COP 3014: Fall 2021
A Guide to Using CLion

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1 CLion

CLion is a comprehensive C++ Integrated Development Environment (IDE) developed and maintained by JetBrains. It is very intuitive and easy to use. For this class, we will use CLion for all of our work.

1.1 Applying for a Student License

In order to use CLion, you need to apply for a license. Go to `https://www.jetbrains.com`. From the menu on the top of the screen, choose **Learning Tools** and then **Free Licenses for Students and Teachers**. You should see the following screen:

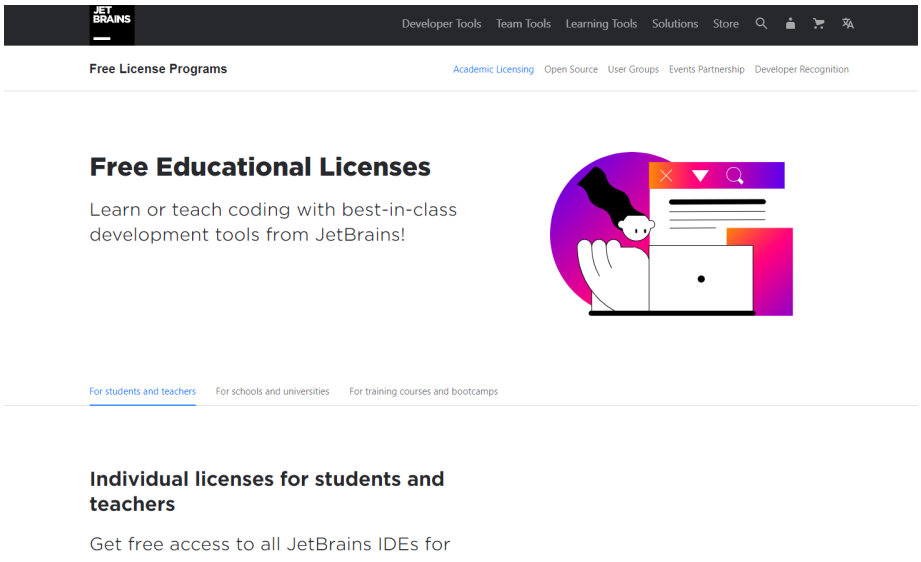

Figure 1: JetBrains Academic Licences

Choose the tab that says "For Students and Teachers", scroll down and click on the blue "Apply Now" button. You will now see a form to apply for a Student License, as shown below. Please fill out the form and use your FSU email ID.

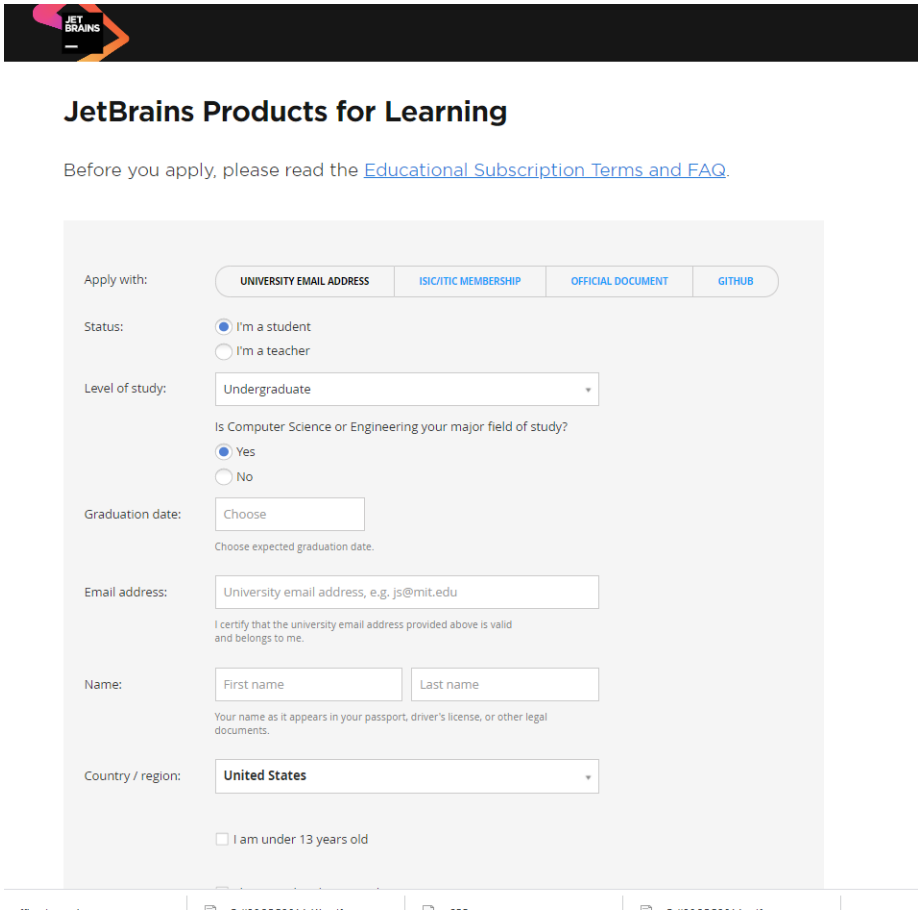

Figure 2: JetBrains Academic Licences

Click on "Apply Now".
You will get an email from JetBrains in a few minutes, asking you to confirm the request for a student license.

Once you confirm the request, they will send you another email, asking you to create a JetBrains Student Account. This takes about 5 minutes. Once you create the account, you should see a page with your Key.

2 Installing CLion

You can now download and install CLion. Download CLion from `https://www.jetbrains.com/clion/download`. The page will automatically show you the right installer for your Operating System. Download the installer.

2.1 For Macs/Linux Machines

If you have a Mac or a Linux Machine, you already have a lot of the prerequisite programs needed for CLion. All you need to do is a couple of simple steps.

2.1.1 Mac OSX

Once you have downloaded the dmg file, use Finder to open the Applications folder. Move the file you just downloaded from the Downloads folder into the Applications folder. You're all set. Move on to Section 3.

2.1.2 Linux Machines

Download the tar from the website. Unpack it and then navigate to the `bin` directory and run `CLion.sh`. Once this is done, move on to Section 3.

2.2 For Windows Machines

Download the installer from the website and run it. It will start up the installation wizard.

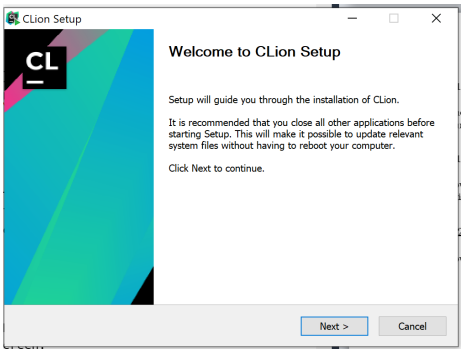

Figure 3: Installation Wizard

It will now ask you to activate your CLion License. Put in the Username and Password for the JetBrains account you created. Click on Activate

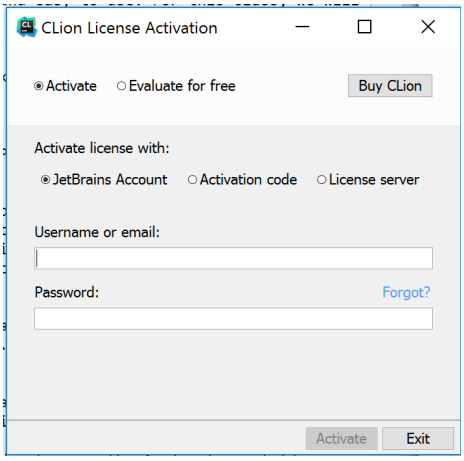

Figure 4: Activate your license

Click on Next. It will ask you to choose a location to install CLion. Go with the default option.

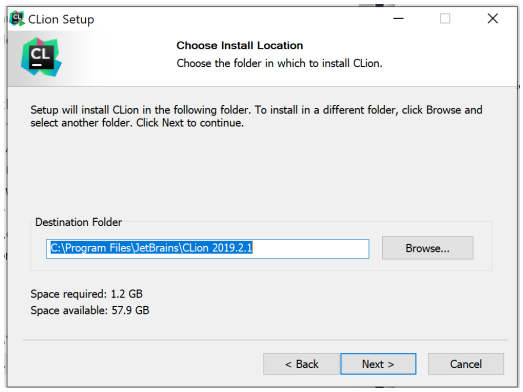

Figure 5: Installation Location

Click on Next. It will ask you to choose file associations. Check all the boxes.

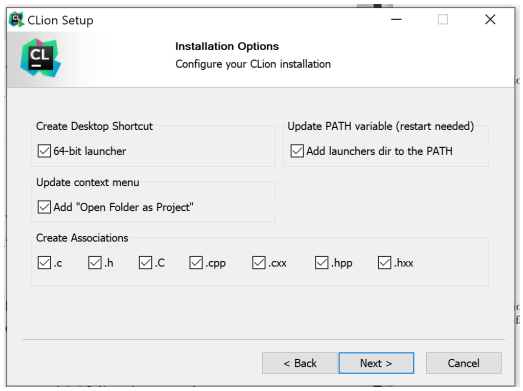

Figure 6: Choosing File Associations

Click on Next. It will ask you to choose a Start Menu Folder. Go with the Default option, which is "JetBrains". This will create an entry for JetBrains and then CLion on the Windows Start Menu.

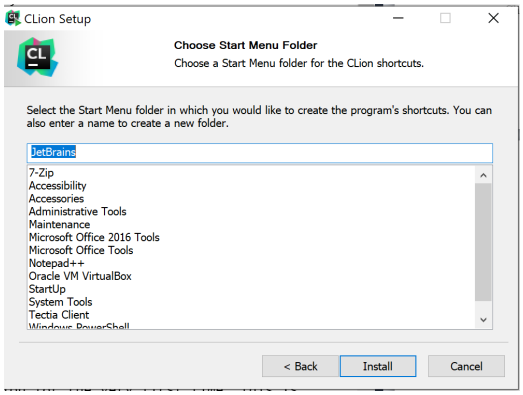

Figure 7: Choosing File Associations

Now click on Install. This will complete the setup. It will ask if you want to run CLion. Say Yes.

3 Running CLion for the first time

Once you have installed CLion, you can run it. There is a bit of setup to do when we run CLion for the very first time. This is mostly the same on all platforms. For Windows, there is an extra setup to get a Unix based C++ compiler installed, but the CLion Wizard will guide you through it.

When we first run CLion, it will ask if we would like to import settings. You will see the following dialog box.

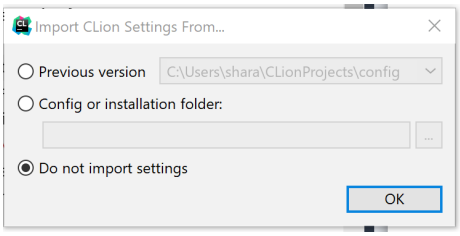

Figure 8: Importing Setting

Choose "Do Not Import Settings". Click OK. It will ask you to accept the User Agreement. Read through the user agreement, if you desire to do so, and then check the box confirming that you Agree. Click on "Continue".

It will ask if you would like to send usage statistics to JetBrains. Choose whichever option (Send/Don't Send) that you are comfortable with.

It will ask you to choose a theme. Pick one that you like.

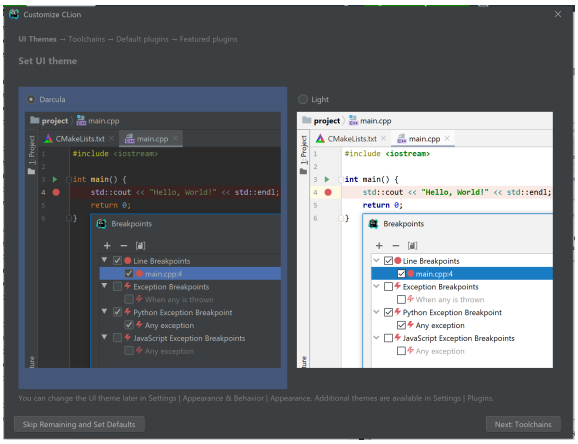

Figure 9: Choose a Theme

Click on Next: Toolchains. This is where the paths diverge for Mac and Windows machines.

3.1 For Macs / Linux Machines

Macs and Linux Machines most likely already have working installations of the C++ compiler, the make utility and a version of the GDB debugger. CLion should be able to automatically detect these. You should see a screen that looks like this, with different numbers next to CMake and GDB:

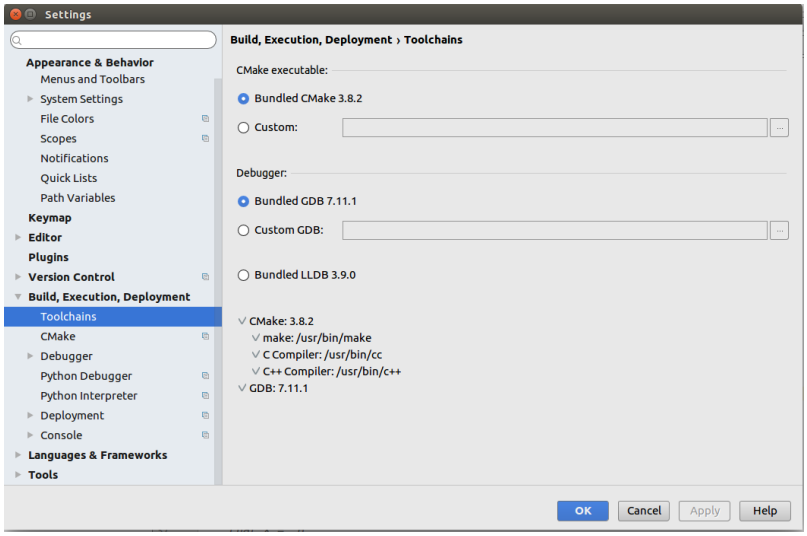

Figure 10: Toolchains

Click on OK. Your setup is now complete.

3.2 For Windows Machines

Windows machines do not come with an installation of the required programs, so you should see a screen that looks like this:

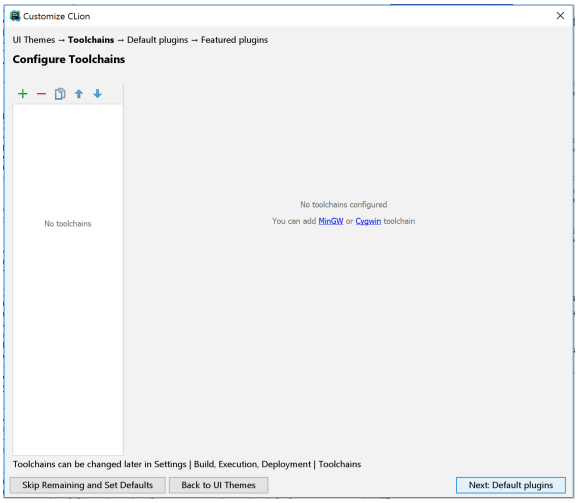

Figure 11: Toolchains

Click on the link that says CygWin. You should now see this:

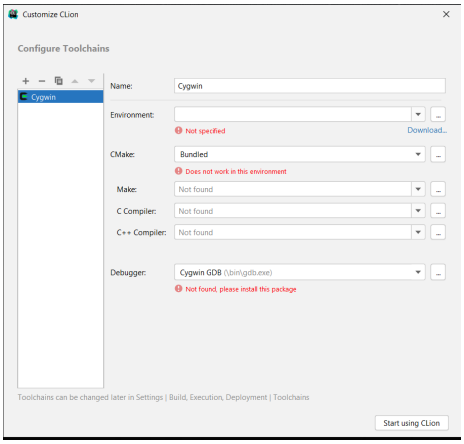

Figure 12: Toolchains

Click on Download. It will open the following screen on your web browser.

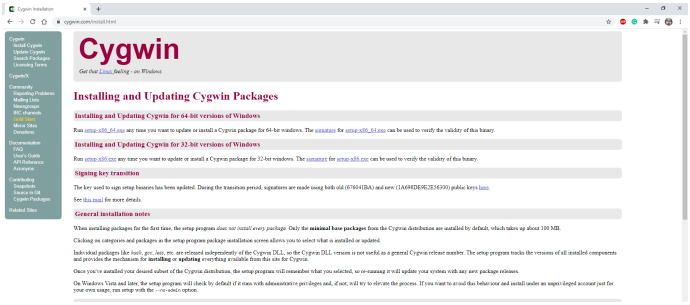

Figure 13: CygWin Download Page

click on “setup-x86-64.exe”. This will download the installer. Run the installer. This might require Admin privileges.

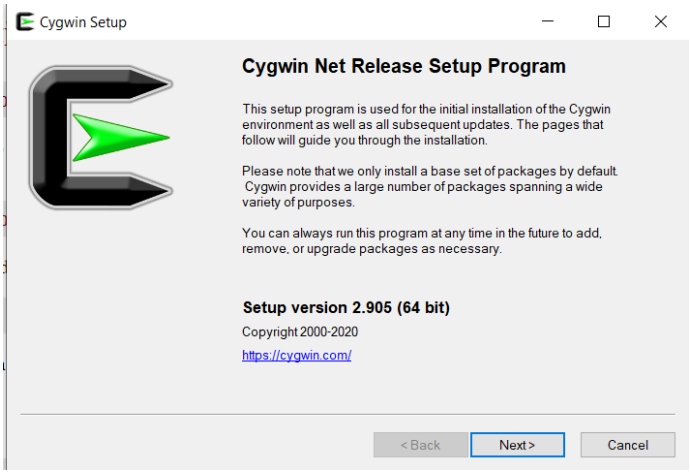

Figure 14: Installing CygWin - Launch Installer

- It will ask you for installation options. Choose “Install from the Internet”. Then click on Next.

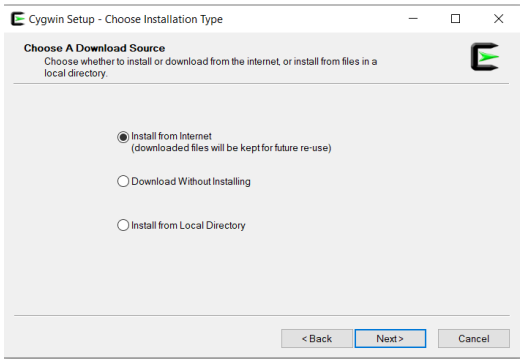

Figure 15: Installing CygWin - Install from the Internet

- It will ask you to choose a directory for installation. Go with the default option (something like C:\CygWin64). It will also ask you to choose users. Choose “All Uses”. Click on Next

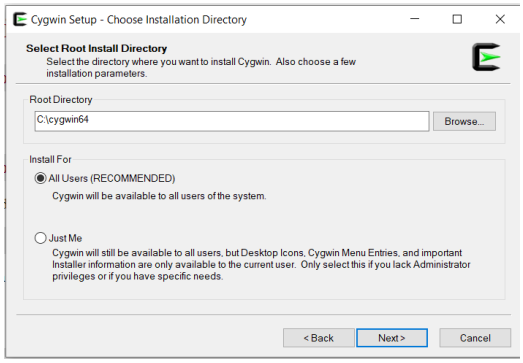

Figure 16: Installing CygWin - Install for All Users

- It will ask you where to store the Downloaded files. Go with the default option (most likely your Downloads folder). Click on Next.
- On the next screen, choose “Use System Proxy Settings”. Click on Next.

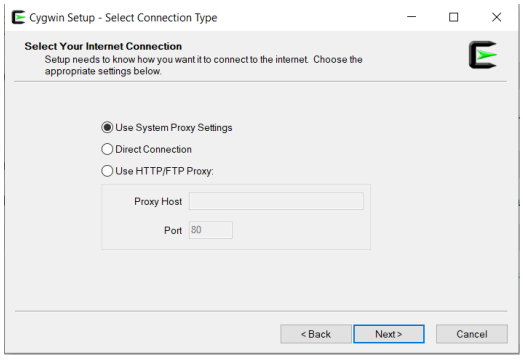

Figure 17: Installing CygWin - Proxy Settings

- The next screen will show you a list of "mirrors". You can pick any of them. Click on Next.

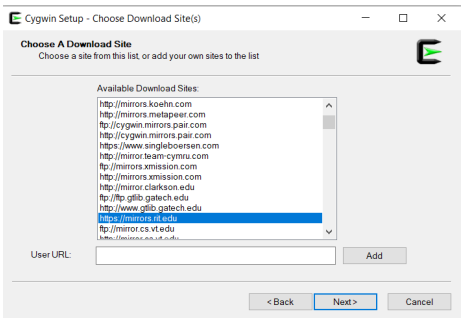

Figure 18: Installing CygWin - Choose a Mirror

It will ask you to choose which packages to install. To keep things simple, we're going to install the 6 required packages for C++. You should be seeing the following screen.

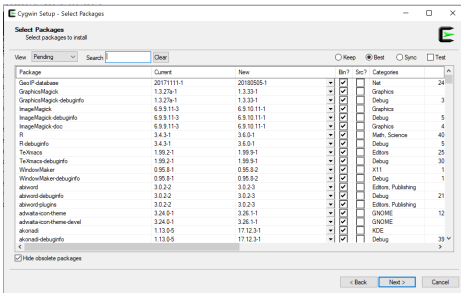

Figure 19: Installing CygWin - Packages

- Go to the Drop-down box on the top left (which probably says "Pending") and choose "Full".
- Search for `gcc-core`. You will see the following screen. Click on the drop down box on the line for `gcc-core:`. Choose a number like 9.3. Sometimes, you might get multiple version numbers. Pick the latest (largest) version number that doesn't say "Test".

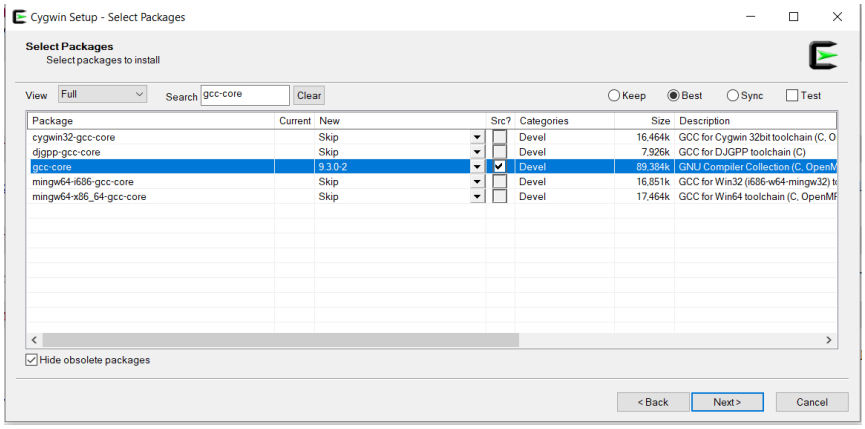

Figure 20: Get gcc-core

- Clear the search bar. Search for `gcc-g++`. You will see the following screen. Click on the drop down box on the line for `gcc-g++`. Choose a number like 9.3. Sometimes, you might get multiple version numbers. Pick the latest (largest) version number that doesn't say "Test".

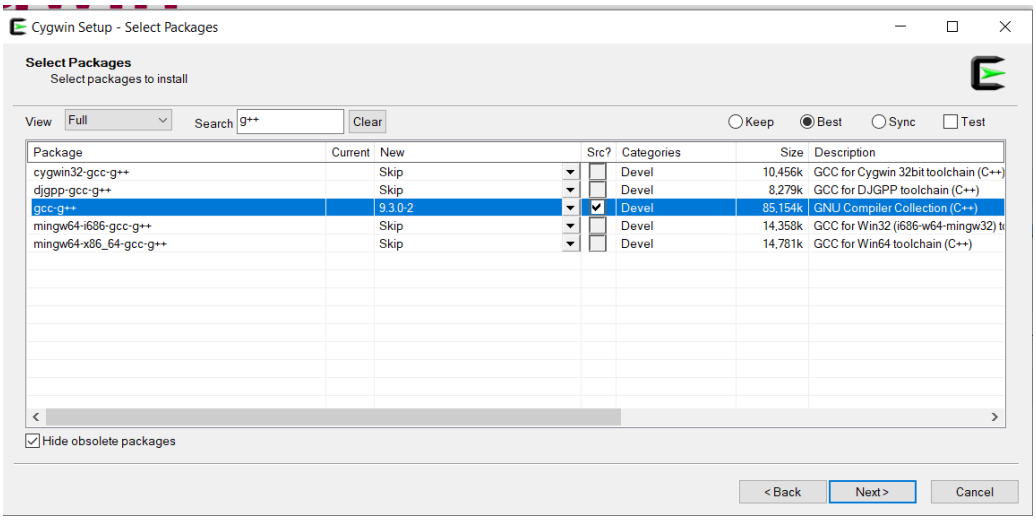

Figure 21: Get gcc-g++

- Clear the search bar. Search for `libgcc`. You will see the following screen. Click on the drop down box on the line for `libgcc1`. Choose a number like 9.3. Sometimes, you might get multiple version numbers. Pick the latest (largest) version number.

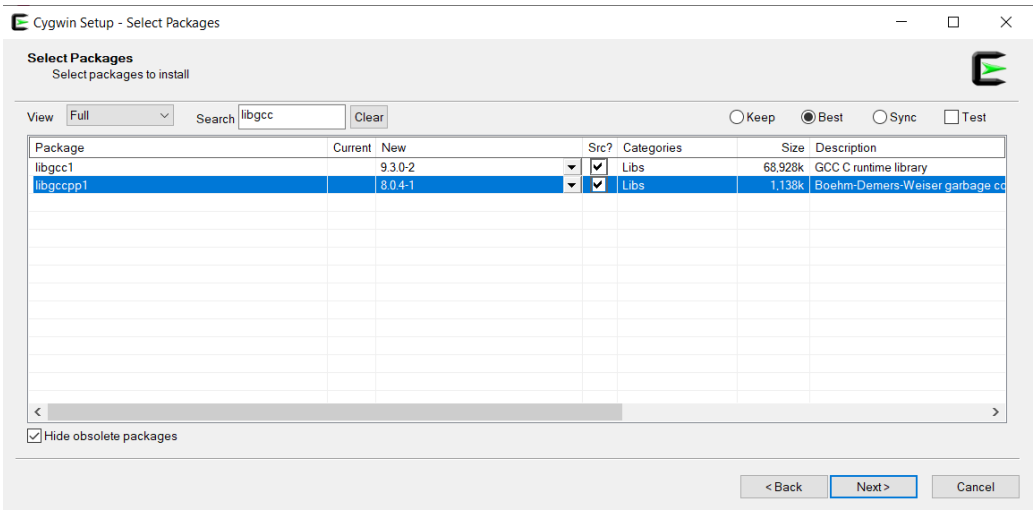

Figure 22: Get libgcc

- Clear the search bar. Search for `make`. You will see the following screen. Click on the drop down box on the line for `cmake`. Choose a number like 3.14.

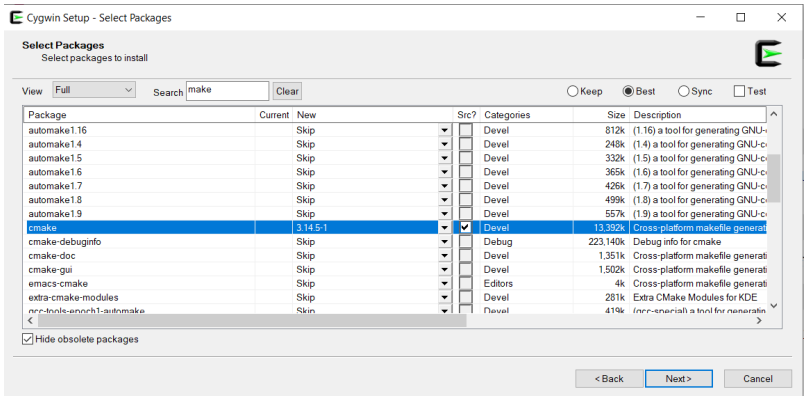

Figure 23: Get cmake

- Scroll down a little bit until you see `make`. Click on the drop down box on this line and choose a number like 4.3.1.

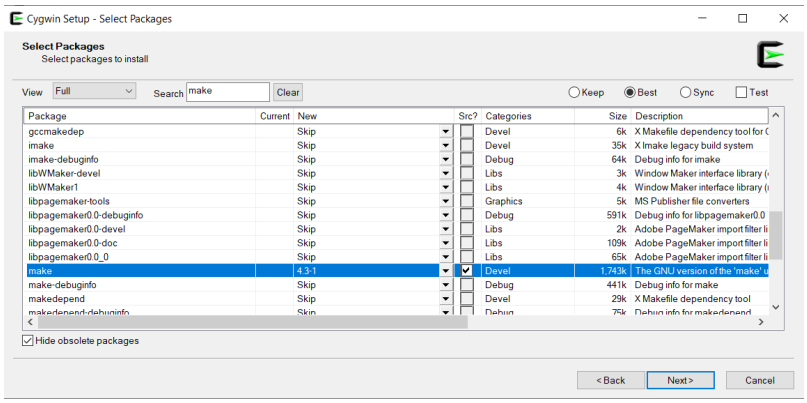

Figure 24: Get make

- Clear the search bar. Search for `gdb`. You will see the following screen. Click on the drop down box on the line for `gdb`. Choose a number like 8.3.1.

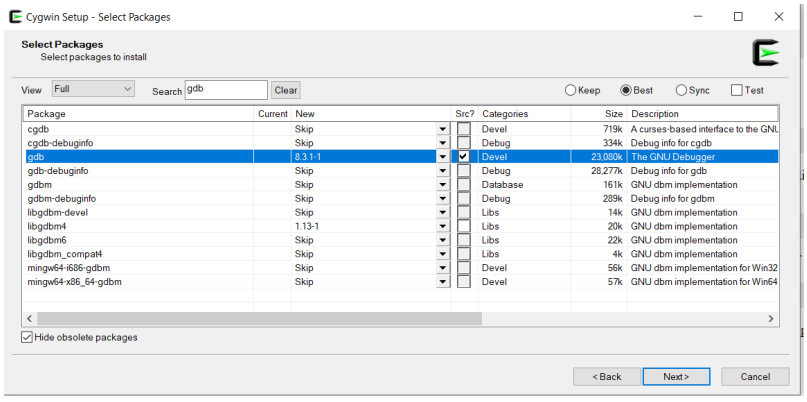

Figure 25: Get gdb

- Clear the search bar. Then click Next. You will see the following screen where CygWin will show you a list of dependencies. Just click Next. CygWin will now install the new packages we have specified. This should not take too long, only about 10 minutes. On the final screen of the CygWin installation wizard, click Finish.

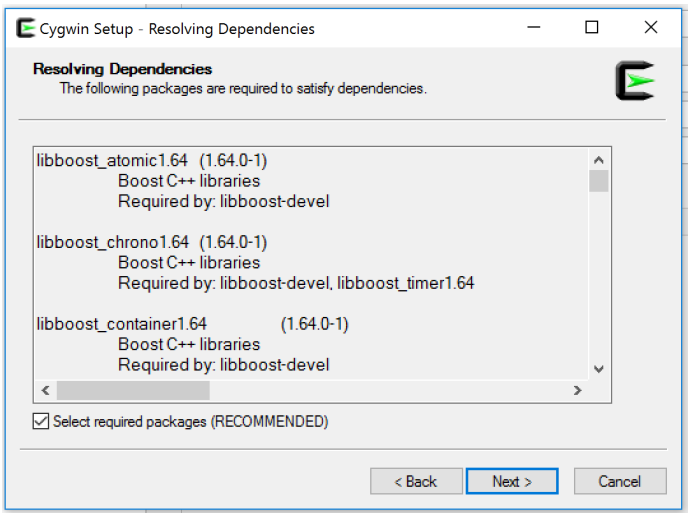

Figure 26: Dependencies

- Back in CLion, the software will now try and detect the new libraries. After about a minutes, it should have automatically detected all the libraries. Click OK.

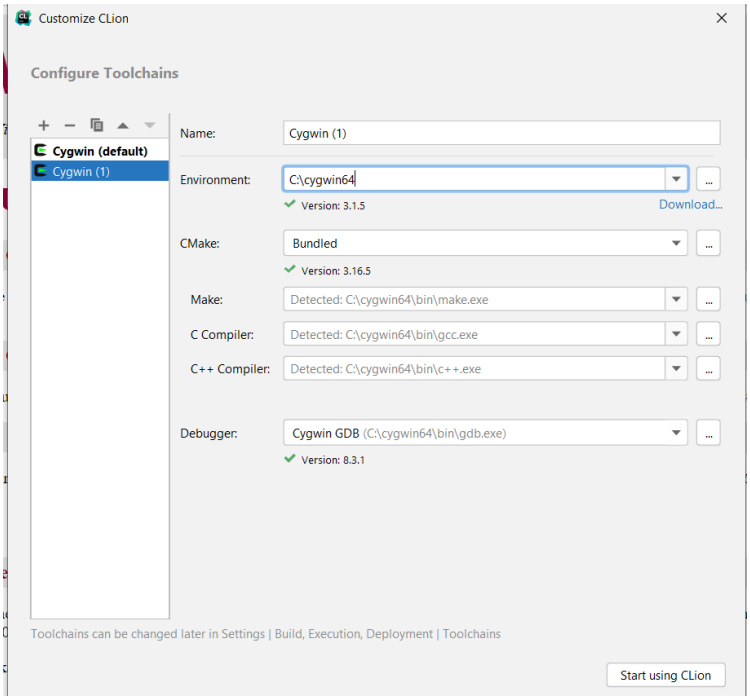

Figure 27: CLion detecting CygWin Libraries

CLion will now start up for the first time, and resolve all the external dependencies and symbols. This takes about 5 minutes. You are now good to go.

4 Creating a Project

In order to write and run a C++ program on CLion, you should first create a project. Open CLion and then choose File ->New Project.

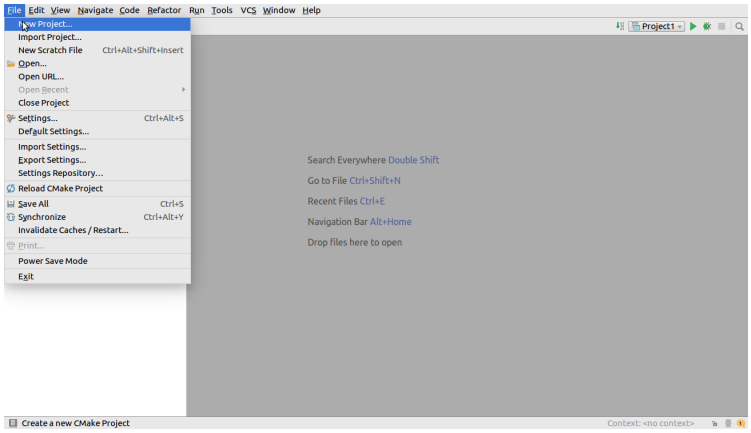

Figure 28: Opening a New Project

You will now see a screen where it asks you to choose where to save the project. Also, the project is called "untitled" by default. Change it to a name of your preference, and if requires, a location that you can easily remember. By default, it is saved in a Folder called `CLionProjects`.

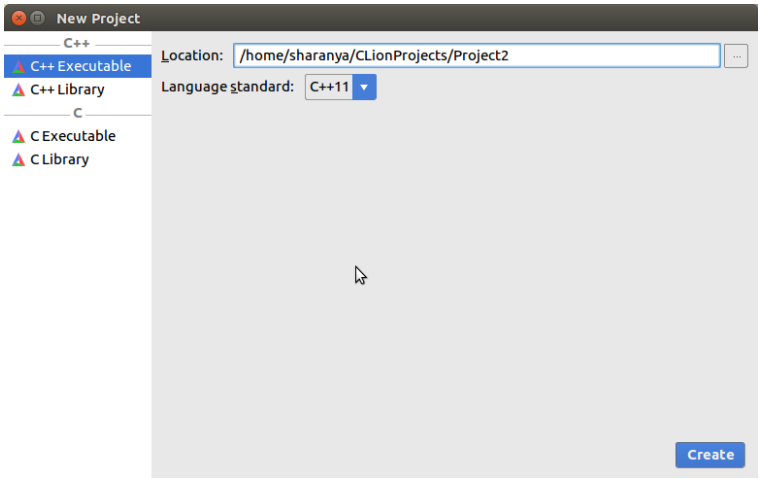

Figure 29: New Project Name and Location

Click on Create. This will open a new project with a default program stub. This program is called "main.cpp". We will usually require to to give specific names to your programs. This requires you to refactor the project. Right Click on "main.cpp" in the Project Explorer Window on the left and choose Refactor ->Rename.

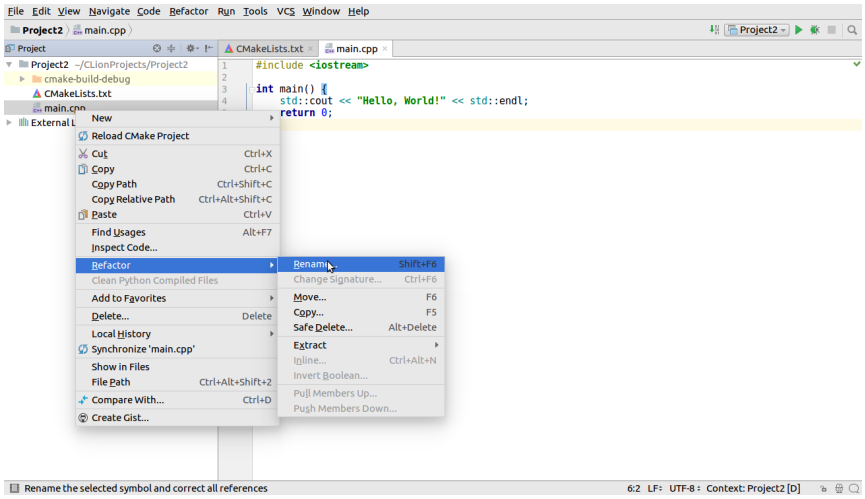

Figure 30: Renaming the file

In the following window, give the file its required name.

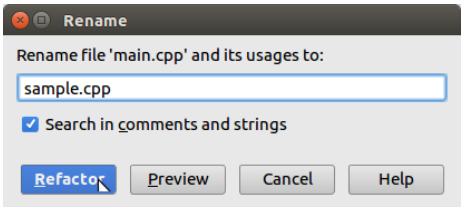

Figure 31: Renaming a file

Click on Refactor. You are now ready to start writing your program.

5 Running your program

Once you have completed writing your program, save your work by choosing File ->Save. Before running your program, you have to Build your project. This compiles your program and if your program is error free, it gets your program ready for execution. Choose Run ->Build. You should see something like the following screen:

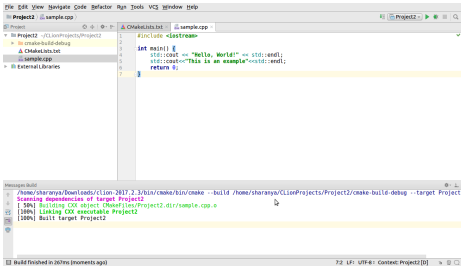

Figure 32: Building the Project

The console window on the bottom of your screen will show you the Build results. If your program

has errors, they will be listed there. If the program compiles fine, it will say “100% Built Target” followed by the Project name.

Once your project builds successfully, you can run it. Choose the project on the drop down list in the top right corner and then click on the green arrow button next to it. Your output will be displayed on the bottom of the screen in the console window.

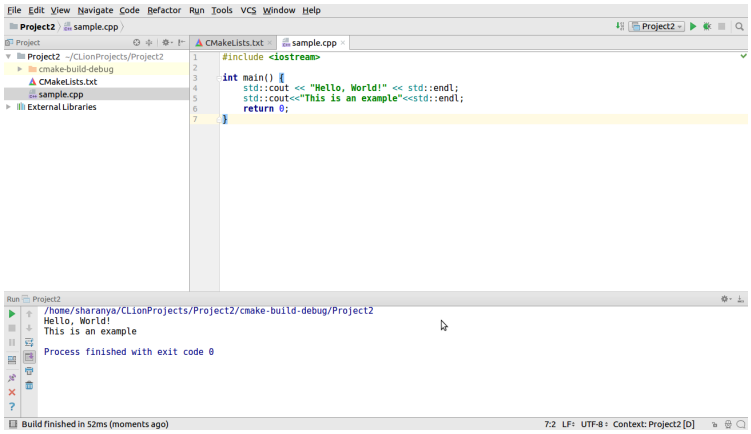

Figure 33: Running the Project

6 Opening an Existing Project

To open an existing project choose File >Open. In the dialog box that pops up, navigate to the location where you saved the project. Click on the project name and then click OK.

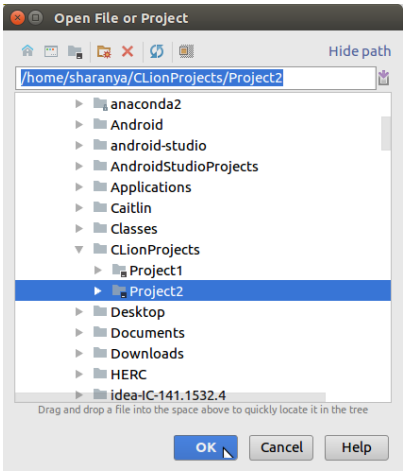

Figure 34: Running the Project

If you already have a project open, CLion will ask you if you would like to open this project in the same window or in a new window. You can choose either option.

7 Turning in your assignment

CLion would have created a folder where it places your projects by default. Alternatively, you might have specified a folder to put your project in when you created it. Navigate to the folder on Finder (Mac) or Folders (PC) and you will see a Folder for your Project. Opening that will show you all the source files under that project. The .cpp file is the file you need to turn in through Canvas

8 Troubleshooting

This section can be used for troubleshooting the most common errors you might encounter while installing CLion. If your problem persists after trying this, please contact your instructor/ TA for help.

8.1 On Windows

8.1.1 Issue with CLion not finding the CygWin Debugger

One likely issue with the CygWin installation is CLion being unable to locate the `gdb.exe` file for the Debugger. It will say "File Not Found", even if the file is manually located. This happens with a certain combination of Windows and CLion versions. To resolve this issue, please use the following steps.

1. Open CLion. Go to File ->Settings. Choose **Build, Execution, Deployment**. and then choose **Toolchains**.
2. Add a new Environment by clicking on the "+' button and then choosing "MinGW".

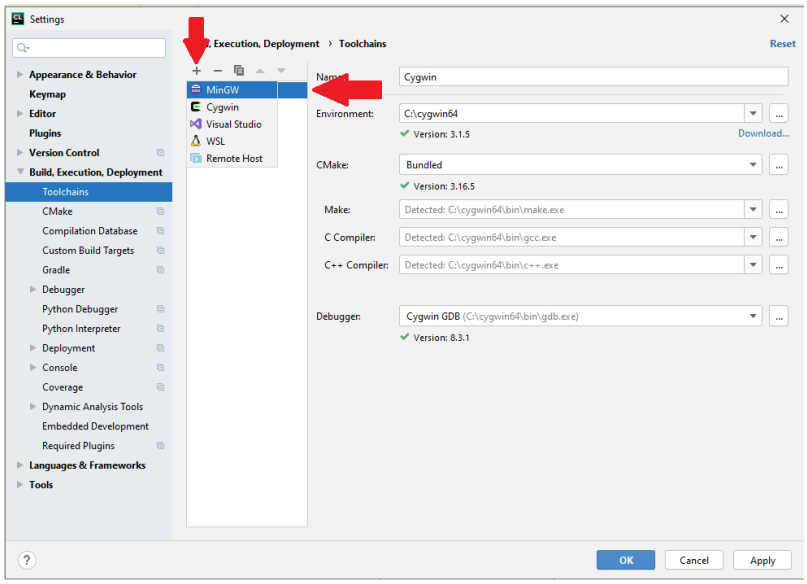

Figure 35: Create a MinGW Environment

3. This will create a new Environment, and all the field will be empty again. Click on the Download link. This will open a page on your browser, shown below. Click on "Sourceforge".

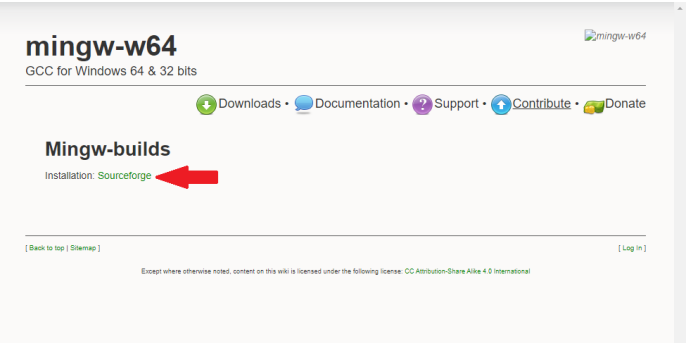

Figure 36: Download MinGW

4. This will open another webpage. It will start downloading the installer after 5 second. Open the installer after it was downloaded. You will see the following screen.

Figure 37: MinGW Installer

5. Click “Next”. This will show you the Settings. Under “Architecture”, choose “x86_64”. Click “Next”.

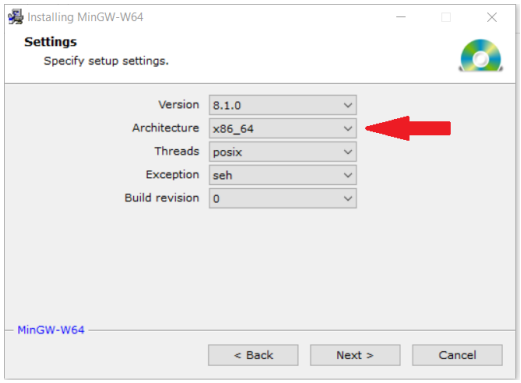

Figure 38: MinGW Installer

6. This will show you the location of the installation. You may change it if you wish to do so, but you may also leave it as-is. Click “Next”.

7. This will install MinGW. Unlike CygWin, MinGW doesn't ask you to choose specific packages. So, this might take a while - up to 25 minutes.
8. Once the installation is complete, click "Next" and then click "Finish".
9. Go back to CLion. It still wouldn't recognize MinGW. Click "Cancel" and exit CLion.
10. Restart CLion. Repeat Steps 1 and 2 of these instructions. CLion will now recognize the MinGW environment and automatically find the required files, as shown below. Also, click on MinGW under the Environments box and click on the Up Arrow above it to make it the default Environment.

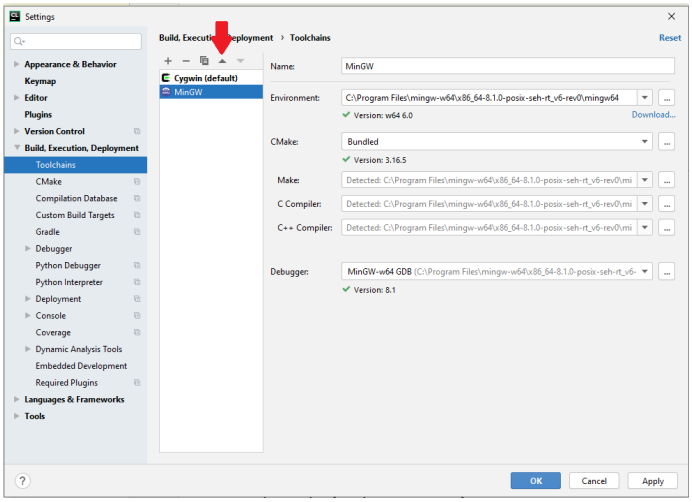

Figure 39: CLion Toolchains

11. You can now resume at Step 4 on Page 13.

8.1.2 Other ways to Troubleshoot the issue above

There are also a few other workarounds for the issue above.

1. **Install an older version and update**: You can install an older version of CLion, which doesn't result in this issue, and then update CLion, retaining the older settings. Any version released in 2019 or Version 2020.1 would work. Older versions of CLion can be found at https://www.jetbrains.com/clion/download/other.html
2. **Install CygWin first, and then install CLion**. Uninstall CLion. Go through the steps to get the correct libraries on CygWin first. Then install CLion again. This time, it should be able to recognize all the files without issues.

8.1.3 Other issues on Windows

The other common issue on Windows is a glitch in the CygWin installation when a few critical dependency files are not downloaded. Please go through the following steps:

1. Open CLion. Go to File ->Settings. Choose **Build, Execution, Deployment**. and then choose **Toolchains**.
2. You will see "Download" link on the right. Click on the link.
3. Go through the steps for the CygWin installation again (the list below Figure 11), until you see the packages screen. However, this time, choose a different mirror.

4. Go to the Drop-down box on the top left, that says "Pending" and choose "Full".
5. Go through the process of installing the 7 libraries again, but this time, make sure you get version numbers that are higher than the ones you have installed. Otherwise, go back and choose a different mirror. Keep doing this until you see higher version numbers, and install the latest versions.
6. Restart CLion. The old project would have been opened under the old settings. Open a new project. You should now be able to run it without issues. The very first time you build a project with CLion, it will take a little time to index all the libraries. Please wait until the little arrow on the top right goes green before running.

8.2 On a Mac

CLion usually installs without trouble on a Mac. Some older versions of OSX might have issues due to the different versions of the C++ compiler. OSX does not allow you to directly update the Clang tools needed for this, but you can re-install the XCode developer tools, which will get all the updates you need indirectly. Please go through the following steps.

1. Open the Terminal.
2. Re-install XCode developer tools by typing
   `xcode-select --install`
   and press Enter.
3. Accept the XCode user license. On the terminal, type
   `sudo xcodebuild -license`
   Enter the admin password for the computer when prompted. Please not that you will not see the password being typed in. This is ok. Type in the password and press Enter.
4. The license will then be presented on screen. Hit the space bar to scroll through the text. When you get to the end of the text, you'll be prompted to enter "agree". Type this in and hit Enter.
5. Restart CLion, click on File ->Reload CMake Project and everything should work.