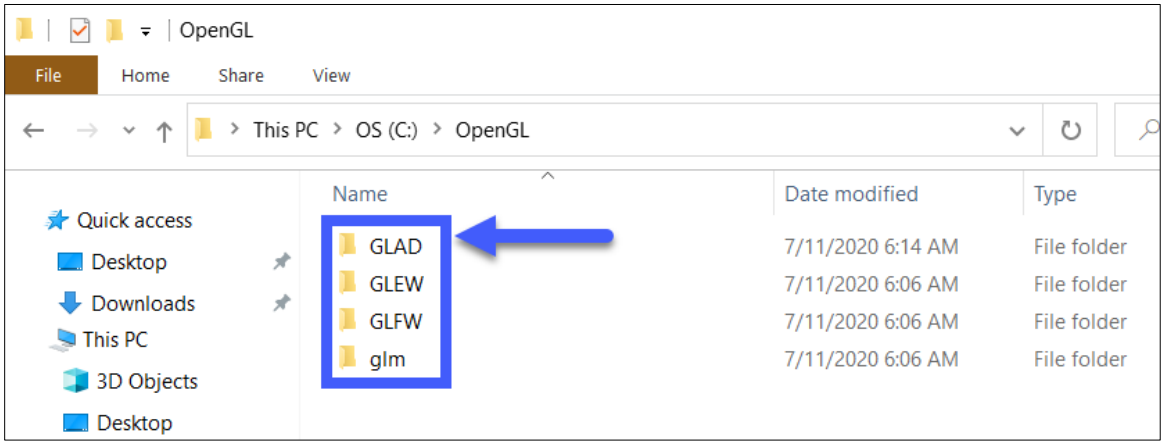
CS 330 Module One Setup Guide

Overview

This guide will walk you through the necessary steps to set up the Modern OpenGL libraries that you will need to use while completing this course. Please ensure that you have already installed Visual Studio on your own machine before proceeding to set up OpenGL.

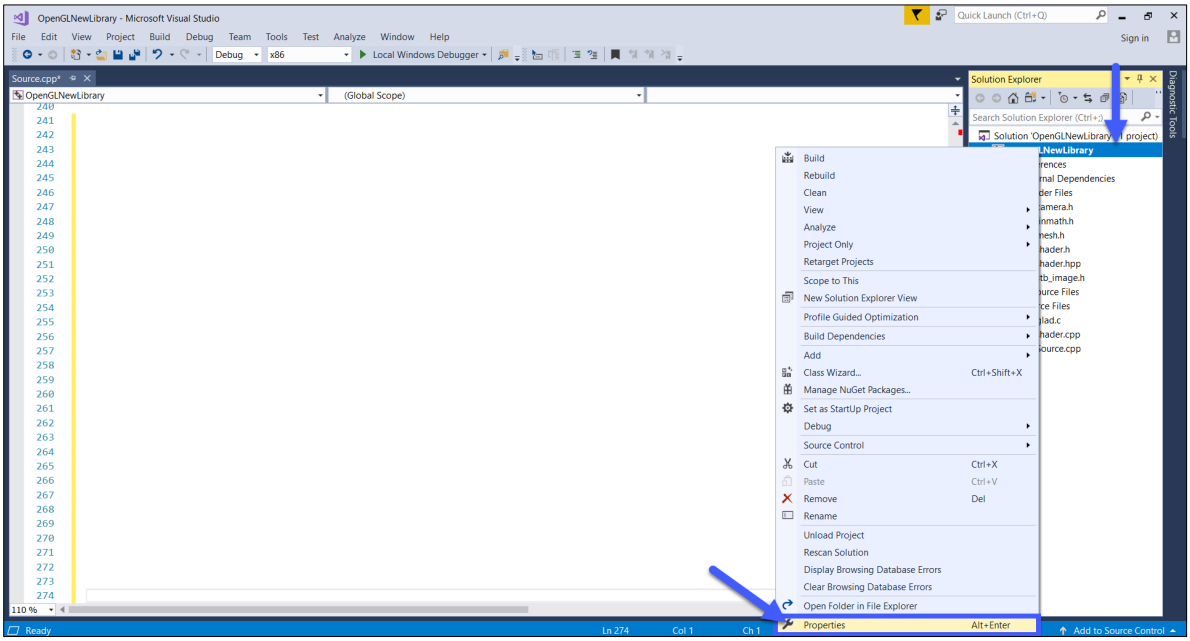
Modern OpenGL Setup

1. Begin by downloading the **OpenGL** ZIP file, which is linked in the Module One Setup activity of your course. Then move this file to a place you will be able to find easily on your C: Drive and unzip the file. Once complete, you should be able to see four different folders: **GLAD**, **GLEW**, **GLFW**, and **glm**. These are the OpenGL libraries you will be using throughout this course.

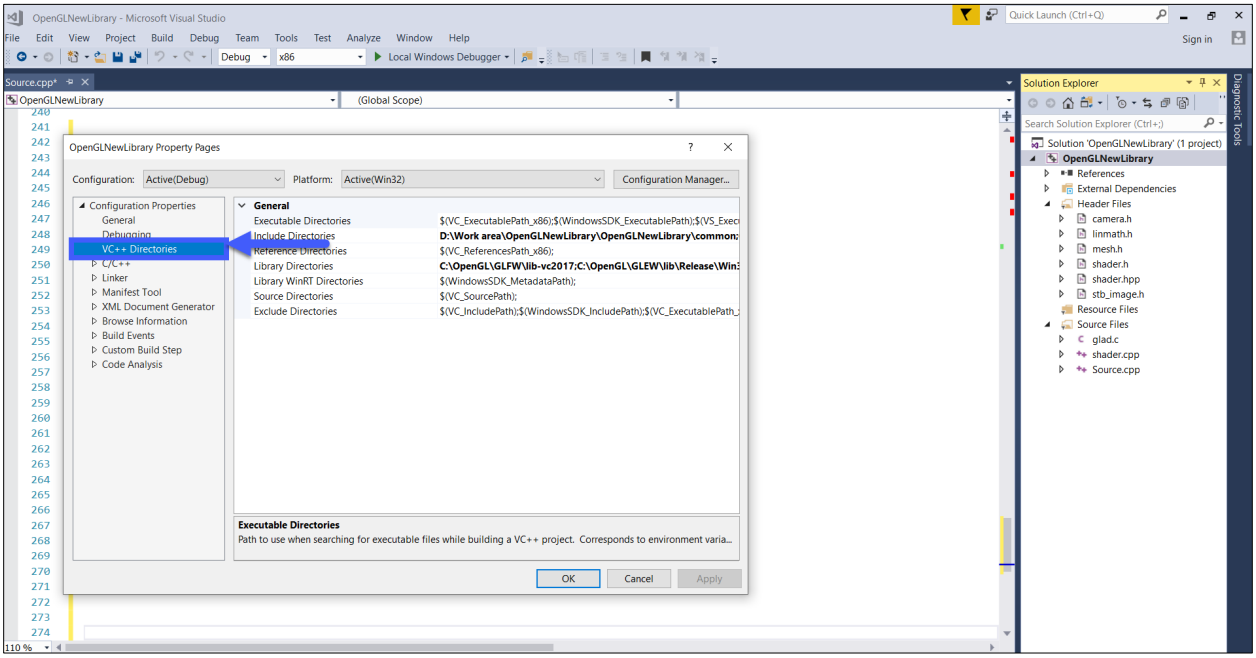


2. Next, download and unzip the **OpenGLSample** ZIP file, which is also linked in the Module One Setup activity of your course. After the folder has been unzipped, open it and click the **OpenGLSample.sln** file. This will open the solution (or SLN) file in Visual Studio.

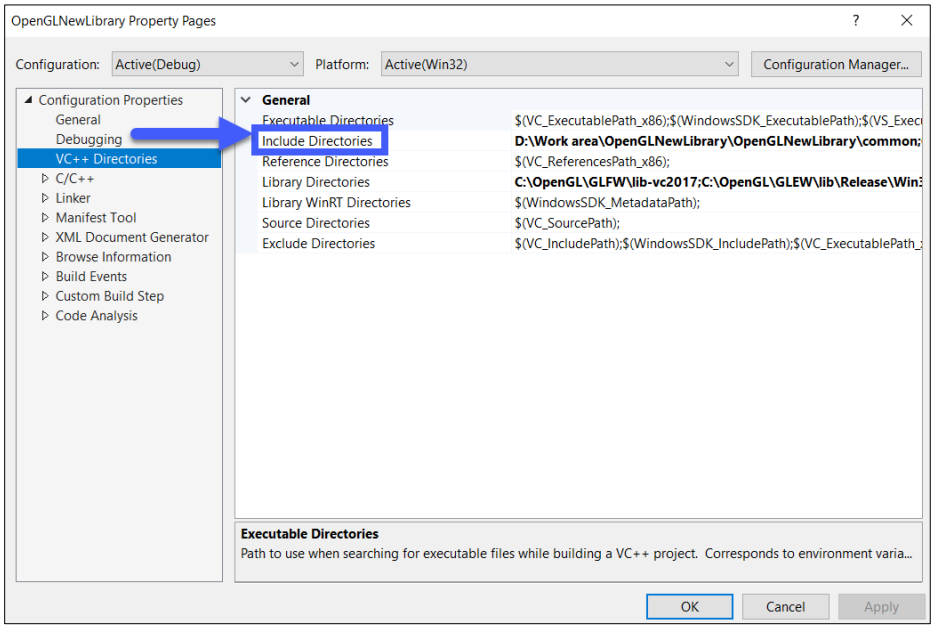
3. Now you will need to update the sample project's settings so it will point to the OpenGL libraries you already downloaded. In the open project in Visual Studio, make sure you have the **Solution Explorer** visible by selecting it from the **View** menu. Then, right-click on the project title in the Solution Explorer and select **Properties**.



4. In the window that pops up, select **VC++ Directories** from the **Configuration Properties** menu.

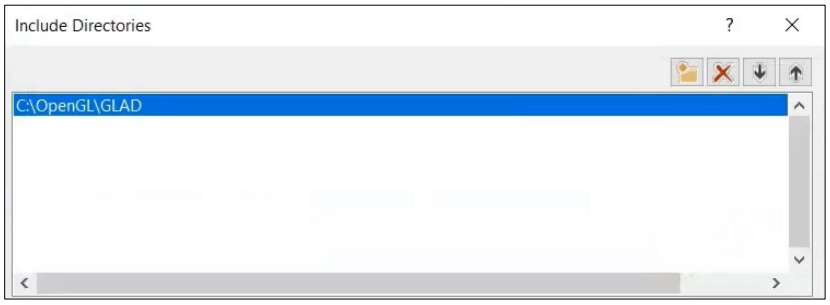


5. Here you will need to tell the project where to look for the Include Directories and the Library Directories. Start by selecting **Include Directories**. A small arrow will appear in the Include Directories row. Click the arrow and then select **Edit**.

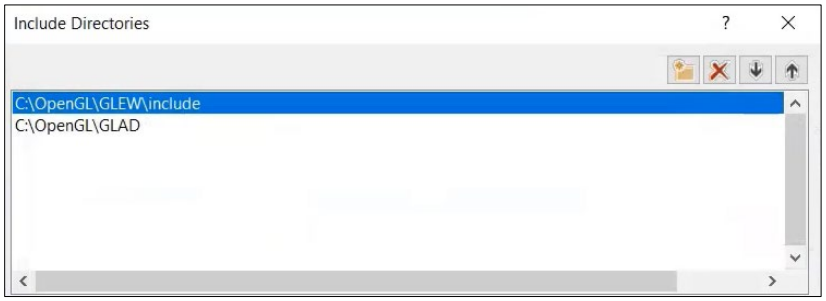


6. From the **Include Directories** window, add a subfolder by clicking the folder icon. Then select the **…** icon to specify the subfolder.

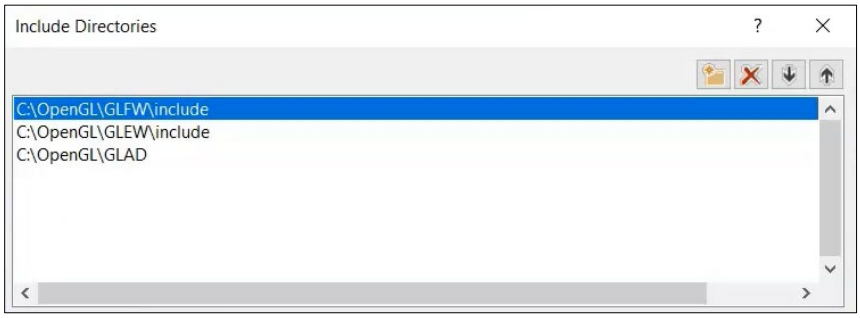
7. Navigate to the OpenGL folder you previously downloaded to your C: Drive. It will be easiest to keep track of the libraries you have already added if you go in order. Start by selecting the **GLAD** folder to add. Once complete, it will appear in your list of Include Directories.



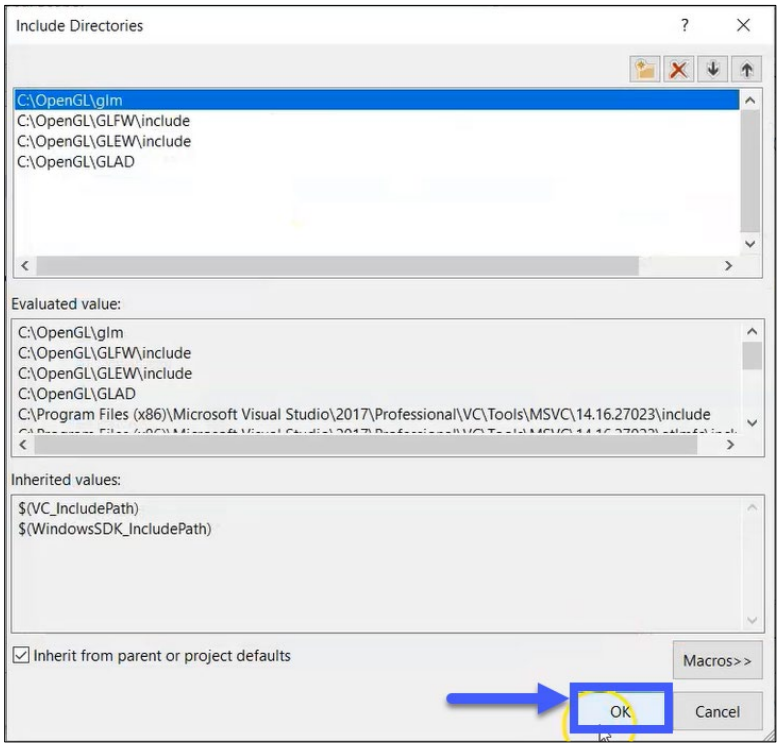
8. Repeat Step #6 to add another subfolder. This time, open the **GLEW** folder and select the **include** folder that is within it. Once complete, it will appear in your list of Include Directories.



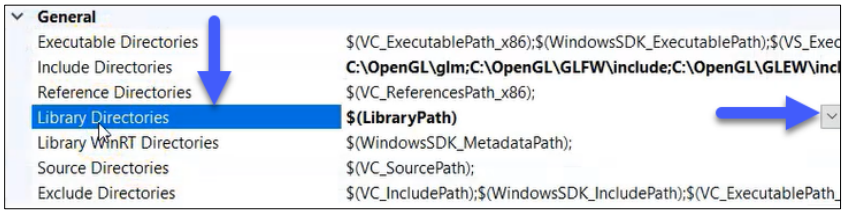
9. Repeat Step #6 again to add another subfolder. This time open the **GLFW** folder and select the **include** folder that is within it. Once complete, it will appear in your list of Include Directories.



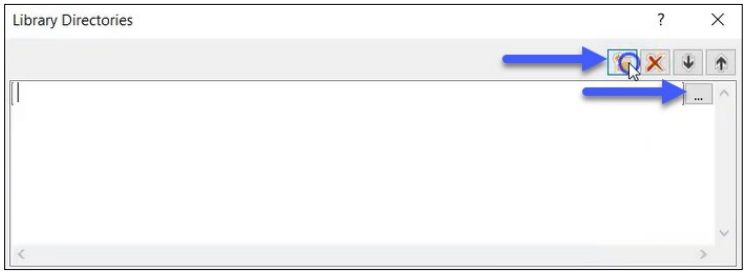
10. Repeat Step #6 one final time to add another subfolder. Select the **glm** folder to add. Now all of the Include Directories are ready. You may click **OK** to close the **Include Directories** window.



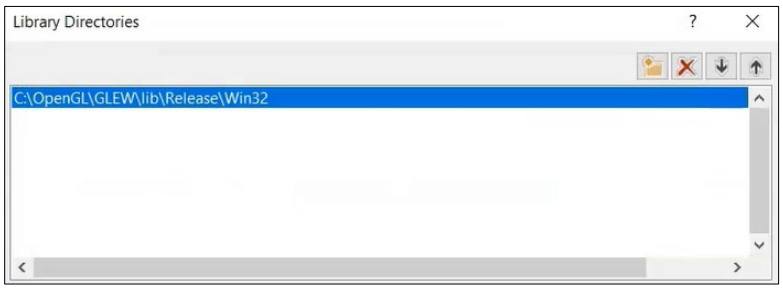
11. Next, you will follow a similar process with the library directories. Select the **Library Directories** from the **VC++ Directories** window. A small arrow will appear in the Library Directories row. Click the arrow and then select **Edit**.



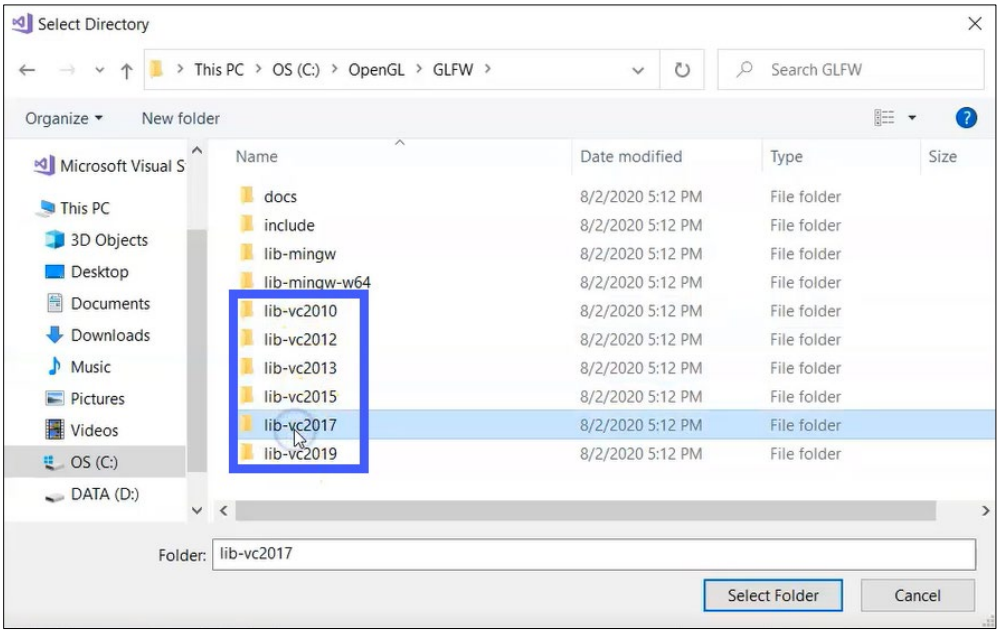
12. You will have two folders that contain LIB files. From the **Library Directories** window, add a subfolder by clicking the folder icon. Then select the **…** icon to specify the subfolder.



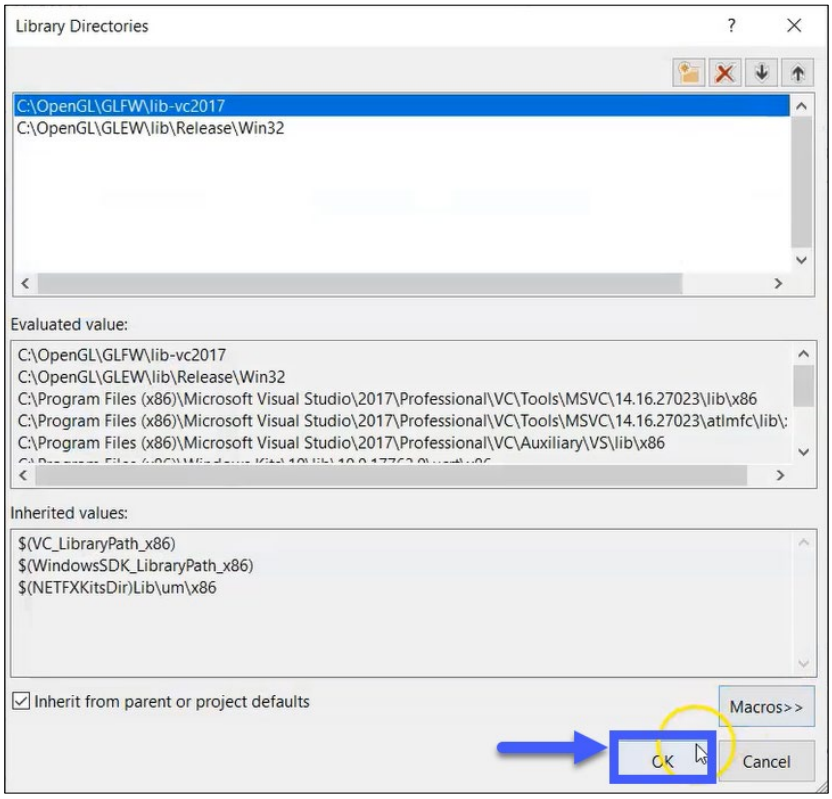
13. Open the **GLEW** folder from the OpenGL folder you downloaded previously. Open the **lib** folder that is within it, then open the **Release** folder, then select the **Win32** folder. Once complete, it will appear in your list of Library Directories.



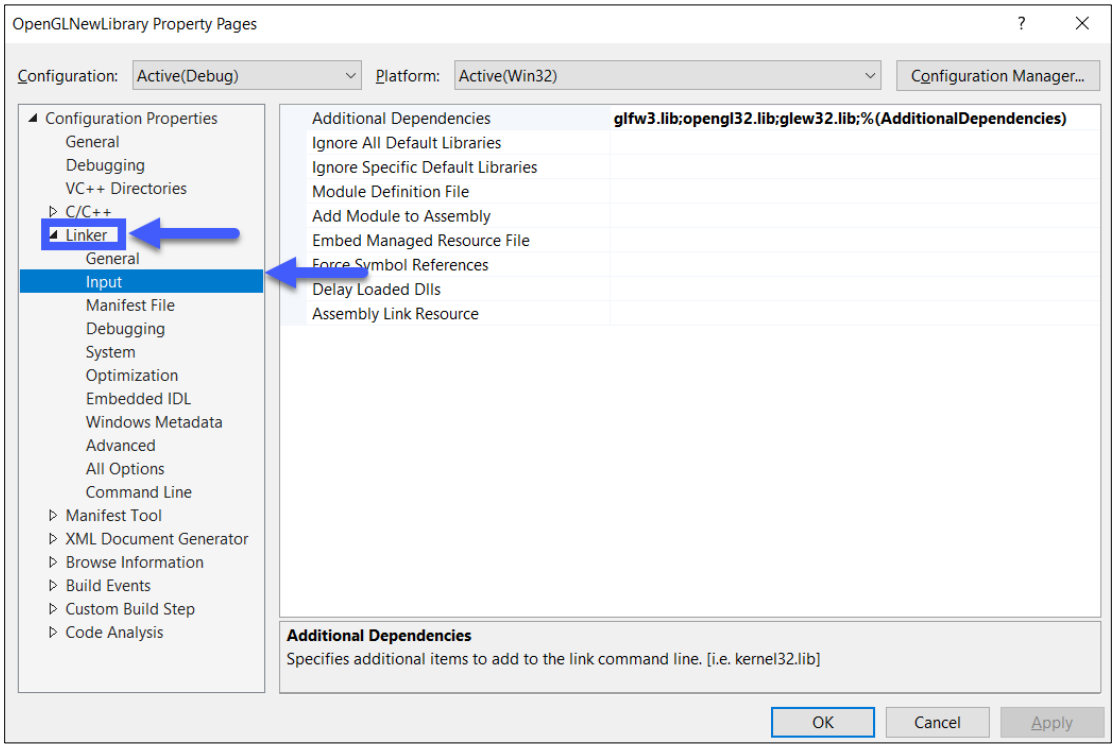
14. Repeat Step #12 to add another subfolder. This time, navigate to the **GLFW** folder and open it. From here you will notice a list of different library folders to choose from, all of which begin with “lib-vc”. They are numbered to correspond to the version of Visual Studio you are using, based on the year it was released. From this list, select the version that is appropriate for you.



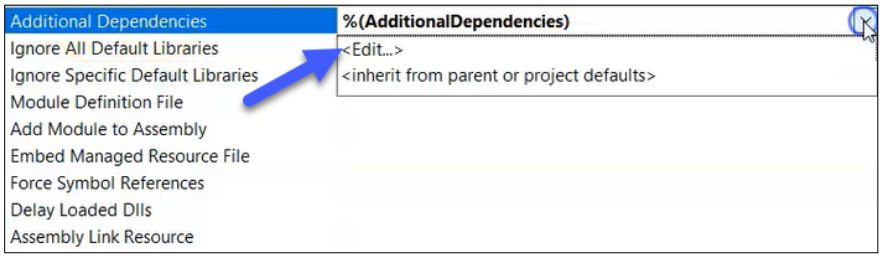
15. Now all of the Library Directories are ready. You may click **OK** to close the **Library Directories** window.



16. The last piece you will need to add is the Linker. Here you will tell Visual Studio the names of the LIB files you will be using. Select **Linker** from the **Configuration Properties** menu and then choose **Input**.



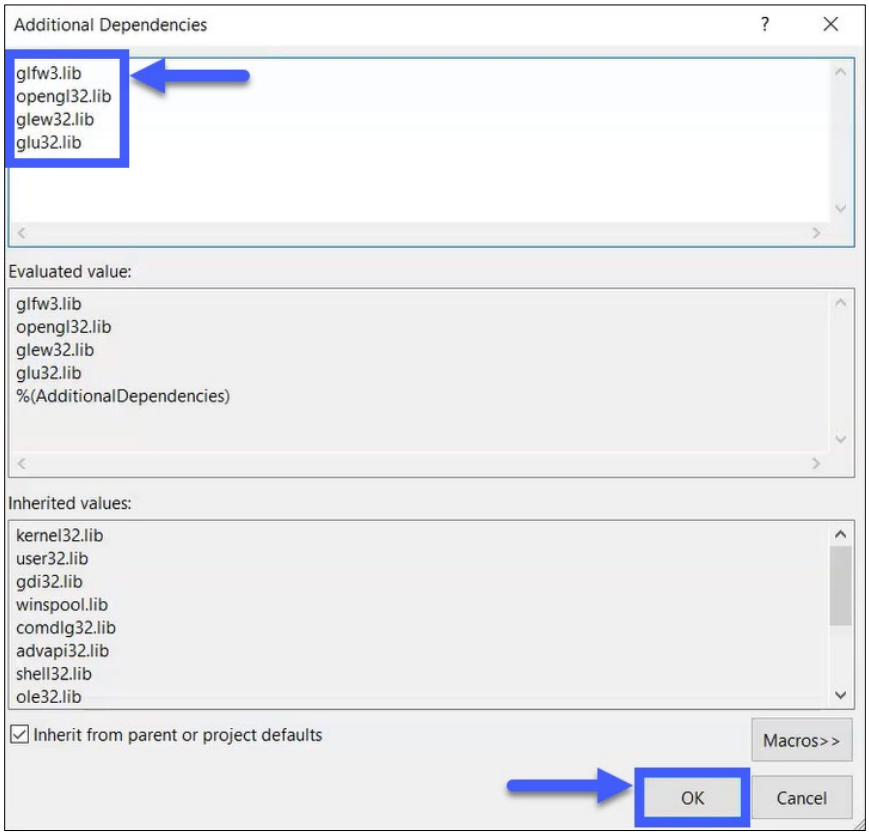
17. Select **Additional Dependencies** from the **VC++ Directories** window. A small arrow will appear in the Additional Dependencies row. Click the arrow and then select **Edit**.



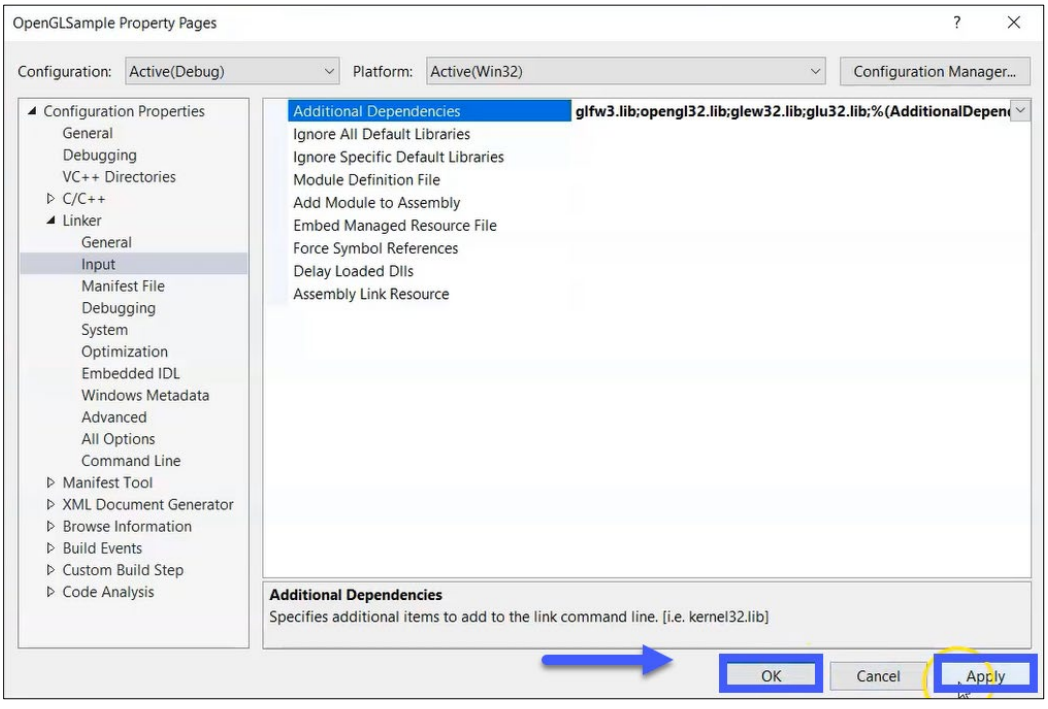
18. From here, simply type the following into the **Additional Dependencies** text box. Watch out for typos in this step!

    - glfw3.lib
    - opengl32.lib
    - glew32.lib
    - glu32.lib

19. Once complete, you may close the window by clicking **OK**.



20. Click **Apply** to apply your changes from the **Property Pages** window. Then click **OK** to close the window.



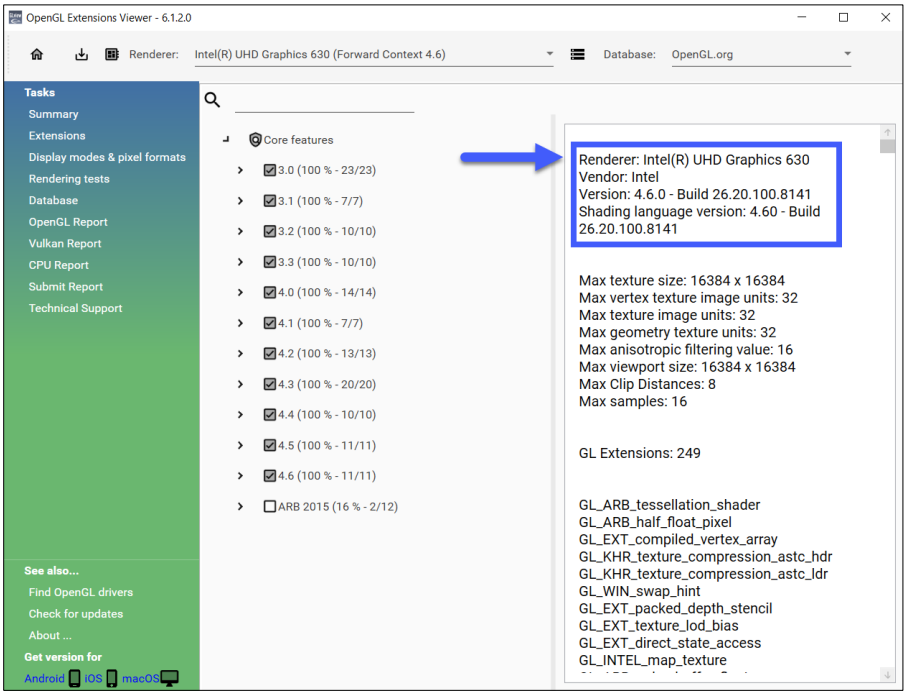
21. You are now prepared to run the sample code in Visual Studio! To do this, click the green **Play** button from the toolbar. It may take a short while for your libraries to run the first time, but in subsequent launches they will be quicker. If you experience difficulty viewing the sample 3D objects, you may need a different version of the GLAD library folder. To accomplish this, proceed to the **Updating GLAD** section of this document.

Updating GLAD

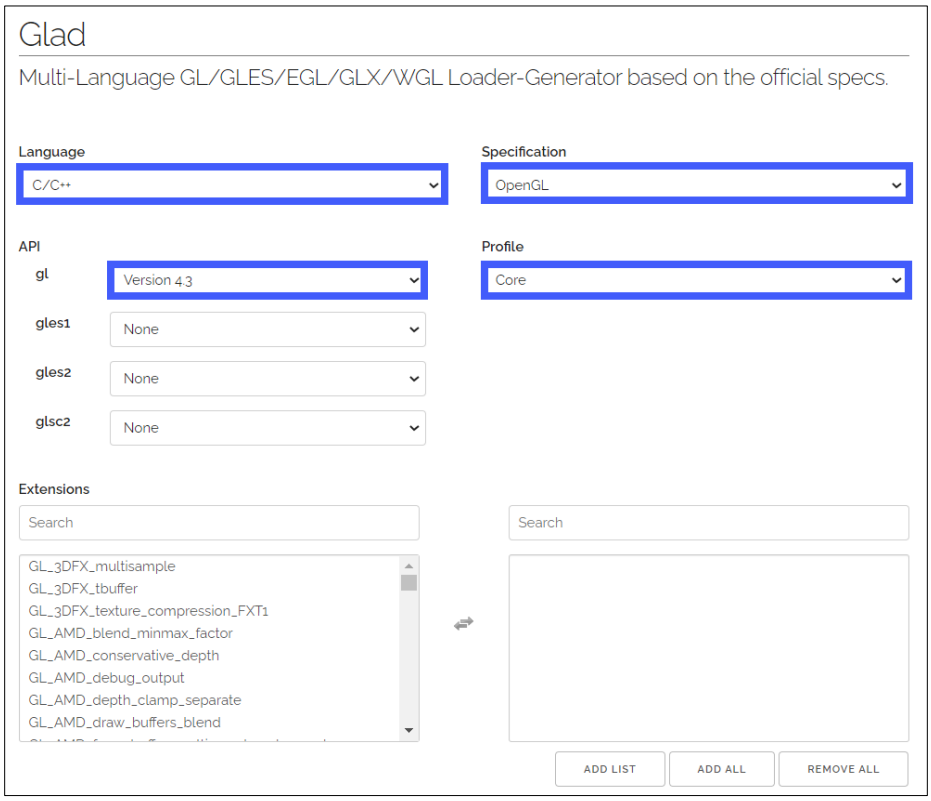
The GLAD folder you currently have access to is the 32-bit version, which should run on most machines. If you experience difficulty with this version, it is possible your machine may be better served by a different one. To check your computer's video card and determine if this is the case, follow the steps outlined below.

1. Begin by checking the video card on your machine to identify which version of OpenGL your video card runs. Navigate to the OpenGL Extensions Viewer 6 website and follow the on-screen instructions to install the OpenGL Extensions Viewer. Once complete, select the OpenGL report.

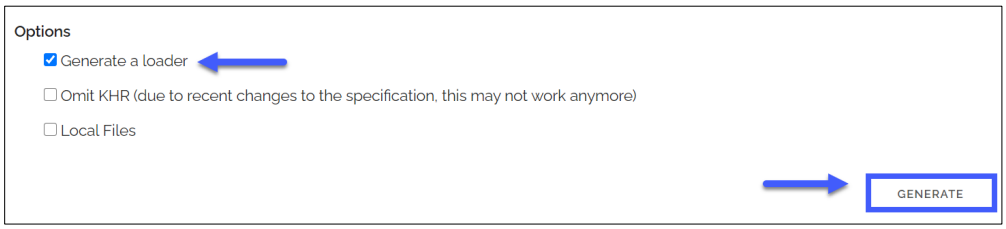
2. The **OpenGL Extensions Viewer** will relay information regarding which version of OpenGL your machine runs. OpenGL 4.3 is the most likely version, but version 4.6 is shown in this example screenshot.



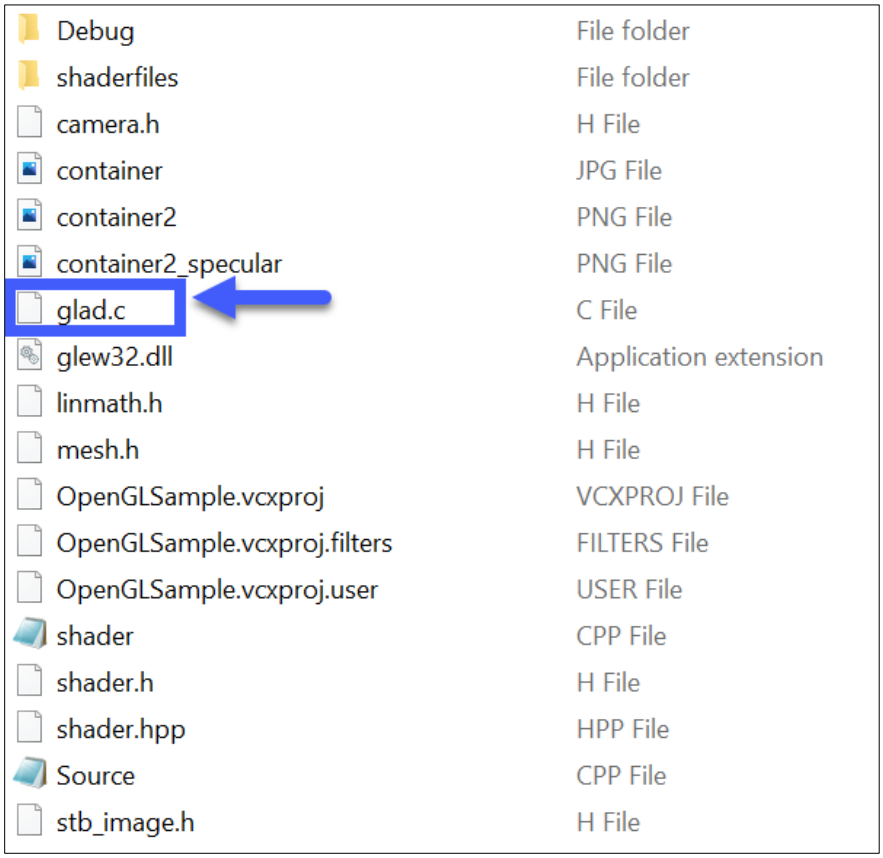
3. Next, proceed to the GLAD website and adjust your selections. For Language, choose **C/C++**. For API, change the GL selection to the version of OpenGL you now know runs on your machine. Leave the GLES menus listed as **None**. For Specification, ensure that **OpenGL** is selected. For Profile, pick **Core**.



4. Once complete, scroll to the bottom of the page and ensure **Generate a loader** is checked. Then click the **Generate** button. This will create a GLAD zipped file for your specifications.



5. Inside the zipped file, you will find a “glad.c” file. Copy this and go into your **OpenGLSample folder**, and then into the **OpenGLSample subfolder**. Locate the existing “glad.c” file and replace it with the new version.



6. Copy the other two folders in the zipped file, which are named “glad” and “KHR,” into your **OpenGL folder** and replace the two existing files of the same names.

7. As a final step, walk back through the **Modern OpenGL Setup** section of this document to ensure these new GLAD files are the ones your sample project is directing to. Then you will successfully be able to run the project!