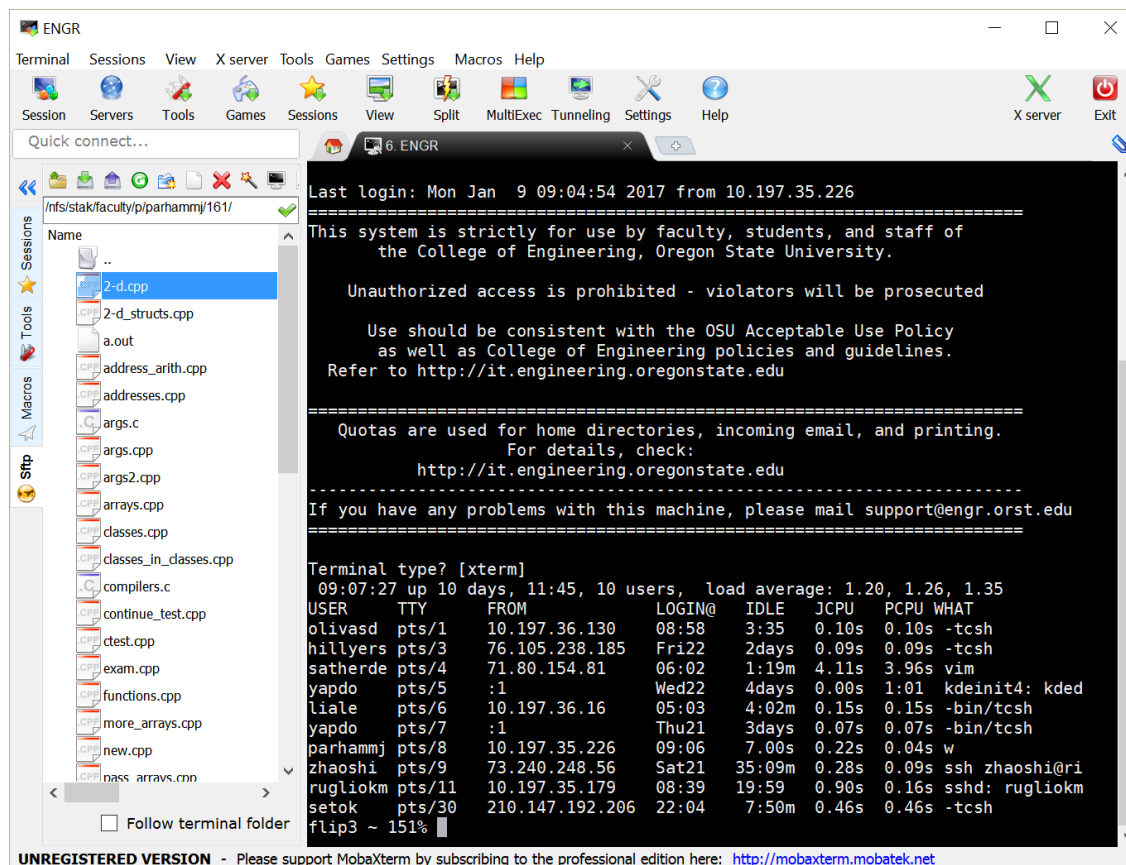
MacOS Users: (See "Map Network Drive" section below)

Step1: Map a Network Drive (OSU WiFi Required)

You can map a network drive and choose the file from the mapped network drive. This allows you to directly work off the server as if it were a disk drive on your computer. You can follow these instructions to map a network drive for Windows or MacOS.

Windows:

https://it.engineering.oregonstate.edu/accessing-engineering-file-space-using-windows-file-sharing

MacOS:

https://it.engineering.oregonstate.edu/accessing-engineering-file-space-using-os-x-smb-command

Step 2: Setup VPN

If you want to use the drive that you set up in step 1 off campus, you must download the **Cisco VPN Client** from OSU:
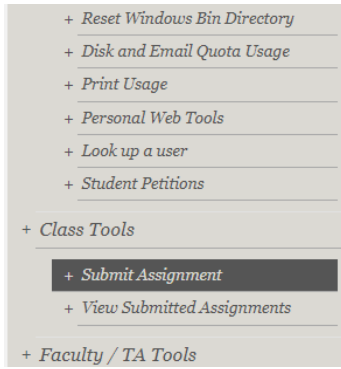
VPN setup for Mac

VPN setup for Windows

VPN setup homepage

**NOTE: You may want to put these programs on a flash drive to carry with you in your backpack. This will help you get around from any computer without needing your laptop all the time.

Submit your files to TEACH

1. Connect to TEACH here:
   https://teach.engr.oregonstate.edu/teach.php?type=want_auth

2. In the menu on the right side, go to **Class Tools -> Submit Assignment**.

+ Reset Windows Bin Directory
+ Disk and Email Quota Usage
+ Print Usage
+ Personal Web Tools
+ Look up a user
+ Student Petitions

+ Class Tools

    + Submit Assignment
    + View Submitted Assignments

+ Faculty / TA Tools

3. Select **CS 162 Lab1** from the list of assignments and click "**SUBMIT NOW**".

4. Select your files and click the Submit button.

(Note: you will not get points if you don't get checked off with a TA!!!)