COP 3363: Spring 2021
Working with the CS Programming Servers

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For this class, we will be working on a Unix environment. Ideally, you will be working with the Computer Science Programming servers. This guide should (hopefully) explain everything you need.

1 Required Software

You will need work with a command line terminal for this class.

- If you have a Mac or a Linux machine, you already have the terminal installed. You can just call up the terminal and begin.
- If you have a Windows machine, please download and install Tectia. Tectia is available from the CS Systems group website (`https://system.cs.fsu.edu/newuser/ssh-how-to/`) for free, if you're connected to a FSU network (FSUSecure, FSUGuest, etc.).
- If you're not on the FSU Campus, the link to download Tectia.zip will ask for credentials. Please enter the following:
  Username: sshcs
  Password: letmedownloadit
- You will need an account with the CS Department to access the programming servers, You can set up an account once you have the commandline terminal software. The instructions are here: `https://system.cs.fsu.edu/newuser/cs-account-setup/`)
- It would also help to have a File Transfer Client. Tectia comes with a File Transfer Client. If you're using a Mac, you can get Cyberduck. You can also use command line SCP or SFTP. This document will explain how.

2 Connecting to the Programming Server

2.1 Using a Mac or Linux Machine

Macs come with a pre-installed g++ compiler and various command line text editors. In theory, you could just develop using the Mac terminal, but we would like you to at least test your programs on the CS programming servers.

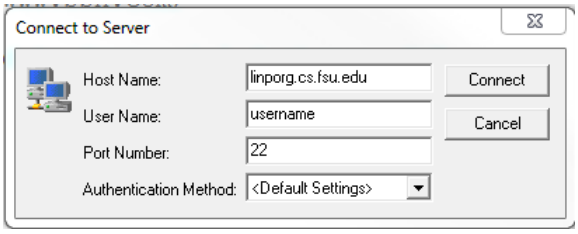
Logging on to the servers

- Call up the "`terminal`" program. It will show you a window with a prompt lie we see in class.
- At the prompt, type
  `ssh username@linprog.cs.fsu.edu`
  Here, "**username**" is your CS username. It will ask for your password. Type in the password for your CS account. YOU WILL NOT SEE THE PASSWORD BEING TYPED IN.
- The prompt should now read something like "`username@linprog.cs.fsu.edu`". You are now connected to the CS programming server.

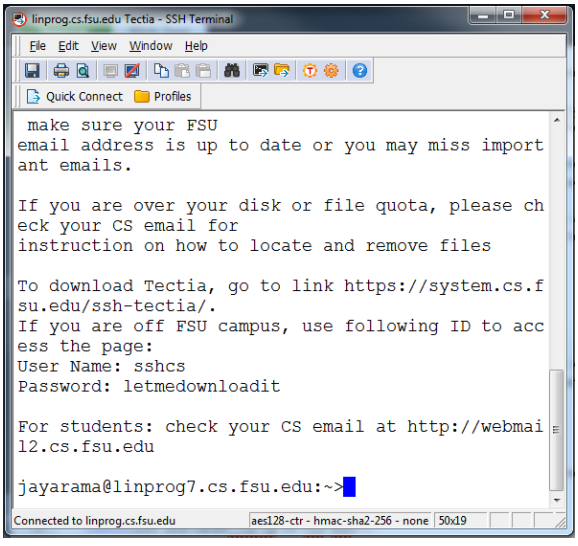
2.2 Using a Windows Machine

With Windows, we will use Tectia (or a similar ssh client software).

- Click on "Quick Connect". On the window that pops up, enter "`linprog.cs.fsu.edu`" for Host Name and your CS username under Username. Make sure the port number says 22.



- Click on "Connect". The very first time, it will ask if you would like to save the host key. Choose Option 3.
- A pop up window with an "Authorized Users Only" warning will appear. Click OK. It will now ask for your password. Enter your CS password.
- It will show you the following window. You are now connected.

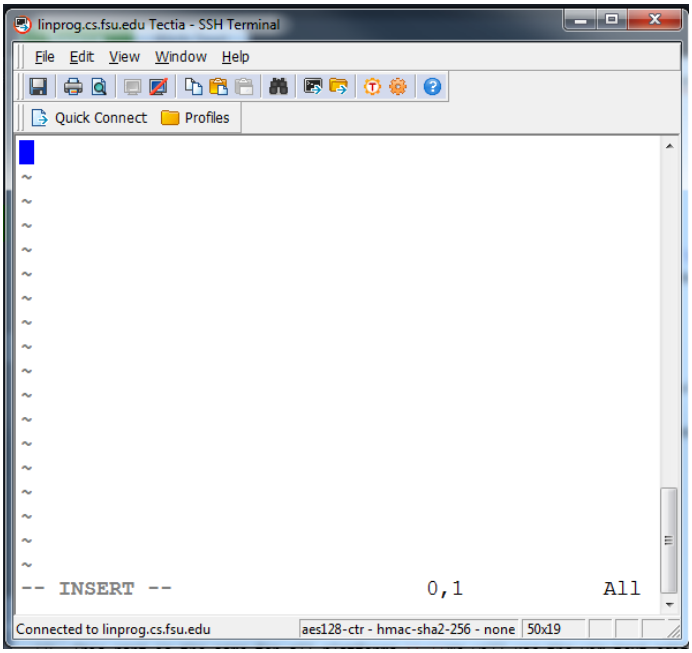


3 Writing Your Program

This part is the same for all platforms.

We will use the vim text editor for writing our program, We have been doing this in class as well.

1. Move into the folder where you want to create the file.
2. Open the file using the vim text editor. At the prompt, type
   `vim filename`
   Make sure
   - The file name begins with a letter, does not contain spaces, and does not contain special characters besides underscore.
   - The file has a ".cpp" extension.
   - For example, '`file1.cpp`", or "`my_first_file.cpp`" are acceptable. "`9-5-2019.cpp`" or "`program`" are not.
   - Don't worry if the file does not already exist, vim will create it for you.
3. Once the file is open, hit "i" to enter "Insert Mode". It should look like the image below.

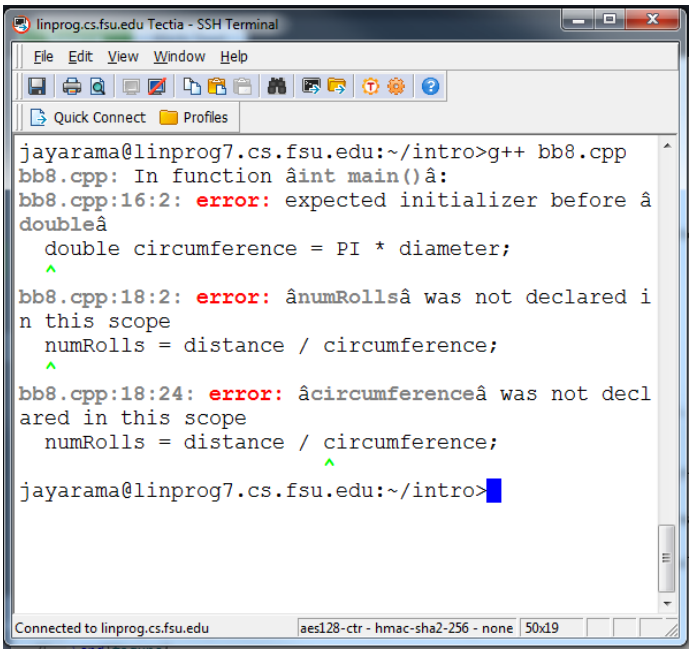


4. Finish typing up the program. Then hit the Esc key to exit insert mode, and then enter ":wq" to save and exit vim.

4 Compiling and Running Your Program

This part is also the same on all platforms.

1. Once you have saved your program, compile the program. To compile, we will use the g++ command.
2. On the prompt, type "`g++ filename`"
3. If there were no errors, the prompt will appear immediately below the command.
4. If the program had errors, they will be displayed here. The image below, shows compiling the program with a few errors.



5. If your program has errors, open the file again, fix the errors, save the file and exit vim. Compile the program again. Repeat this process until it compiles with no errors.
6. **Running** - Once the program has been compiled, you can run it.
7. If we compile just using "`g++ filename`", g++ would have generated an executable called "`a.out`".
8. To run the program, type "`./a,out`" at the prompt.
9. **Exiting**: Once you're done compiling, running and testing your program, you can terminate the connection to linprog by typing "`exit`" on the prompt.
10. **Compiling into a specific executable**:
    - If you want to compile the program into a specific executable, instead of a.out, compile with the g++ -o option.
    - At the prompt, type "`g++ -o executableName filename`"
    - BE CAREFUL WHEN YOU DO THIS. IF YOU CHANGE THE ORDER OF EXECUTABLE AND FILENAME, OR USE THE SAME NAME FOR BOTH, THE PROGRAM WILL BE OVERWRITTEN AND YOU WILL NOT BE ABLE TO RECOVER IT.
    - Once the program has been compiled, you can run it with "`./executableName`"

5 Moving your file to your own computer

To turn in your program, you need to move it to your local machine. Here's how you do it.

5.1 On a Mac

It is recommended that you get a File Transfer Client to easily move files through drag and drop) between the server and you computer. Cyberduck is free, and easy to use. You can get Cyberduck here: `https://cyberduck.io/download/`

When connecting to linprog on cyberduck, make sure you choose "Secure File Transfer Protocol (SFTP)" under the protocol dropdown list. The hostname is "`linprog.cs.fsu.edu`", the username is your CS username, and the password is the password to your CS account.

5.2 On a Mac or Linux Terminal

You can use command line SFTP to move files. In this section, when we say "remote machine", we mean linprog, and when we say "local machine", we mean you computer.

SFTP is Secure File Transfer Protocol. Its primary purpose is to enable file transfers between a local machine and a remote machine where you have an account. Here, we list some basic SFTP commands, which can be used once you have connected to the server using SFTP:

- **put** – copy a file from the local machine to the remote machine
- **get** – copy a file from the remote machine to the local machine
- **ls** – get a directory listing on the remote machine
- **cd** – change your current working directory on the remote machine
- **lls** – get a directory listing on the local machine
- **lcd** – change your current working directory on the local machine

Note here that the ls (list files) and cd (change directory) commands work exactly as you are used to them from a regular unix shell. Except when you use them as-is, you are requesting a listing or a change directory operation on the remote machine – i.e. the machine you just sftp-ed into. If you want to get a directory listing or change directories on the local machine, use the lls (local list files) and lcd (local change directory) commands instead.

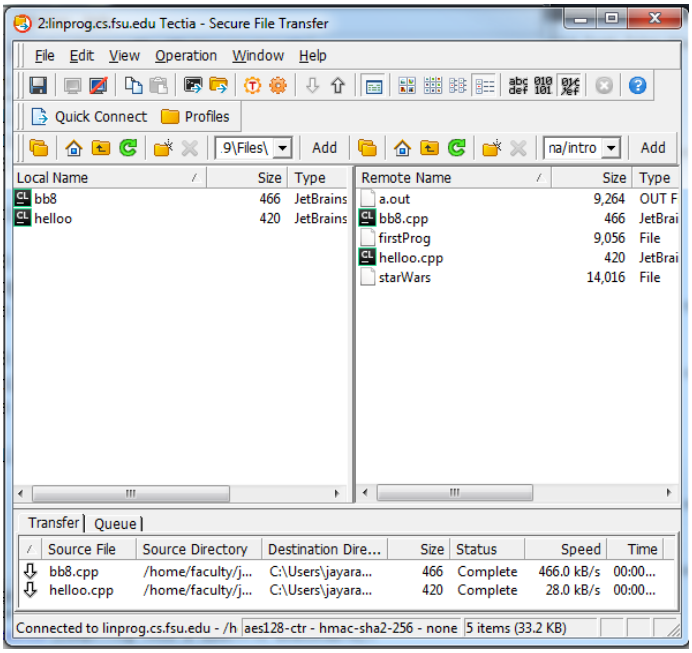
To move a file from linprog to you computer, do the following:

1. Open your terminal. if you already have a terminal window open, connected to linprog using ssh, make sure you terminate the connection by typing "`exit`" on the prompt first. This will take you to your local machine. Navigate into the directory where you want to save the file, like your Desktop (using cd).
2. PLEASE MAKE SURE YOU EXIT THE SSH CONNECTION TO LINPROG BEFORE CONNECTING WITH SFTP. OTHERWISE, YOU WILL OVERWRITE YOUR FILE WITH AN EMPTY FILE AND IT CAN'T BE RECOVERED.
3. Then type "`sftp username@linprog.cs.fsu.edu`", where "username" is your CS username.
4. It will ask for your password. Type it in, Again, you will not see it being typed in.
5. Use cd to navigate to the directory where your program is located. Then, type "`get filename`."

6. For example, to move the file "example.cpp" to your computer, type "`get example.cpp`"
7. Once you're done, terminate the SFTP connection by typing "`exit`" at the prompt.

5.3 On Windows

- Tectia comes with the File Transfer Client. On the Tectia Window, once you're connected to the server, click on the Folder with the Arrow icon on the Tectia toolbar. This will open the file transfer window, as shown below.



- You can now drag and drop files between the programming server and your computer.