

# **Computer Graphics**

## **- [OpenGL]How to install OpenGL**

**Sung Soo Hwang**

# Environment Setup for Mac

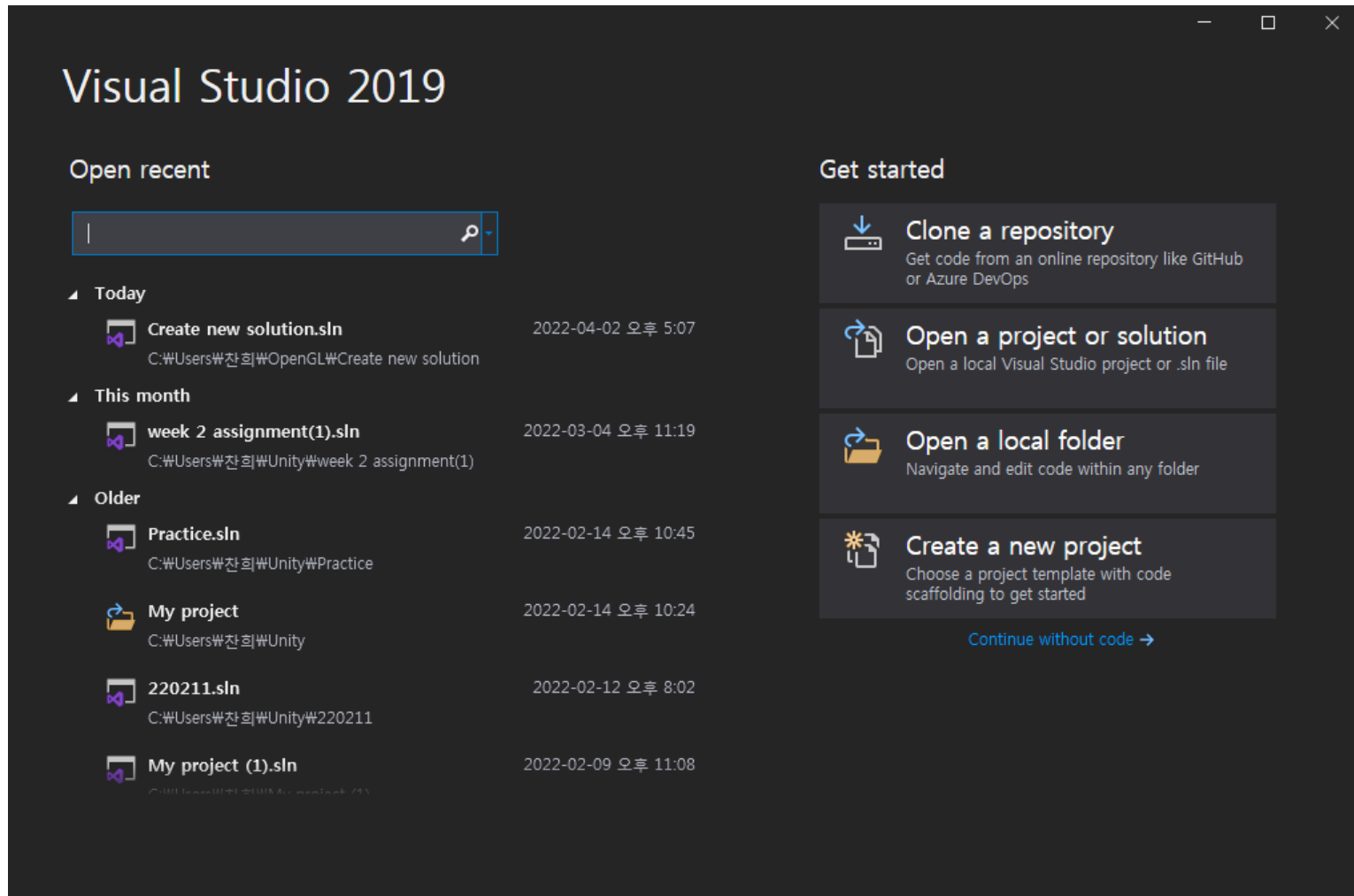
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- In 2018, Apple stopped supporting OpenGL.
- Mac OS users should install Windows OS by using tool called "Bootcamp".
- Follow the link below  
<https://www.youtube.com/watch?v=Hmm9Q-T0oTo>

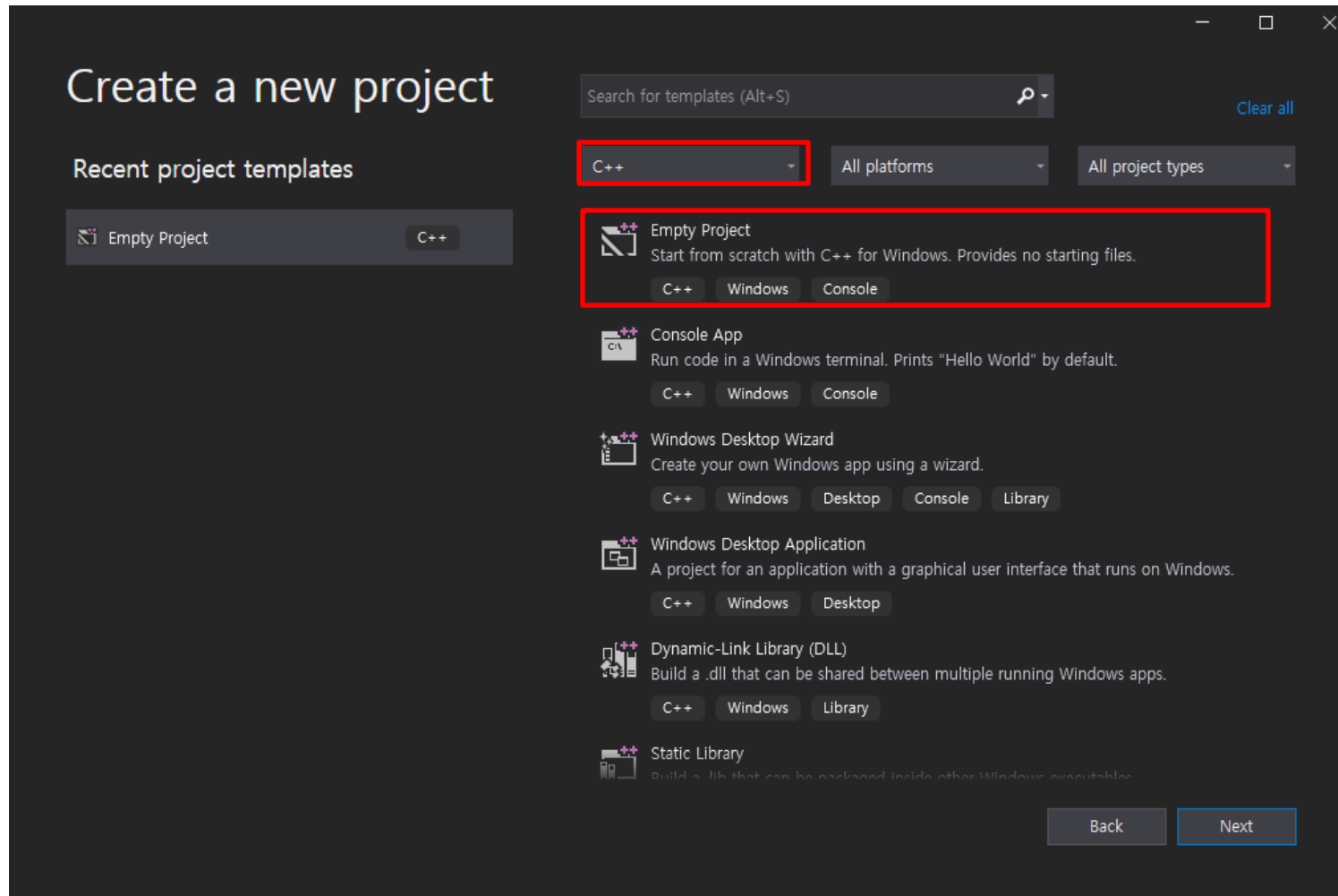
# Environment Setup for Windows

- Making a new project on MSVC
  - Run MSVC(Microsoft Visual Studio) and create a new project



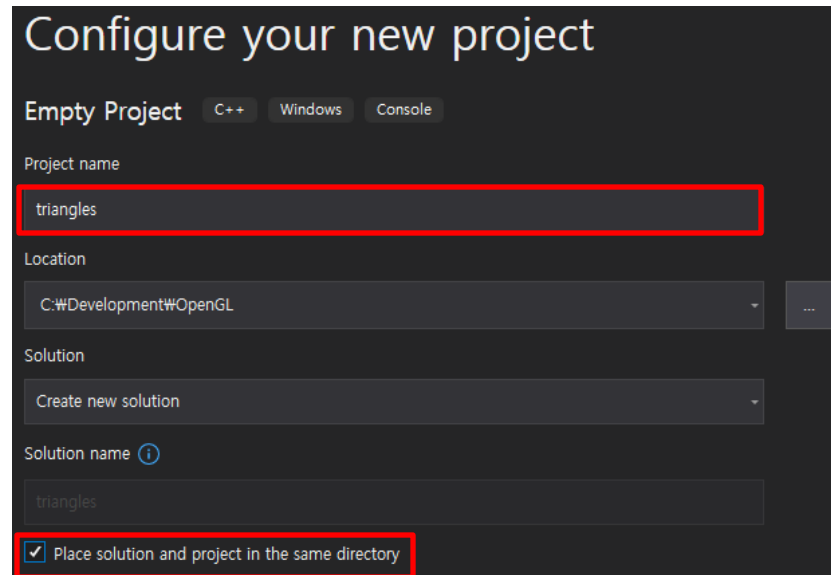
# Environment Setup for Windows

- Select C++ Empty Project and select "Next"

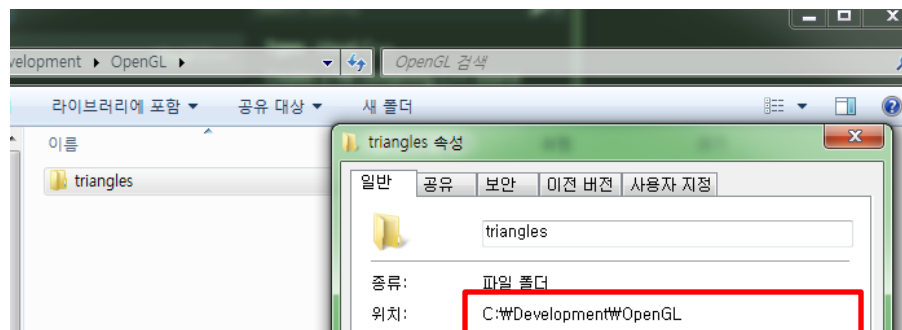


# Environment Setup for Windows

- Set the name of your new project and where to store it. Check "Place solution and project in the same directory"

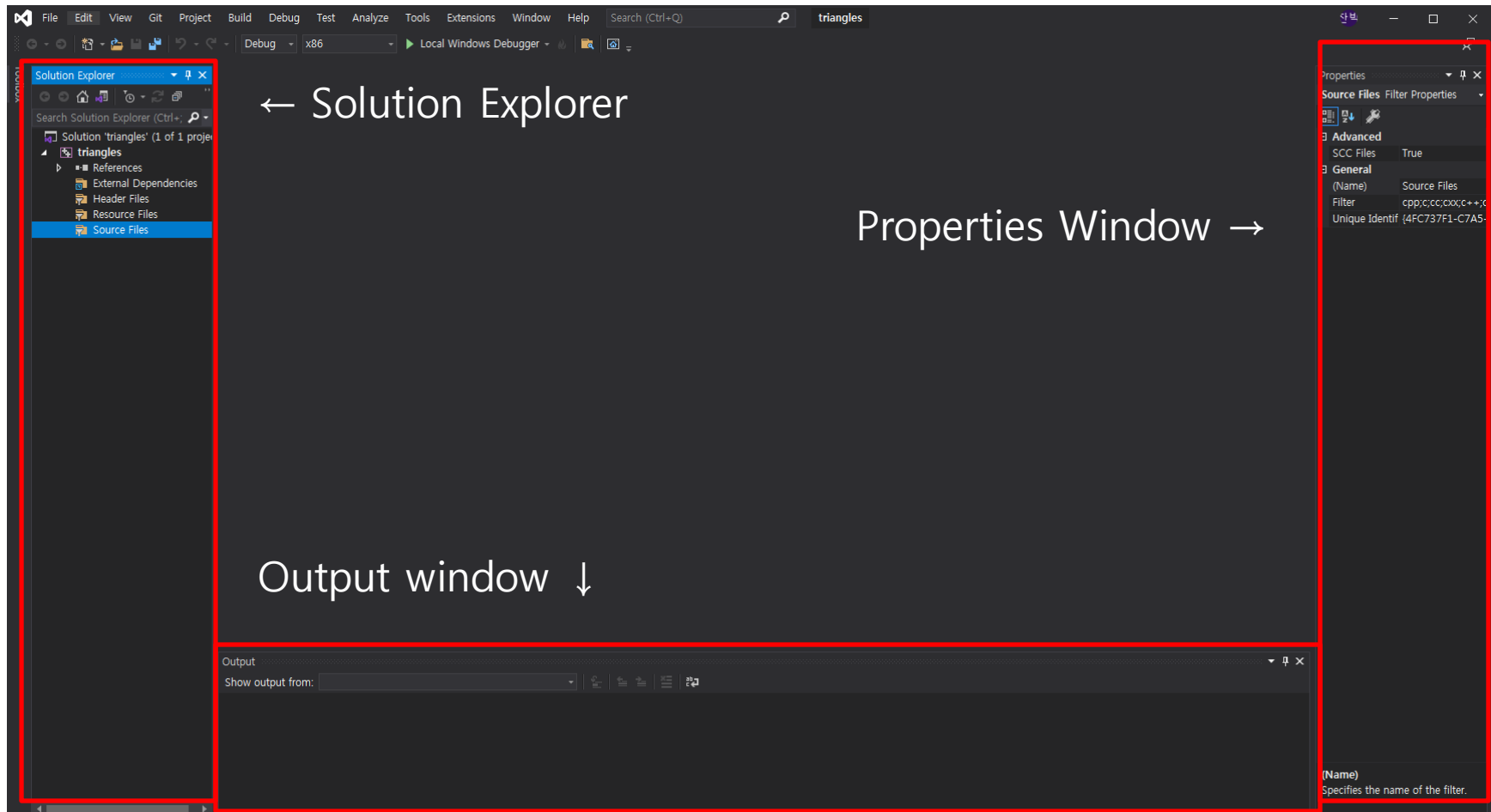


- In this example, MSVC will then make a new project folder named "triangles" in C:\Development\OpenGL



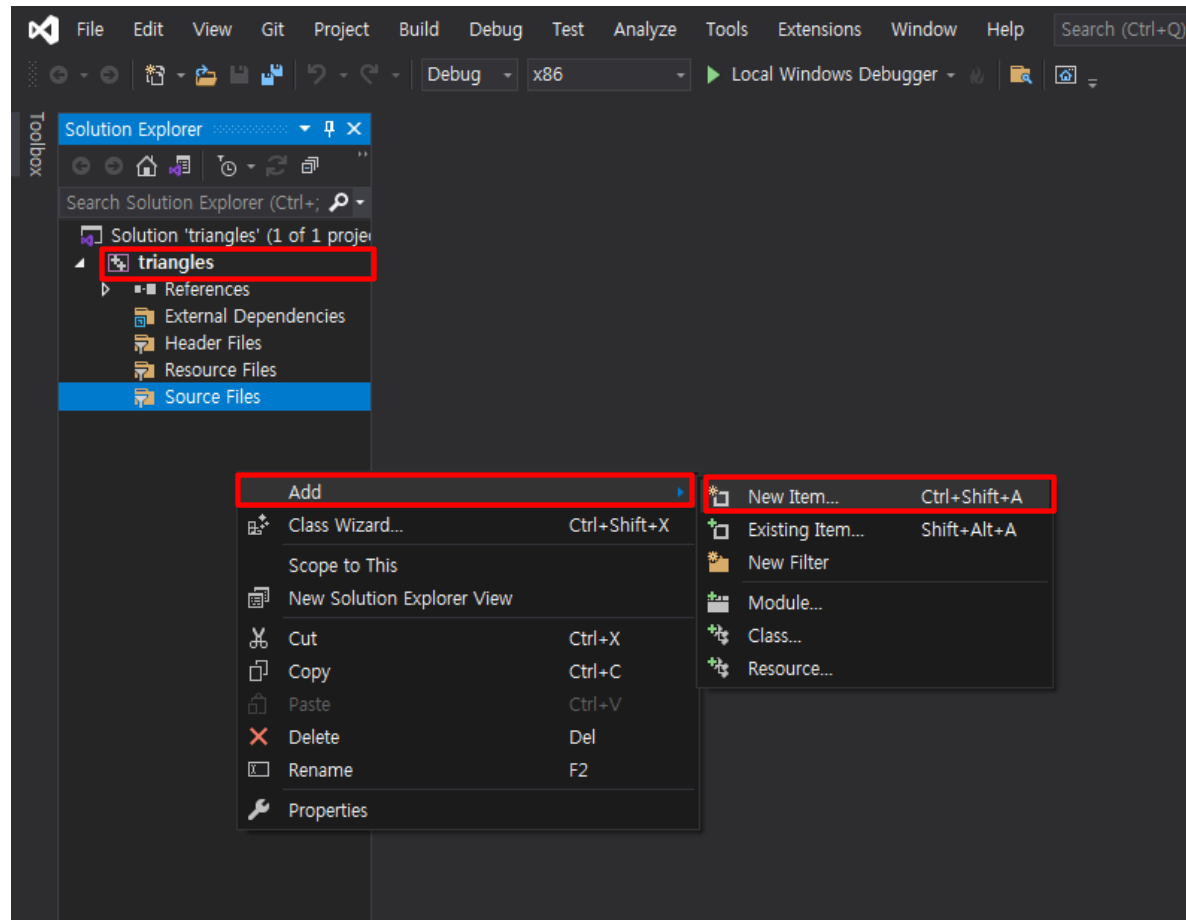
# Environment Setup for Windows

- You will also ought to see the following screen
- The directions of windows and solution explorer can be different.



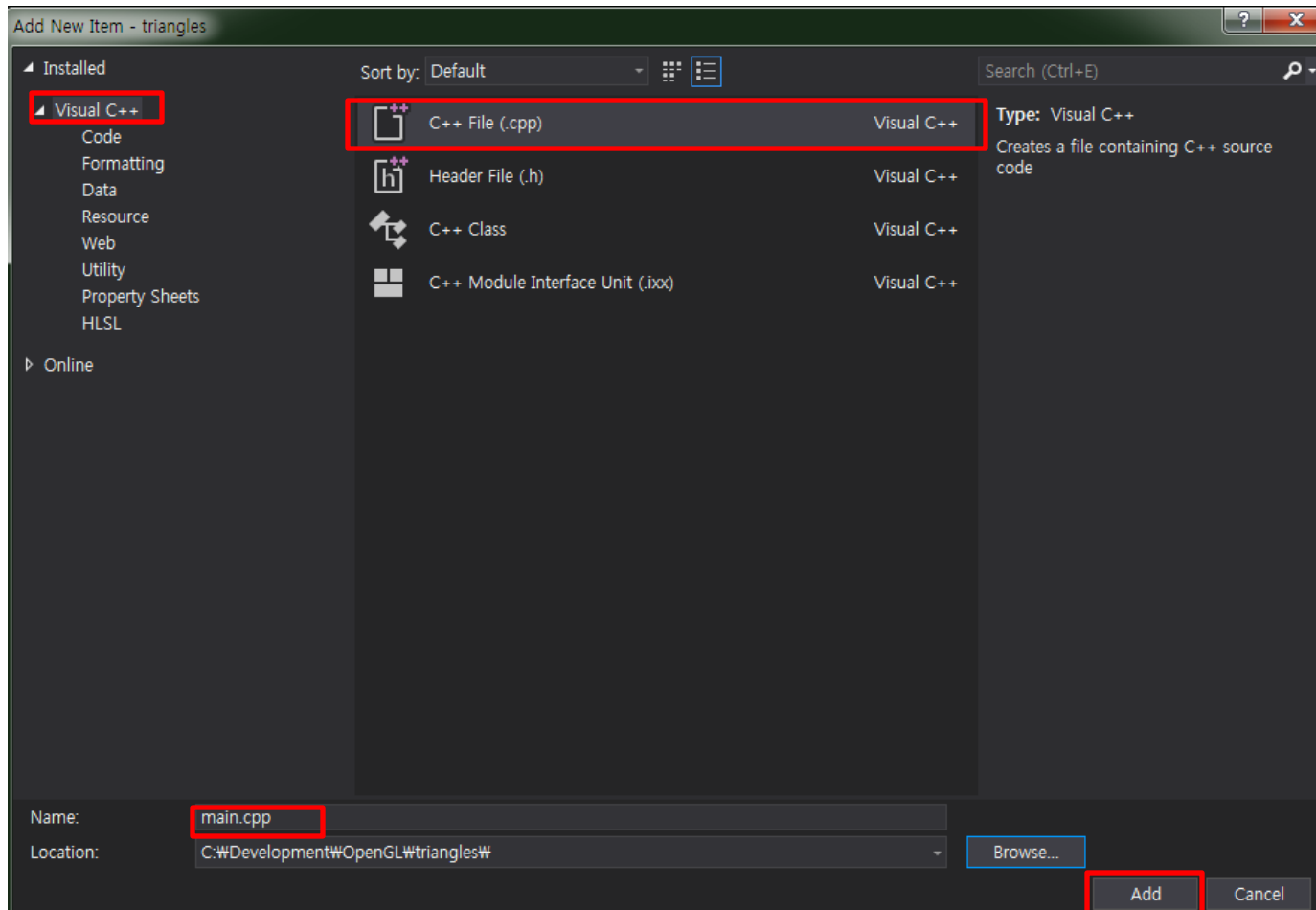
# Environment Setup for Windows

- In the Solution Explorer, click Right Mouse Button(RMB) on the project name. Then, select "Add -> New Item..." in the popup menu.



# Environment Setup for Windows

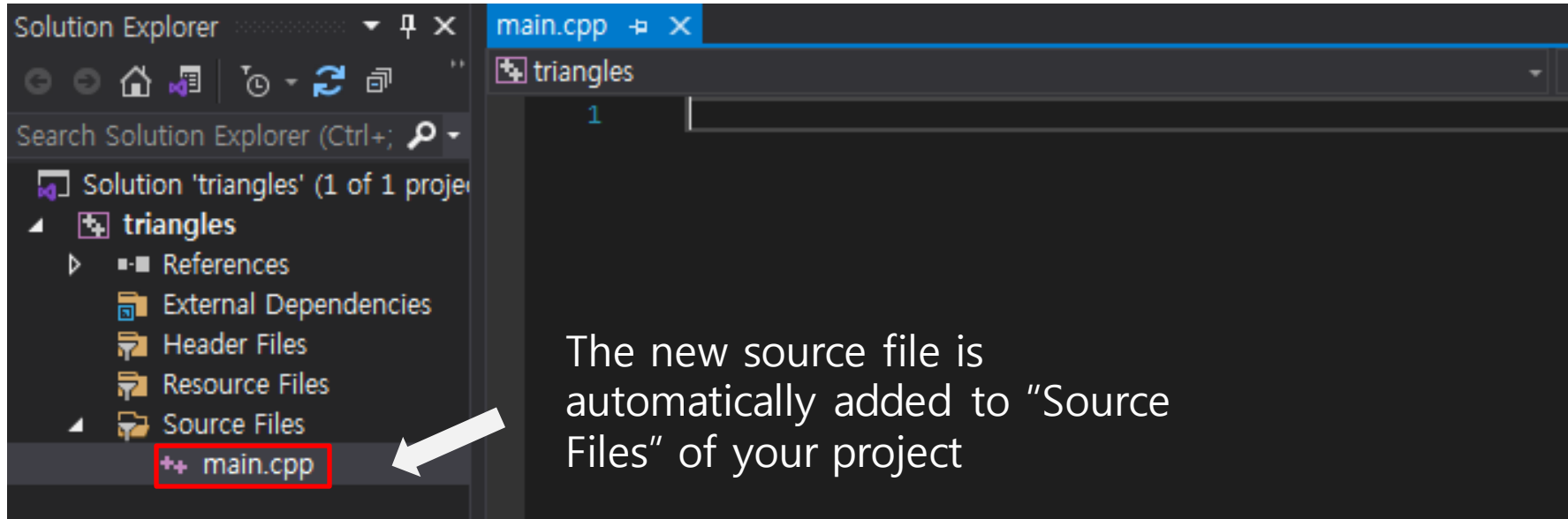
- In the “Add New Item” popup window, select “Visual C++” on its left panel and “C++ File (.cpp)” on its right panel. Also type the name of a new source file on the bottom panel. Then, click “Add” in order to add the new source file to your project.





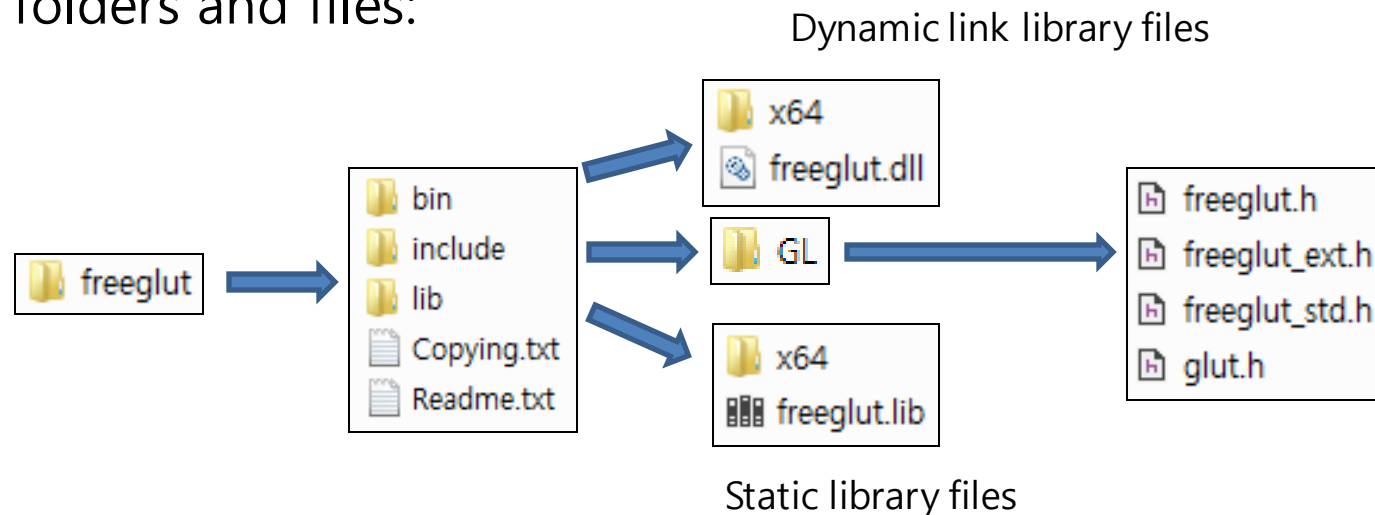
# Environment Setup for Windows

- The following is the result of MSVC screen with the new source file(main.cpp) open:



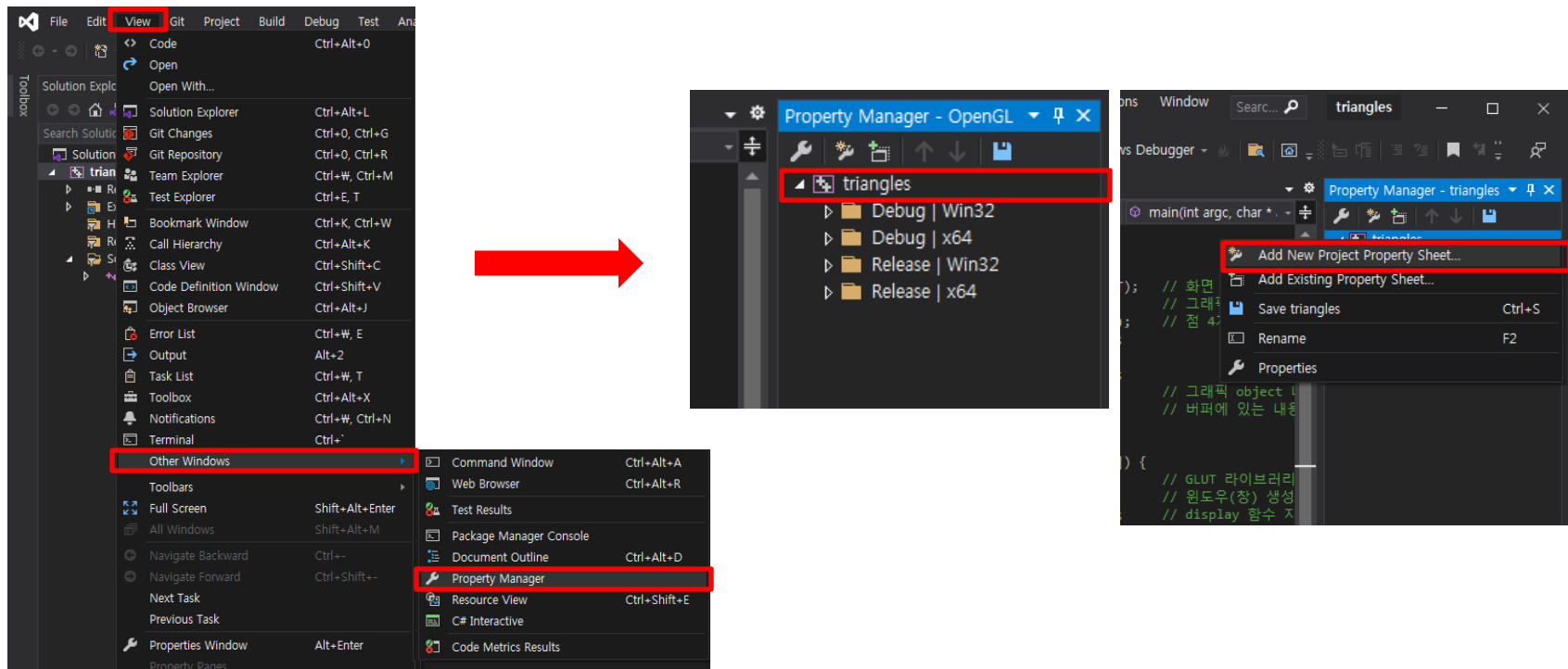
# Environment Setup for Windows

- Linking the FreeGLUT/glew binaries to your project
  - Download freeglut and glew from the following links:  
<http://files.transmissionzero.co.uk/software/development/GLUT/freeglut-MSVC.zip>  
<https://sourceforge.net/projects/glew/files/glew/2.1.0/glew-2.1.0-win32.zip/download>
  - Unzip the downloaded files in the parent of the project folder that you have made just before (in this example, "C:\Development\OpenGL"). Then, you will see the following folders and files:



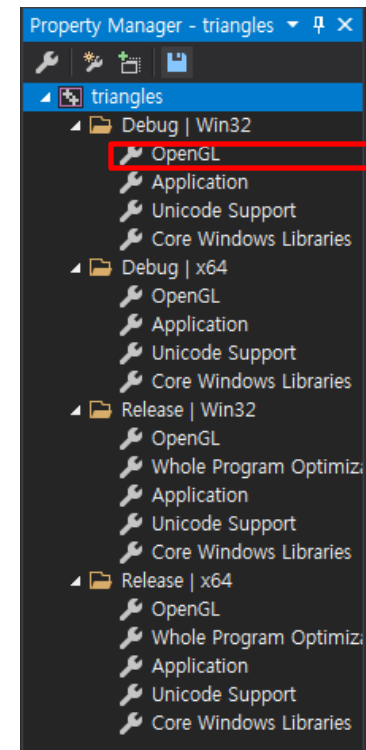
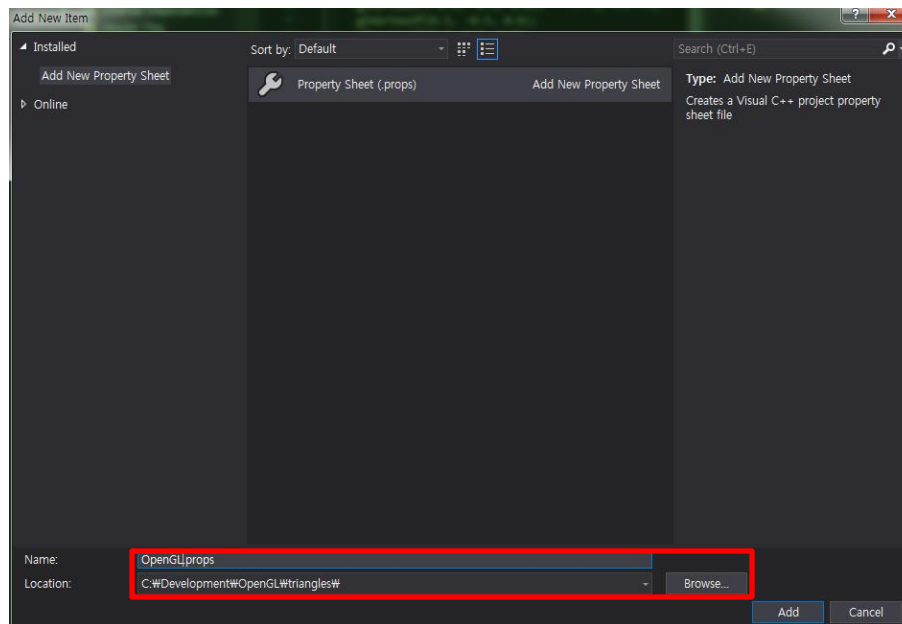
# Environment Setup for Windows

- In the subsequent practice, we must continue to modify the properties of the project. To reduce repetitive work, the set properties are saved as a property sheet so that the same property settings can be called from other project files.
- First, create a new Project Property Sheet in the property manager by clicking RMB on the project.



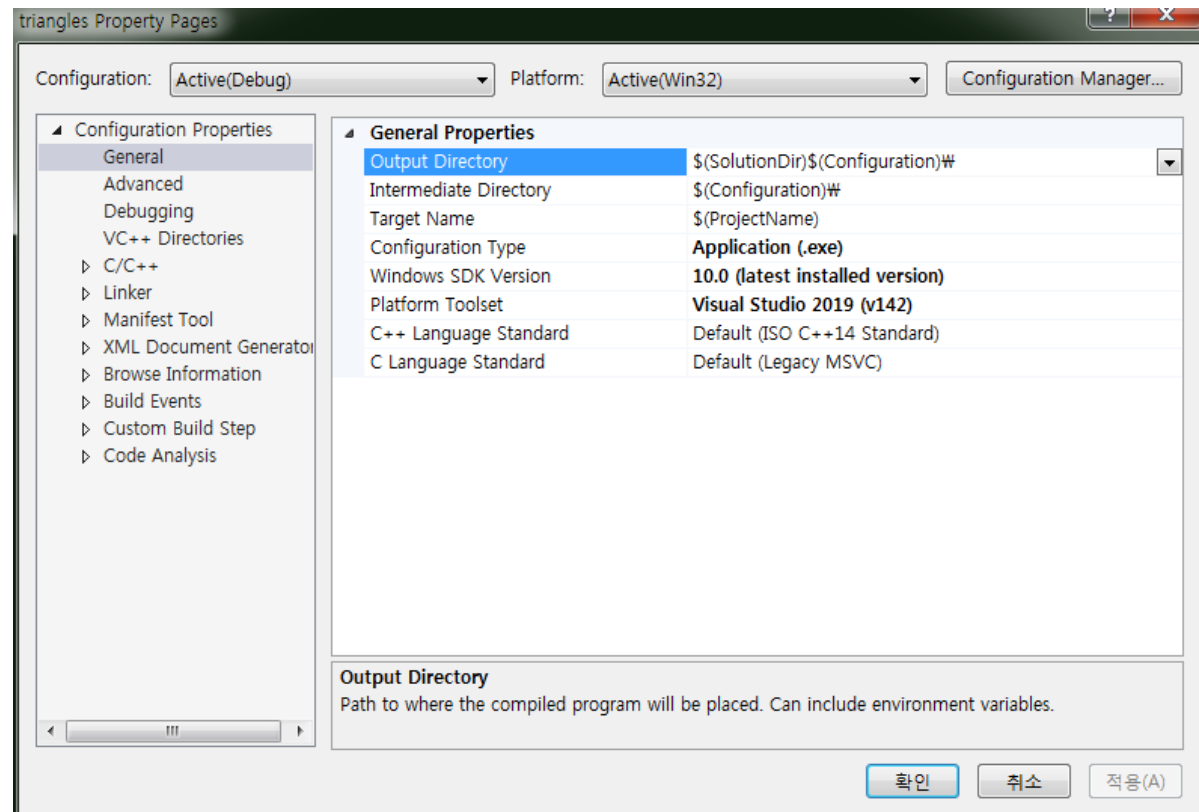
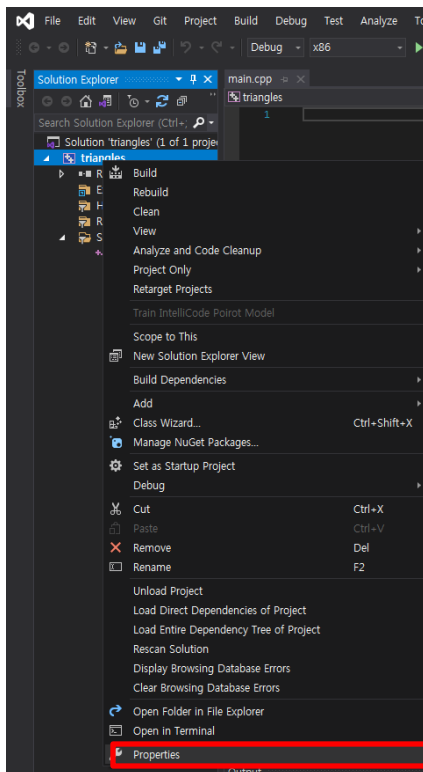
# Environment Setup for Windows

- Set the name and direction of the property sheet and add it.
- Then You can see the new property sheet in the Property Manager.



# Environment Setup for Windows

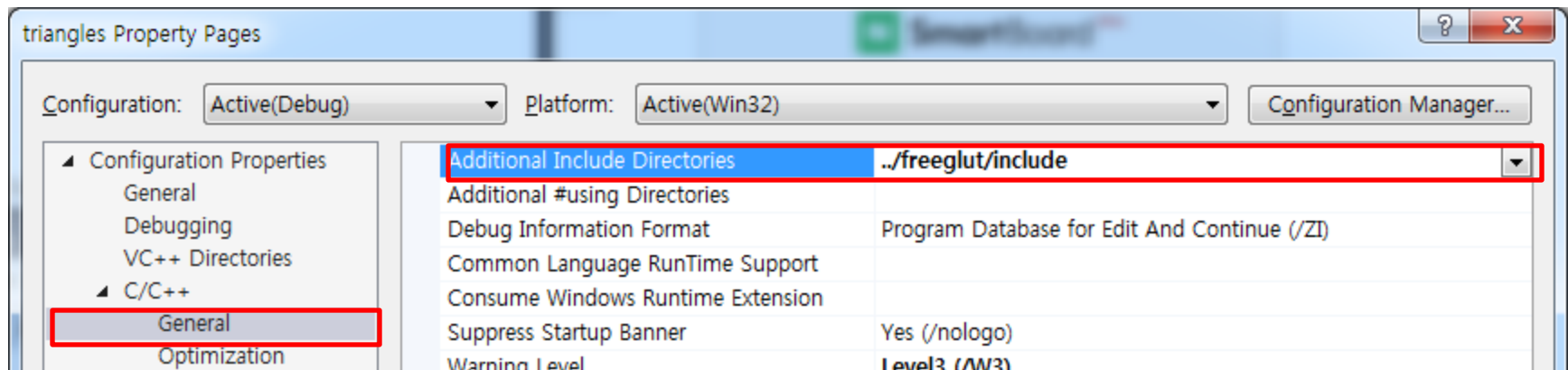
- In the Solution Explorer, click Right Mouse Button (RMB) and select "Properties" in the popup menu as on the right.
- Then, you will see the project's "Property Pages" window as shown below:



# Environment Setup for Windows

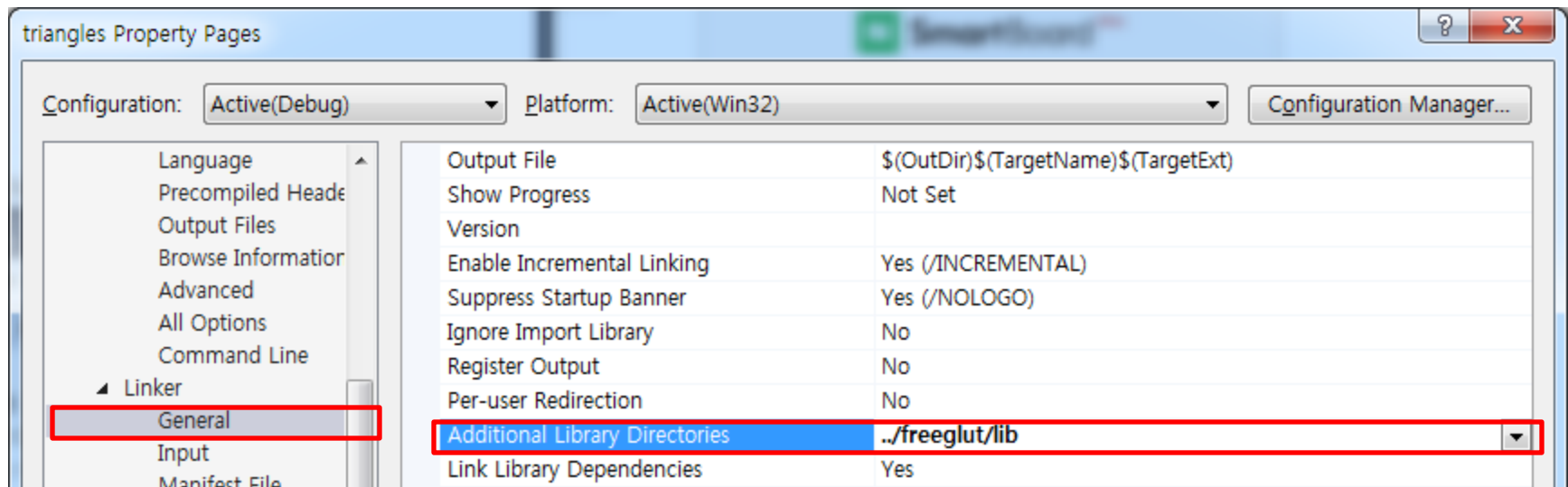
- Select "C/C++ -> General" on the left panel and specify the location of FreeGLUT header files on "Additional Include Directories" on the right panel as follows:
- Then, click the "Apply" button on the bottom.

\* If there are multiple additional include directories, separate each of them by semicolon (;).



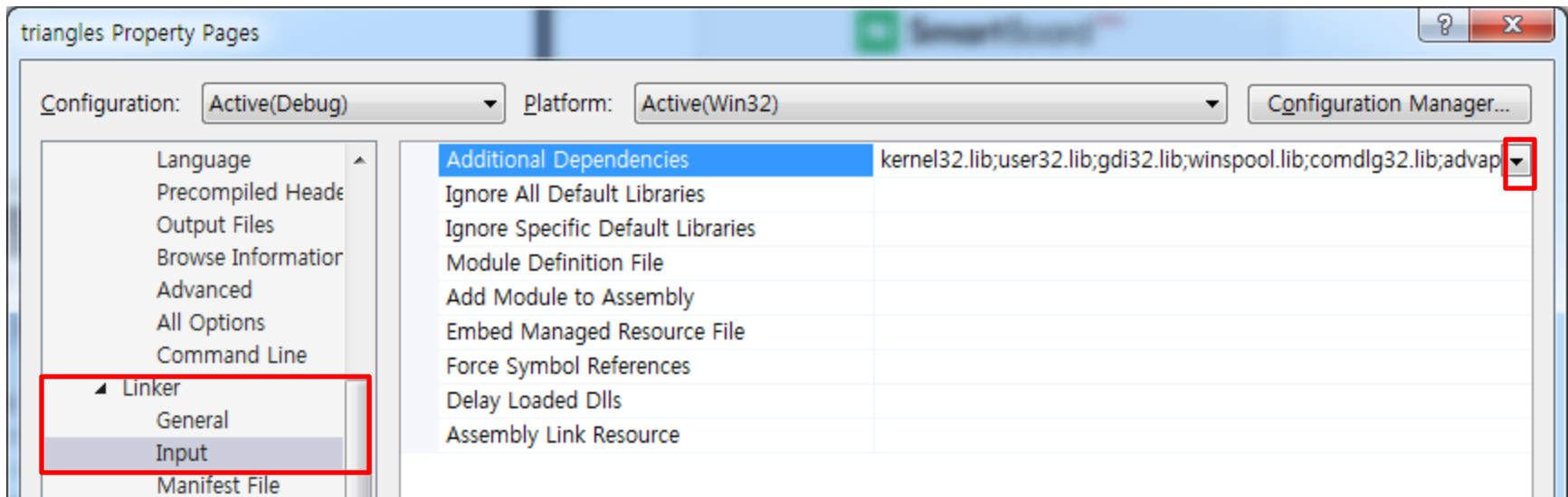
# Environment Setup for Windows

- Select “Linker -> General” on the left panel and specify the location of FreeGLUT static library files on “Additional Library Directories” on the right panel as follows:
  - Then, click the “Apply” button on the bottom.
- \* If there are multiple additional include directories, separate each of them by semicolon (;).

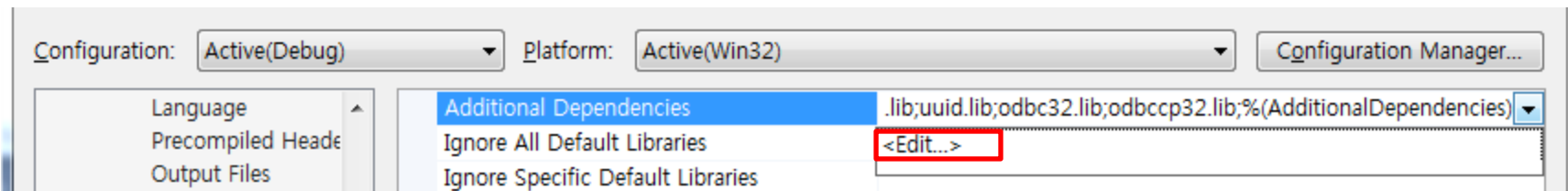


# Environment Setup for Windows

- Select "Linker -> Link" on the left panel and click "Additional Dependencies" on the right panel. Then, you can see a small button on the rightmost as follows:



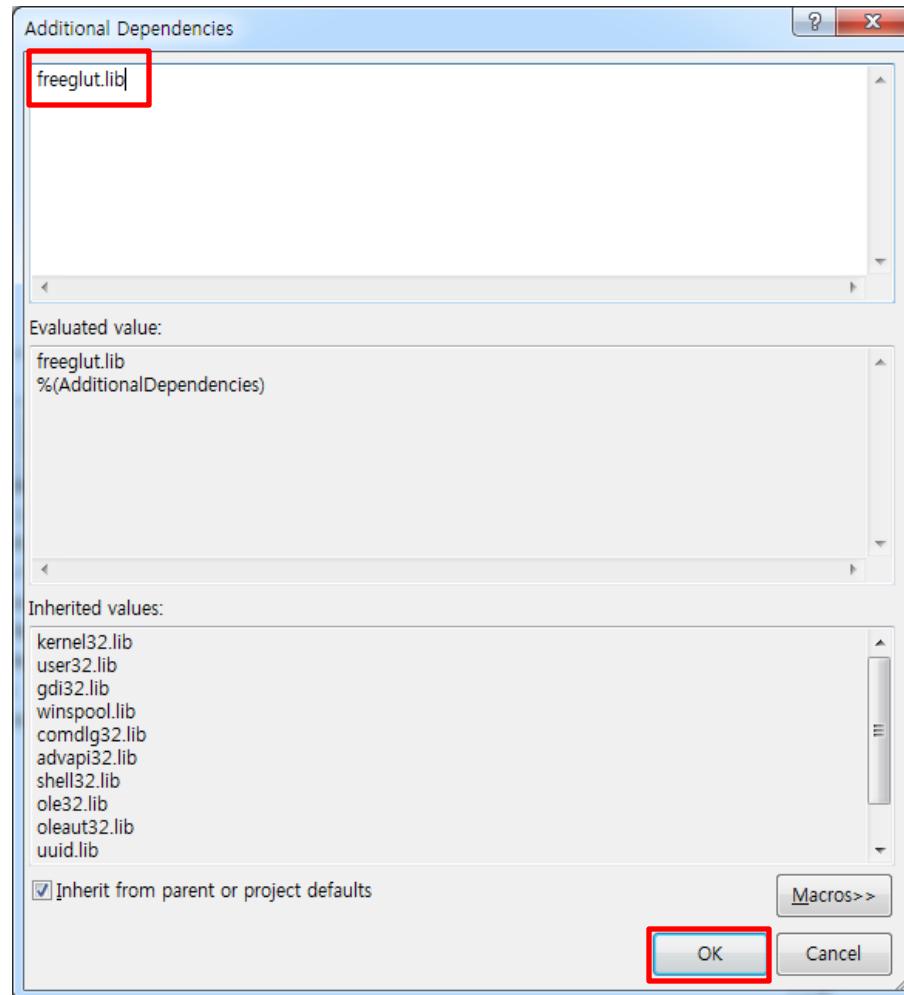
- Click the small button and select <Edit> on the popup list:





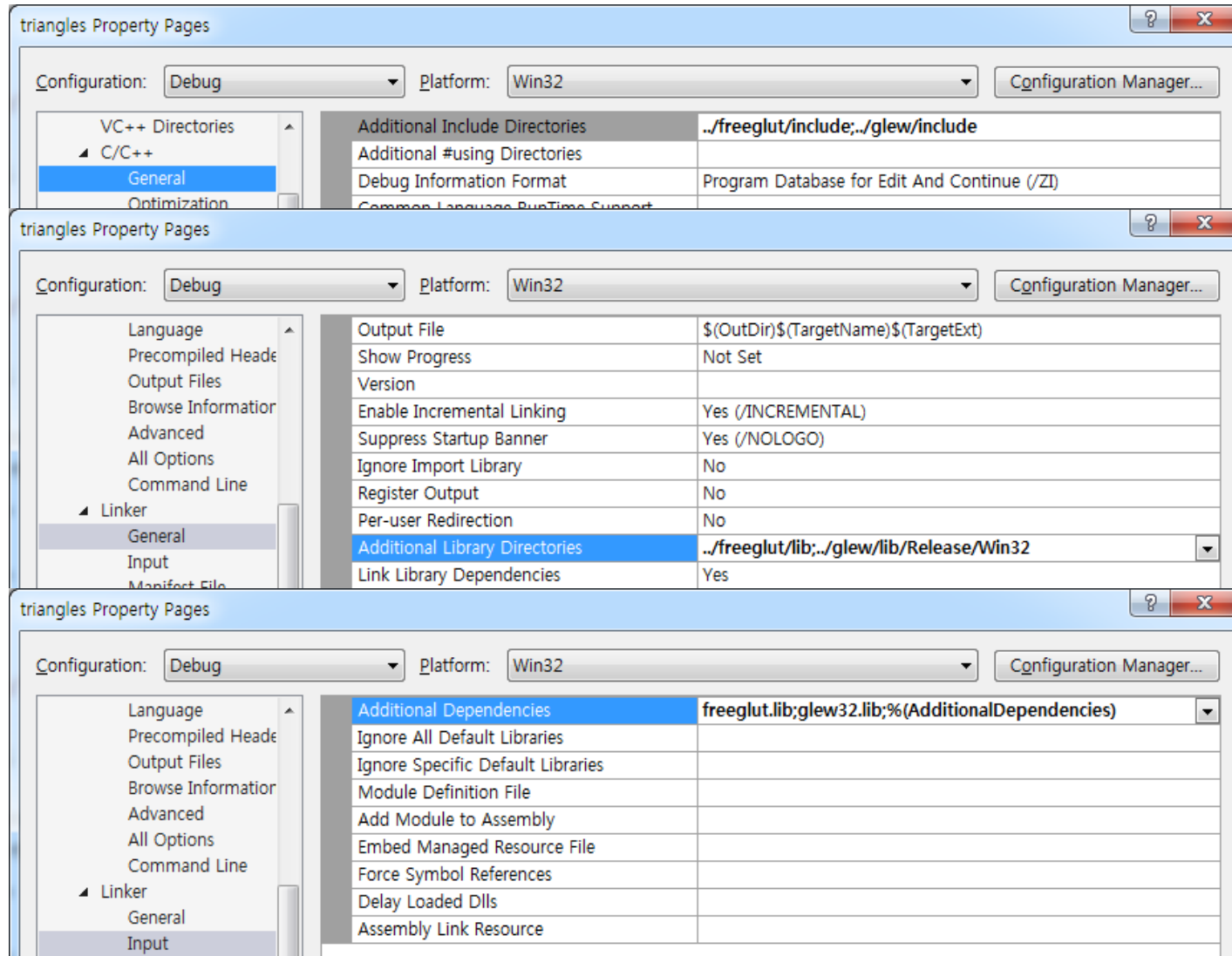
# Environment Setup for Windows

- In the “Additional Dependencies” window, specify the name of the FreeGLUT static library and click OK.



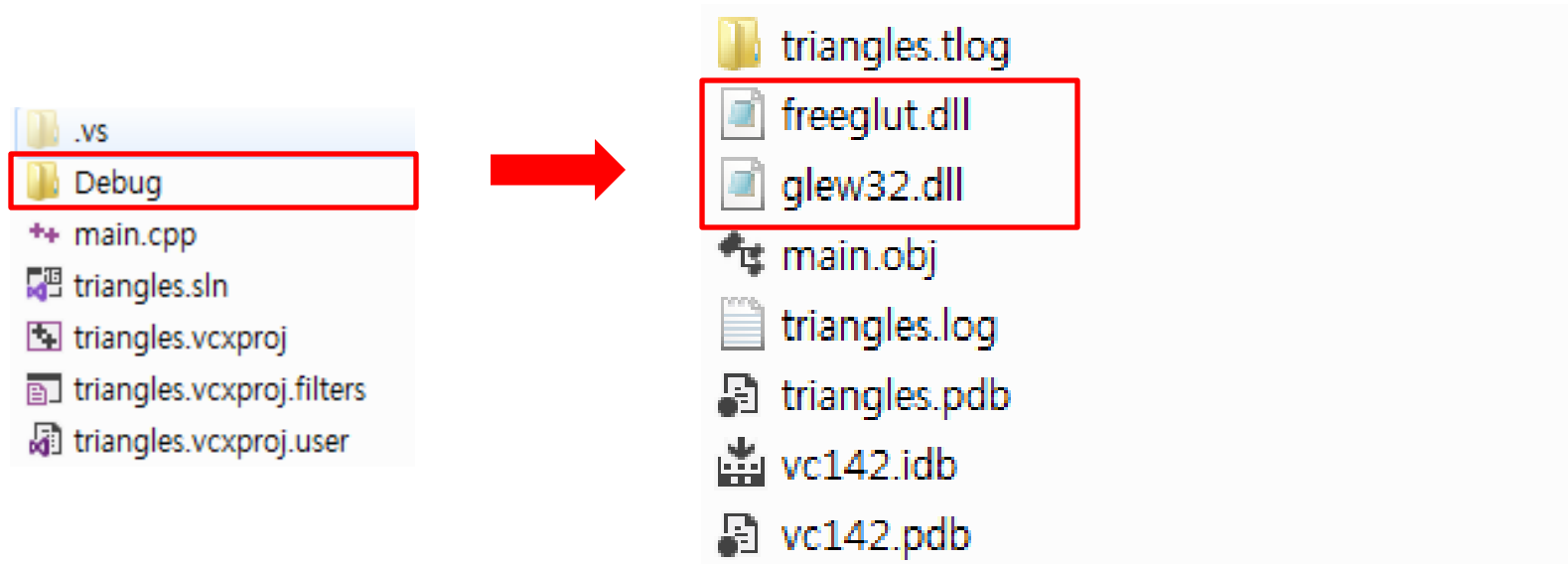
# Environment Setup for Windows

- In a similar way, link the GLEW library to your project.



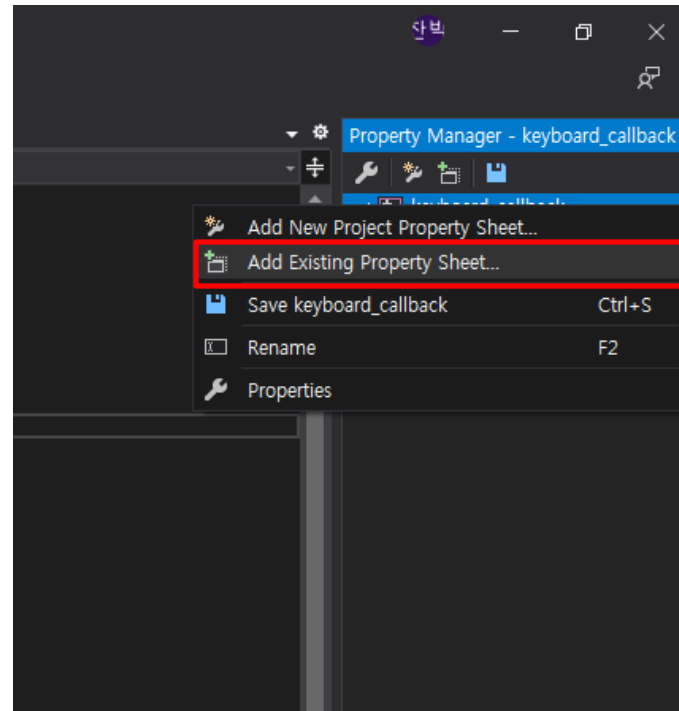
# Environment Setup for Windows

- Move the following DLL files from the GLUT and GLEW libraries to the folder where the execution file of your OpenGL app is generated (which is usually Debug or Release):
  - freeglut.dll
  - glew32.dll



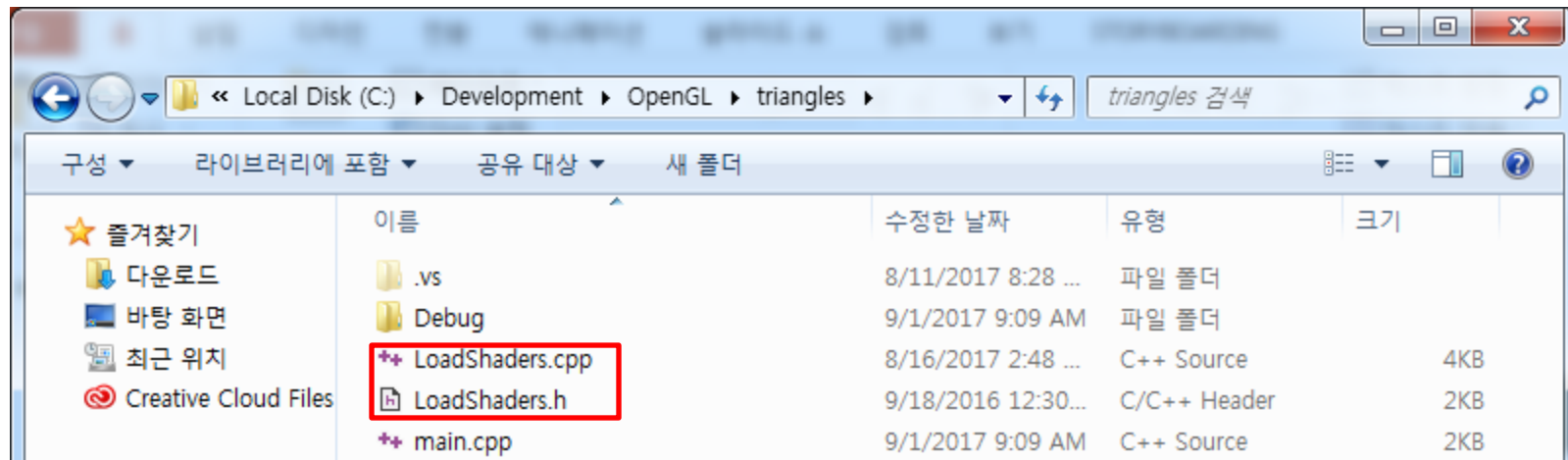
# Environment Setup for Windows

- When the setup of property is done, you can call the property to your new project by adding existing property sheet.
- After moving the DLL files to the new project folder, the basic setting for using OpenGL is done!



# Environment Setup for Windows

- Downloads “LoadShaders.zip” file on the course web page and unzip it in the project folder:



# Environment Setup for Windows

- On the Solution Explorer, click the mouse right button and select "Add" -> "Existing Item..."
- Then, select the extracted files, i.e., "LoadShader.h" and "LoadShader.cpp" and click Add.

