

OpenGL Environment Setup

***Computer Graphics
CGV Lab, NTHUCS***



Prerequisite

- ◆ On Windows:
 - Microsoft Visual Studio 2017 community/professional
- ◆ On Mac:
 - Xcode 11
- ◆ Download GLFW & GLAD from official website.
- ◆ <https://www.glfw.org/>
- ◆ <https://glad.dav1d.de/>
- ◆ Download the sample code on iLMS.



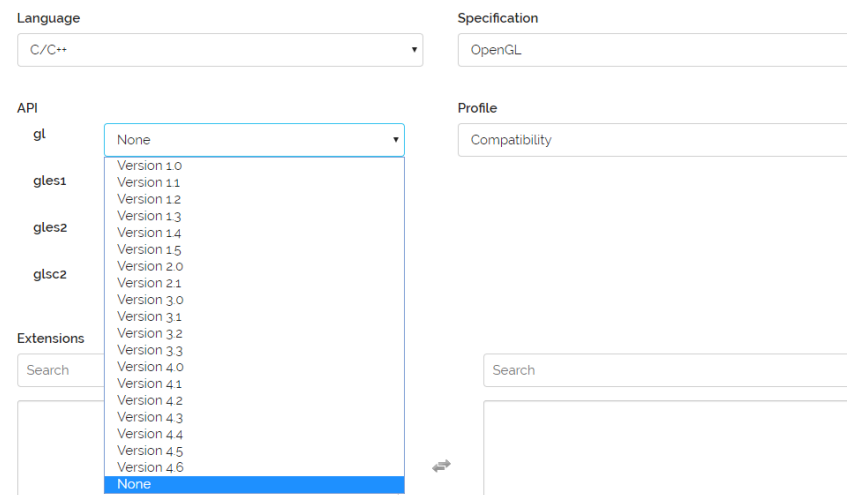
GLFW

- ◆ **GLFW is an Open Source, multi-platform library for OpenGL, OpenGL ES and Vulkan development on the desktop.**
- ◆ **It provides a simple API for creating windows, contexts and surfaces, receiving input and events.**



GLAD

- ◆ GLAD is an OpenGL loading library that loads pointers to OpenGL functions at runtime, core as well as extensions.
- ◆ It generates a loader for your exact needs based on the official specifications from the Khronos SVN. This means they are always up to date!



The screenshot shows the GLAD website's configuration interface. It features several dropdown menus and a search bar. The 'Language' dropdown is set to 'C/C++'. The 'Specification' dropdown is set to 'OpenGL'. The 'API' dropdown is set to 'None', and a list of available APIs is shown: 'gl' (None), 'gles1' (Version 1.0 to 1.3), 'gles2' (Version 1.4 to 1.5), and 'glsc2' (Version 2.0 to 4.6). The 'Extensions' section has a 'Search' button and a list of extensions. The 'Profile' dropdown is set to 'Compatibility'. There is also a 'Search' bar for specifications.

Language	Specification	API	Profile
C/C++	OpenGL	None	Compatibility

APIs: gl (None), gles1 (Version 1.0, 1.1, 1.2, 1.3), gles2 (Version 1.4, 1.5), glsc2 (Version 2.0, 2.1, 3.0, 3.1, 3.2, 3.3, 4.0, 4.1, 4.2, 4.3, 4.4, 4.5, 4.6)

Extensions: Search

Profile: Compatibility

Search



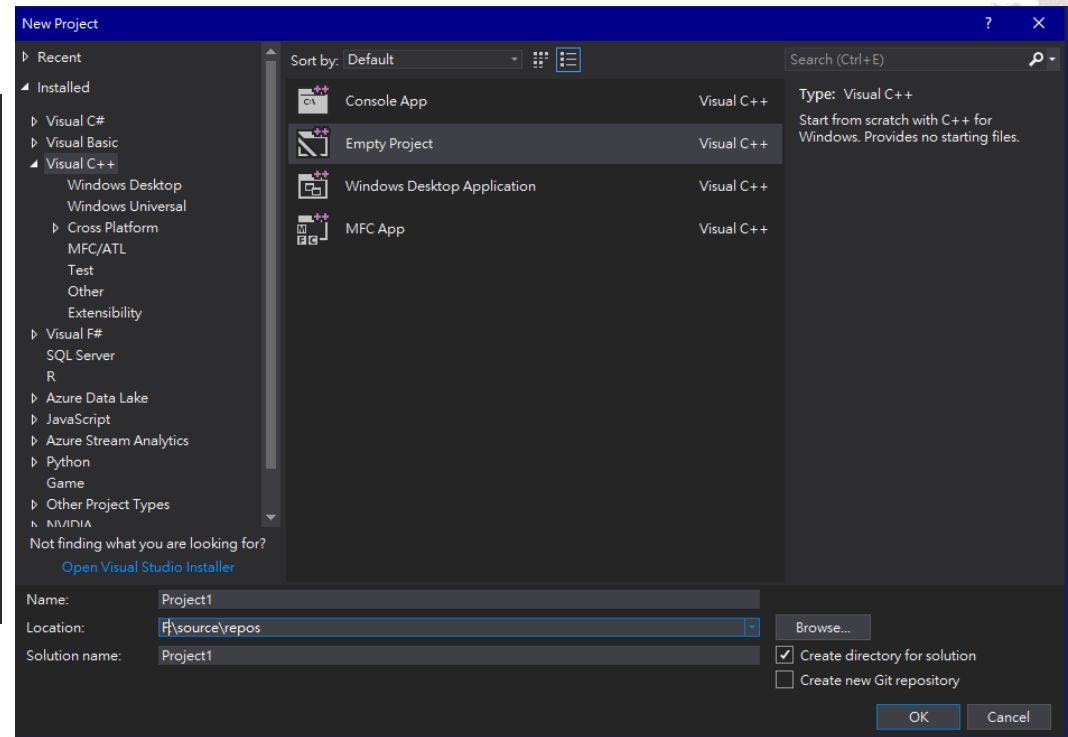
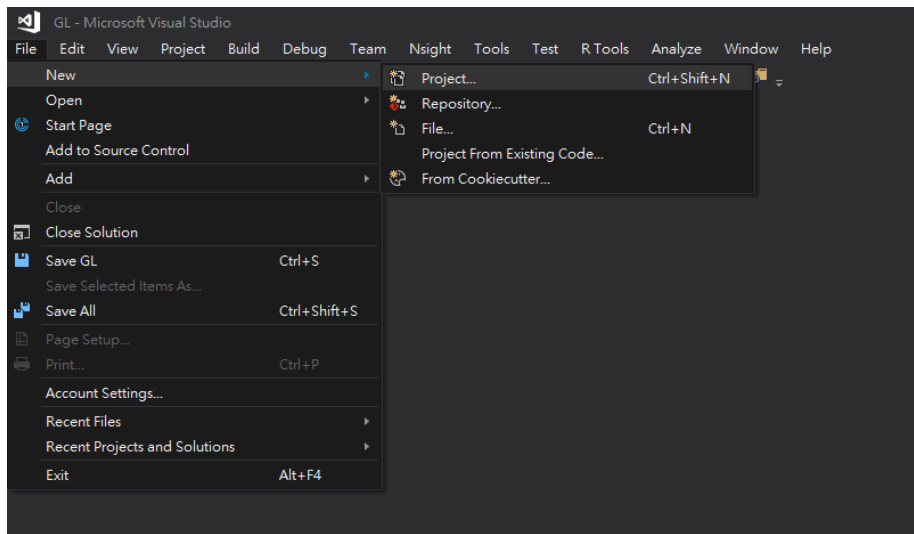
Visual Studio

◆ Ensure you have installed C++ package when installing IDE.



Visual Studio

◆ Create a new empty project.



Visual Studio

◆ Copy the sample code to project folder.

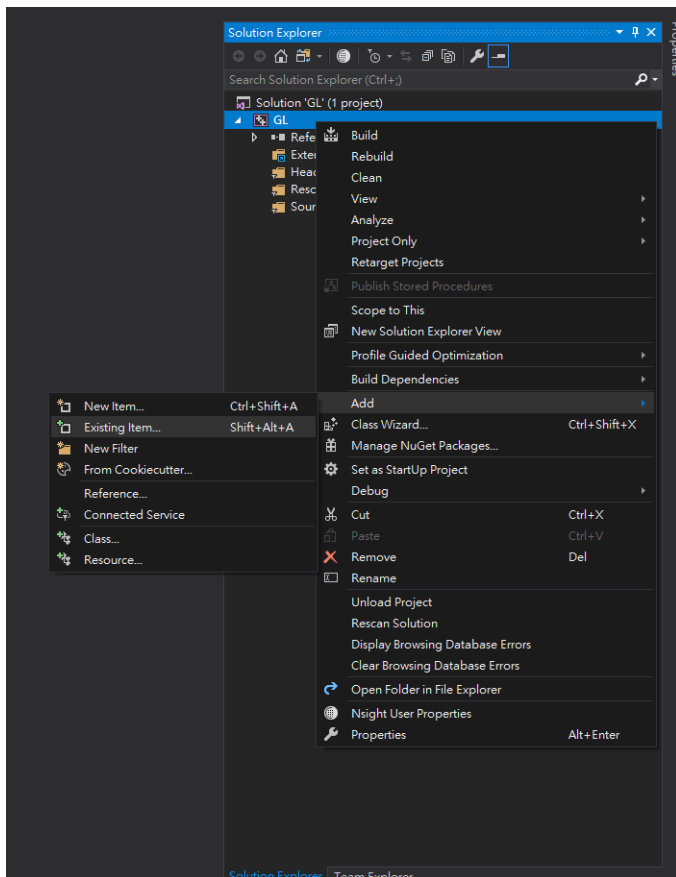
Recommand project hierarchy

- projectName.sln
- projectName\
 - projectName.vcxproj
 - projectName.vcxproj.filters
 - projectName.vcxproj.user
 - main.cpp
 - shader.fs
 - shader.vs
 - textfile.cpp
 - textfile.h



Visual Studio

◆ Add sample code to project.

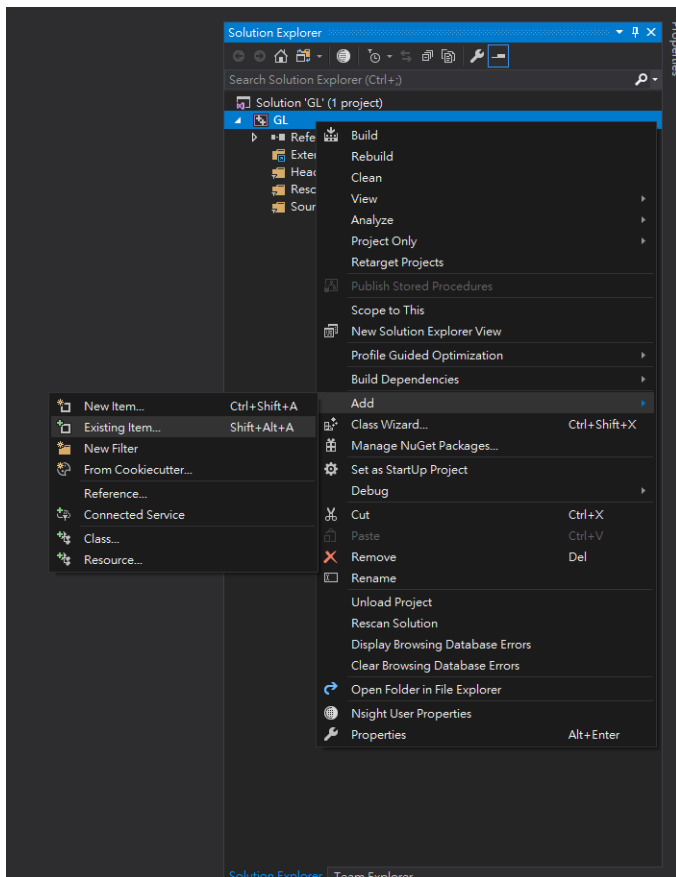


main.cpp	2020/3/18 下午 01:01	C++ Source	6 KB
shader.fs	2020/3/11 上午 11:38	FS 檔案	1 KB
shader.vs	2019/3/20 下午 07:46	VS 檔案	1 KB
textfile.cpp	2020/3/17 下午 05:07	C++ Source	2 KB
textfile.h	2020/3/11 上午 10:54	C/C++ Header	1 KB



Visual Studio

◆ Add sample code to project.



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Visual Studio

- ◆ **Copy the GLFW & GLAD to project folder.**
- ◆ **glad.c can be directly added to project and compiled.**
- ◆ **You can compile glfw3.lib from source or download pre-compiled version from official website.**

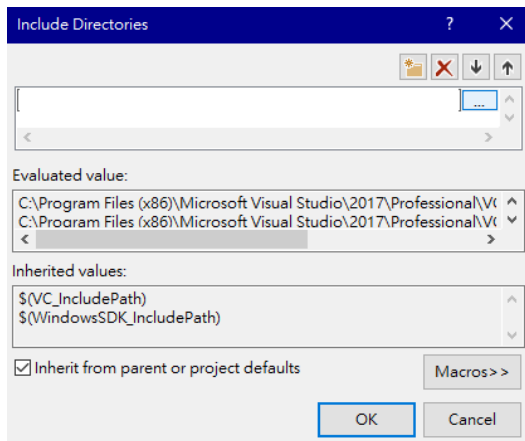
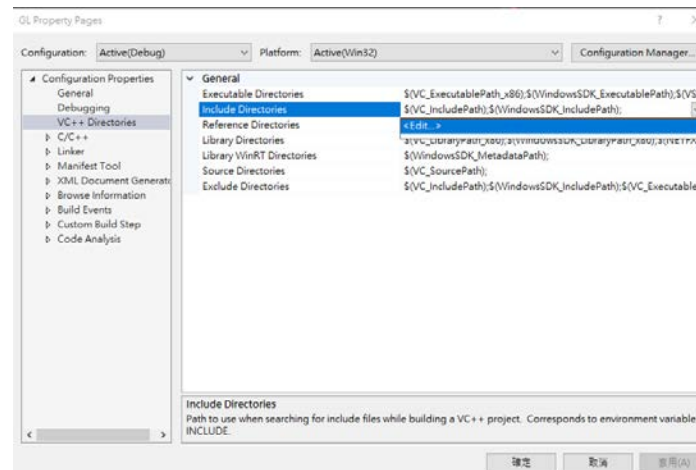
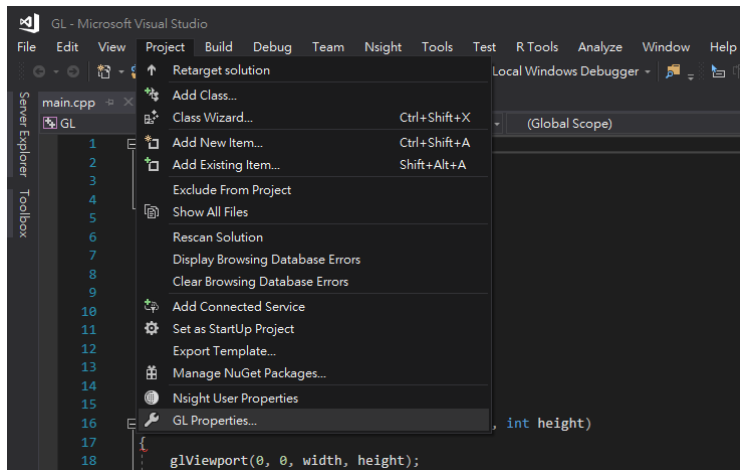
Recommand project hierarchy

```
-projectName.sln
-include\
    - glad\
    - GLFW\
    - KHR\
-projectName\
    - glad.c
-lib\
    - glfw3.lib
```



Visual Studio

◆ Add include path to project setting.



GL

include

lib

2020/3/18 下午 04:49

檔案資料夾

2020/3/18 下午 04:42

檔案資料夾

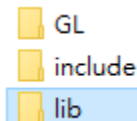
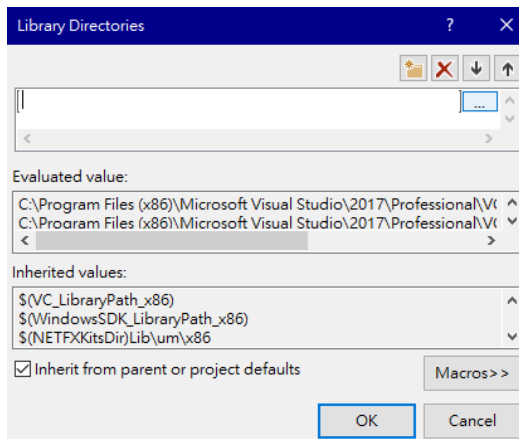
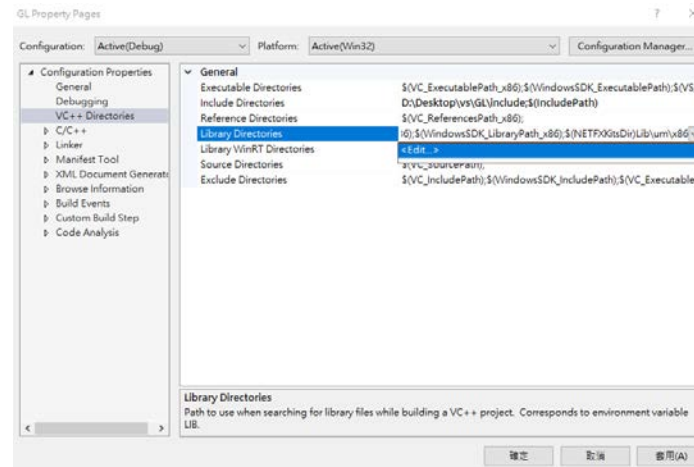
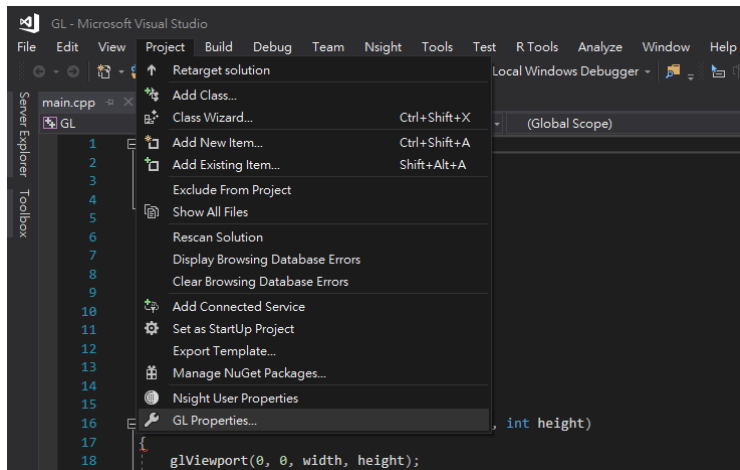
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檔案資料夾



Visual Studio

◆ Add library path to project setting.

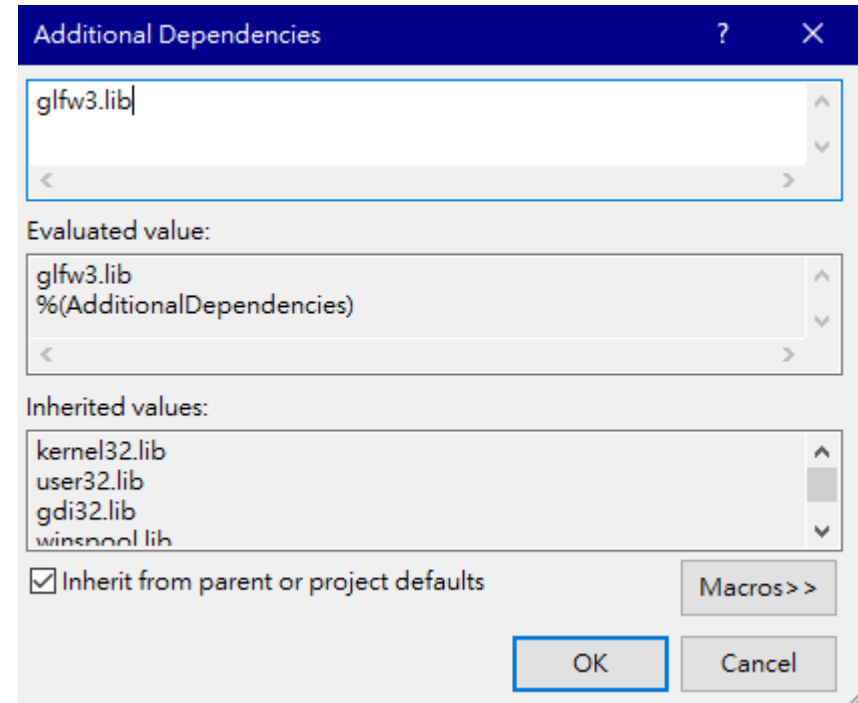
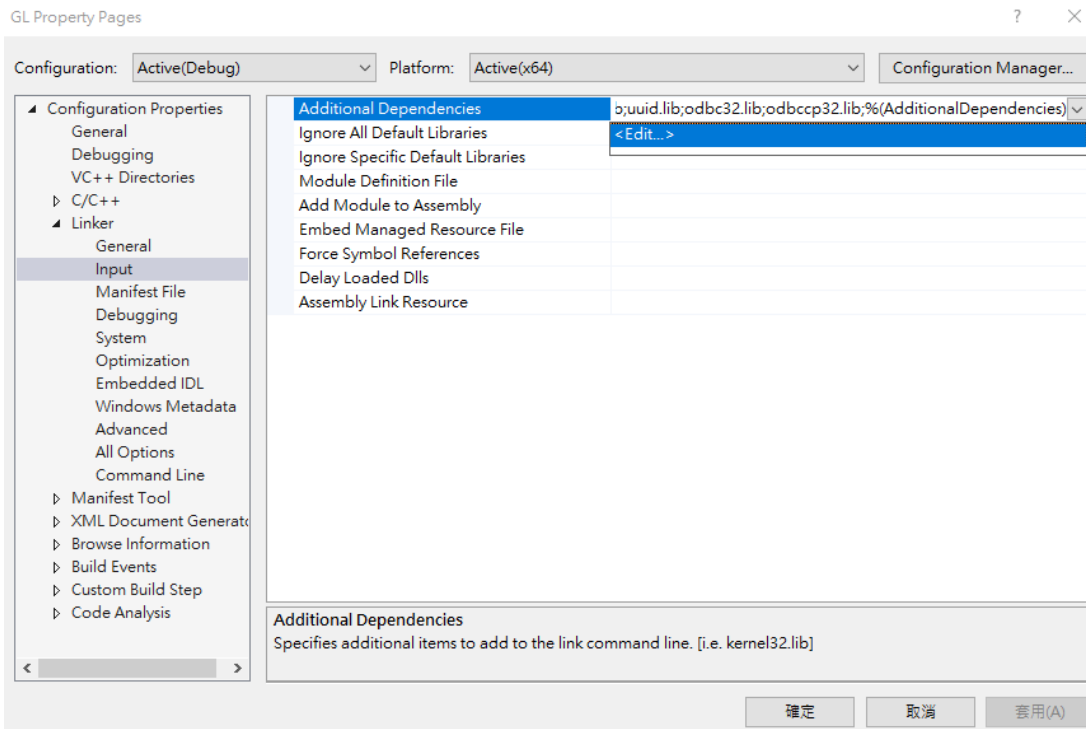


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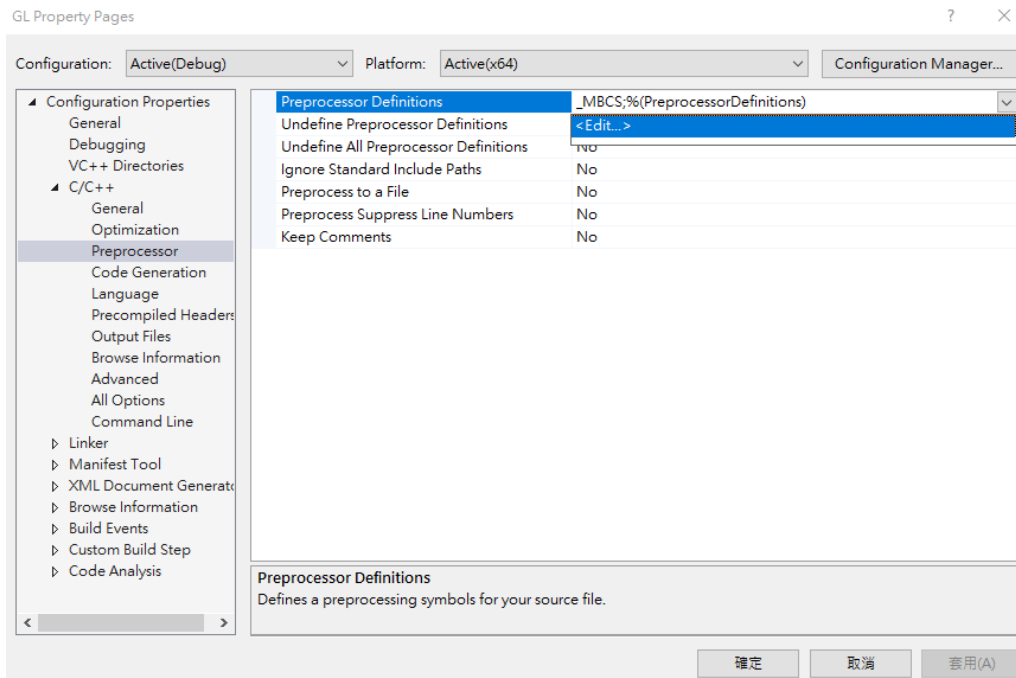
Visual Studio

◆ Add glfw3.lib to linker input.



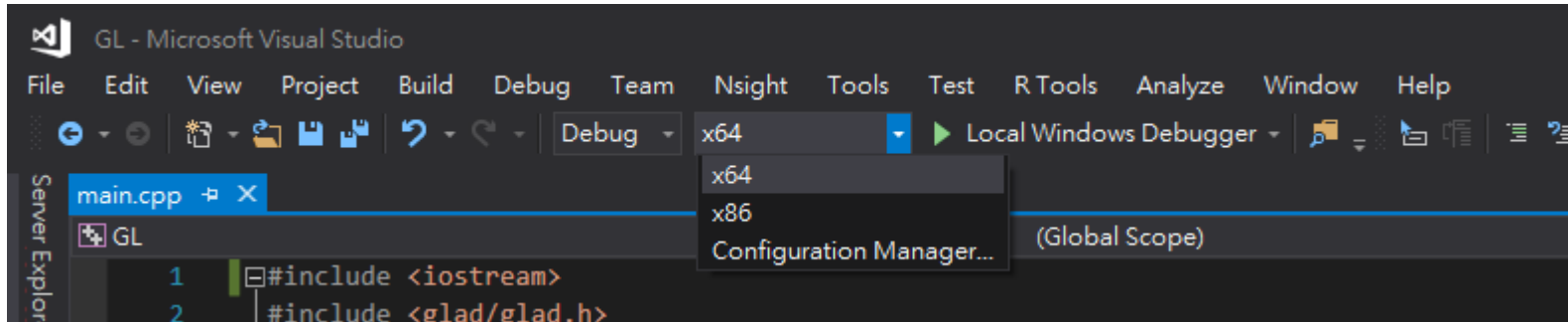
Visual Studio

- ◆ Add `_CRT_SECURE_NO_WARNINGS` to preprocessor definitions to prevent secure warning.



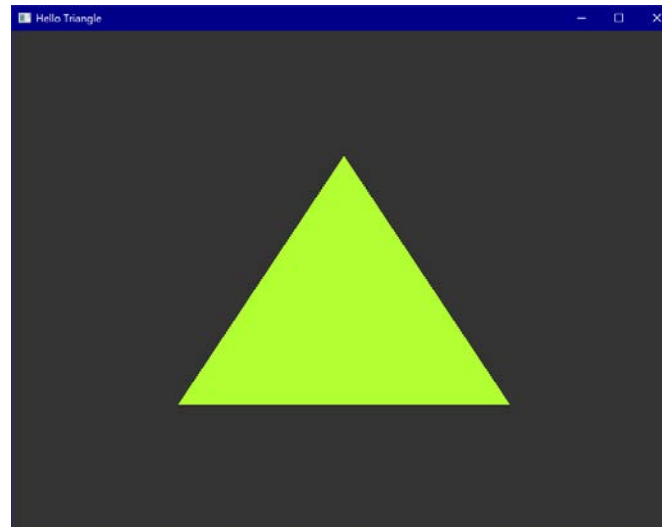
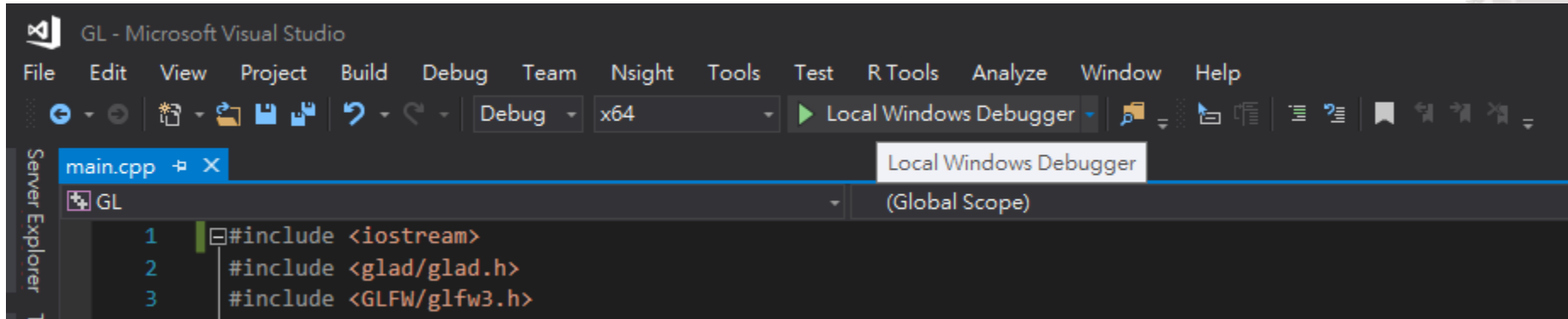
Visual Studio

- ◆ Choose a proper configuration.
- ◆ If you use 32-bit GLFW, choose x86.
- ◆ If you use 64-bit GLFW, choose x64.



Visual Studio

◆ Build and Run.



Xcode

◆ Create new Xcode command line project.



Welcome to Xcode

Version 11.3.1 (11C504)



Get started with a playground

Explore new ideas quickly and easily.



Create a new Xcode project

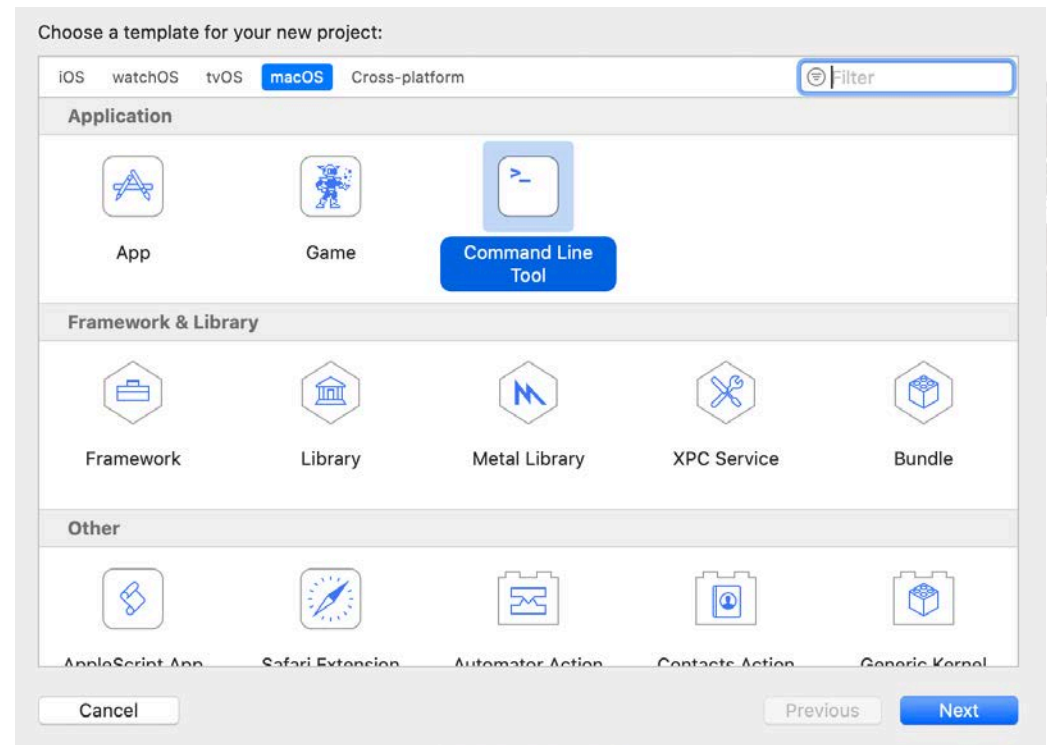
Create an app for iPhone, iPad, Mac, Apple Watch, or Apple TV.



Clone an existing project

Start working on something from a Git repository.

☒ Show this window when Xcode launches



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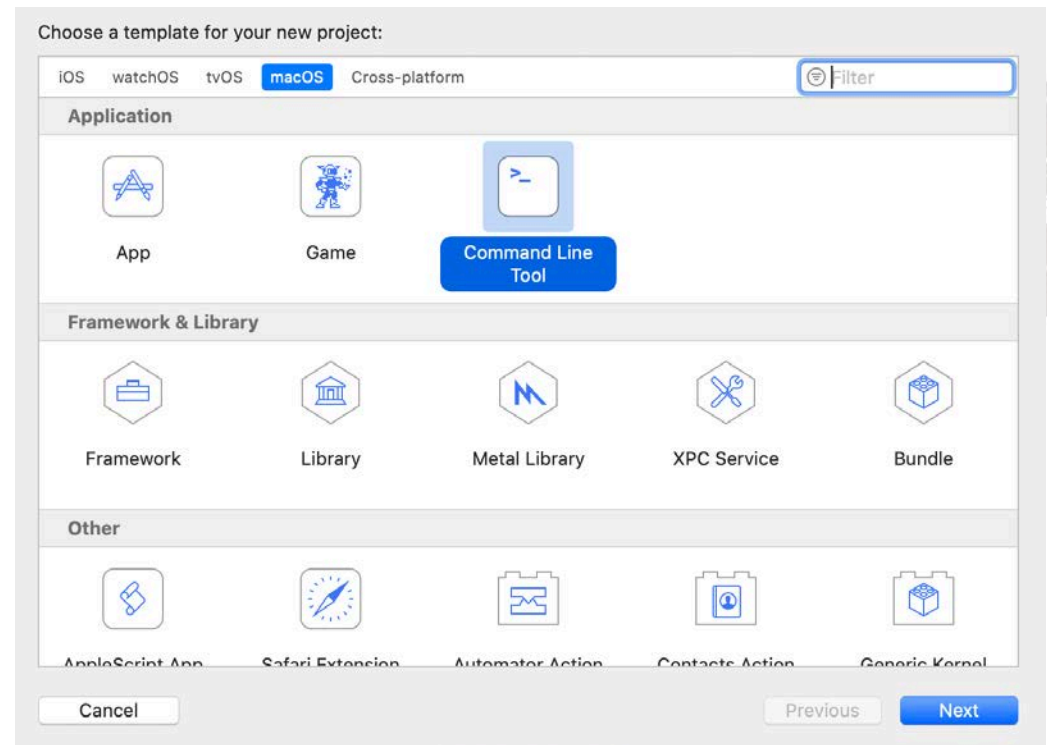
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Xcode

- ◆ **Copy the sample code to project folder.**

Recommand project hierarchy

-projectName.xcodeproj

-projectName\
 - main.cpp

 - shader.fs

 - shader.vs

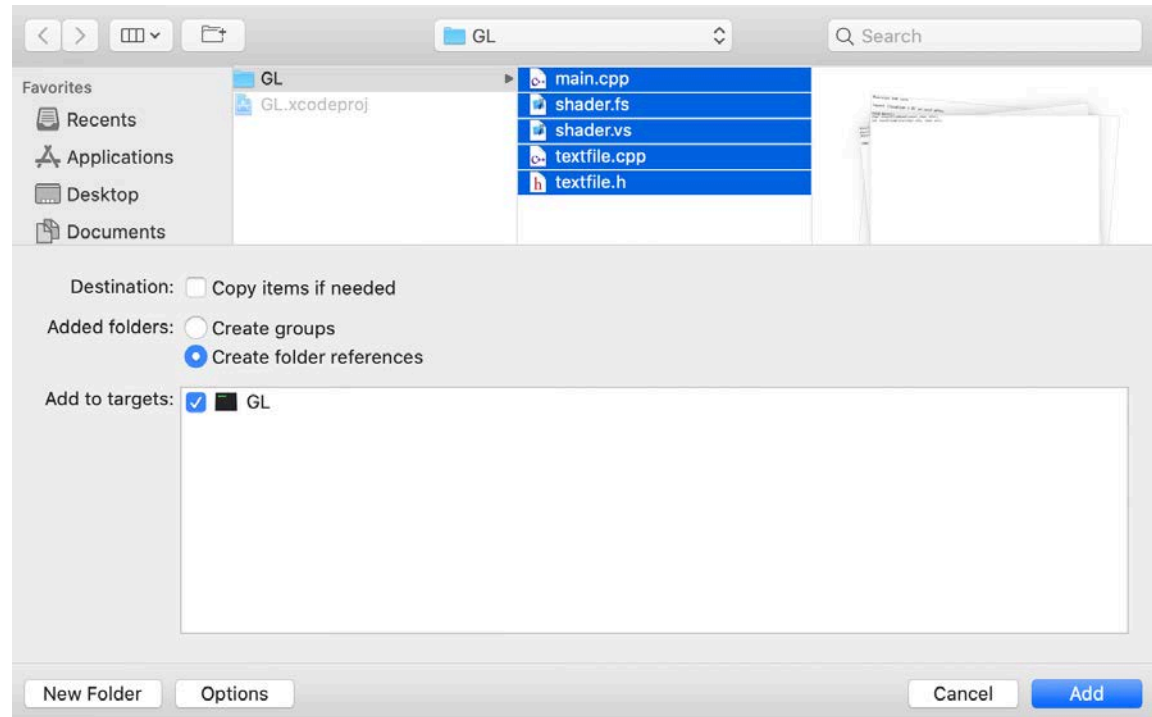
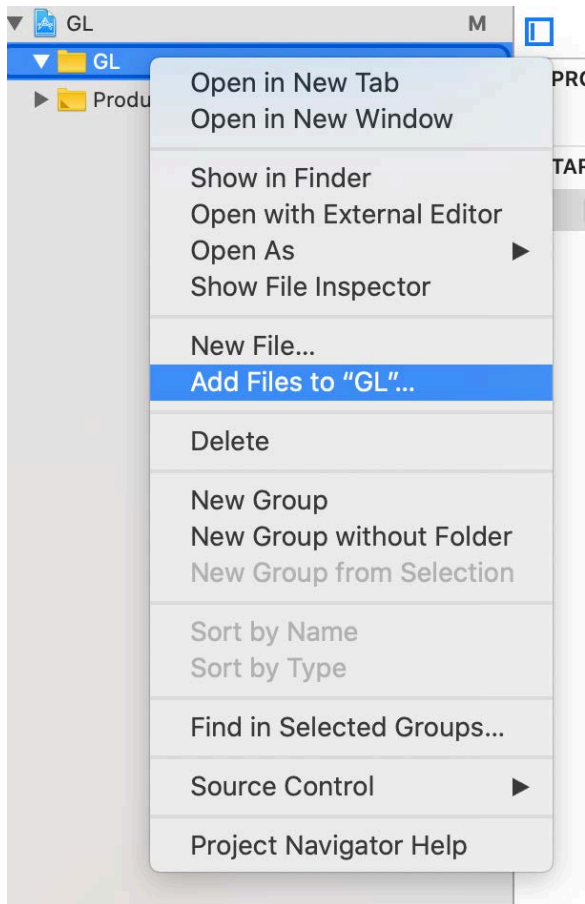
 - textfile.cpp

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Xcode

◆ Add sample code to project.



Xcode

- ◆ **Copy the GLFW & GLAD to project folder.**
- ◆ **glad.c can be directly added to project and compiled.**
- ◆ **You can compile glfw3.dylib from source or download pre-compiled version from official website.**

Recommand project hierarchy

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-projectName\
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- glad.c
-

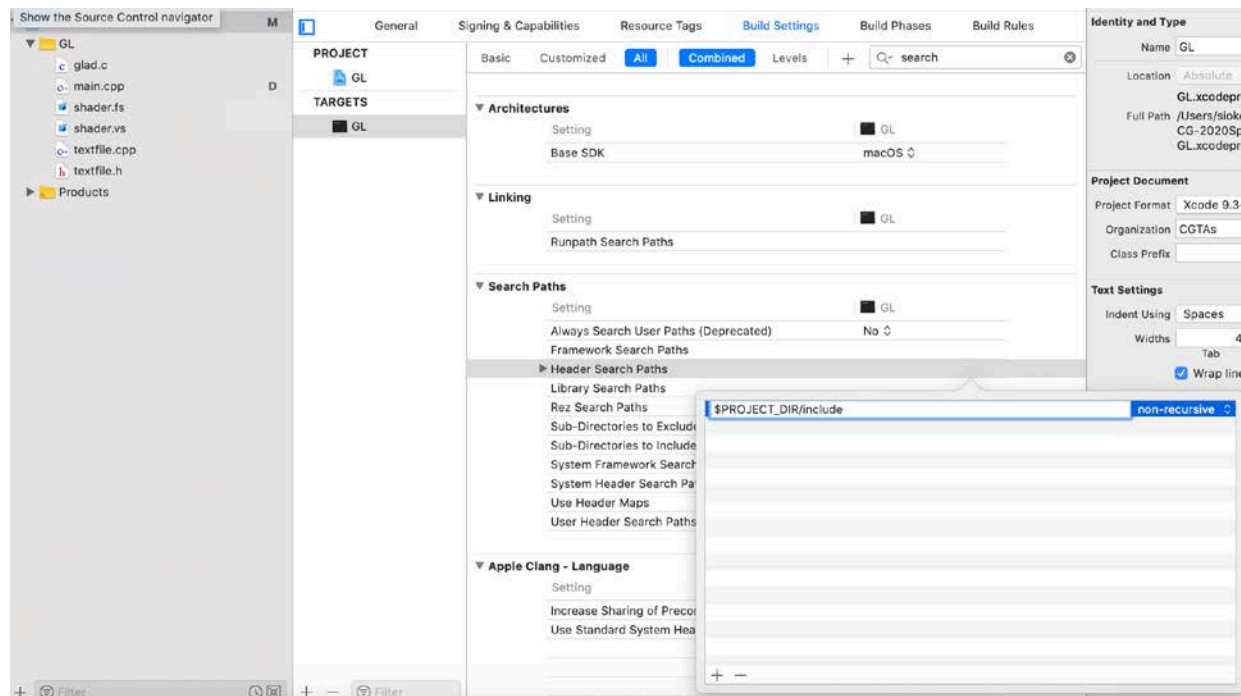
-lib\
-

- glfw3.dylib



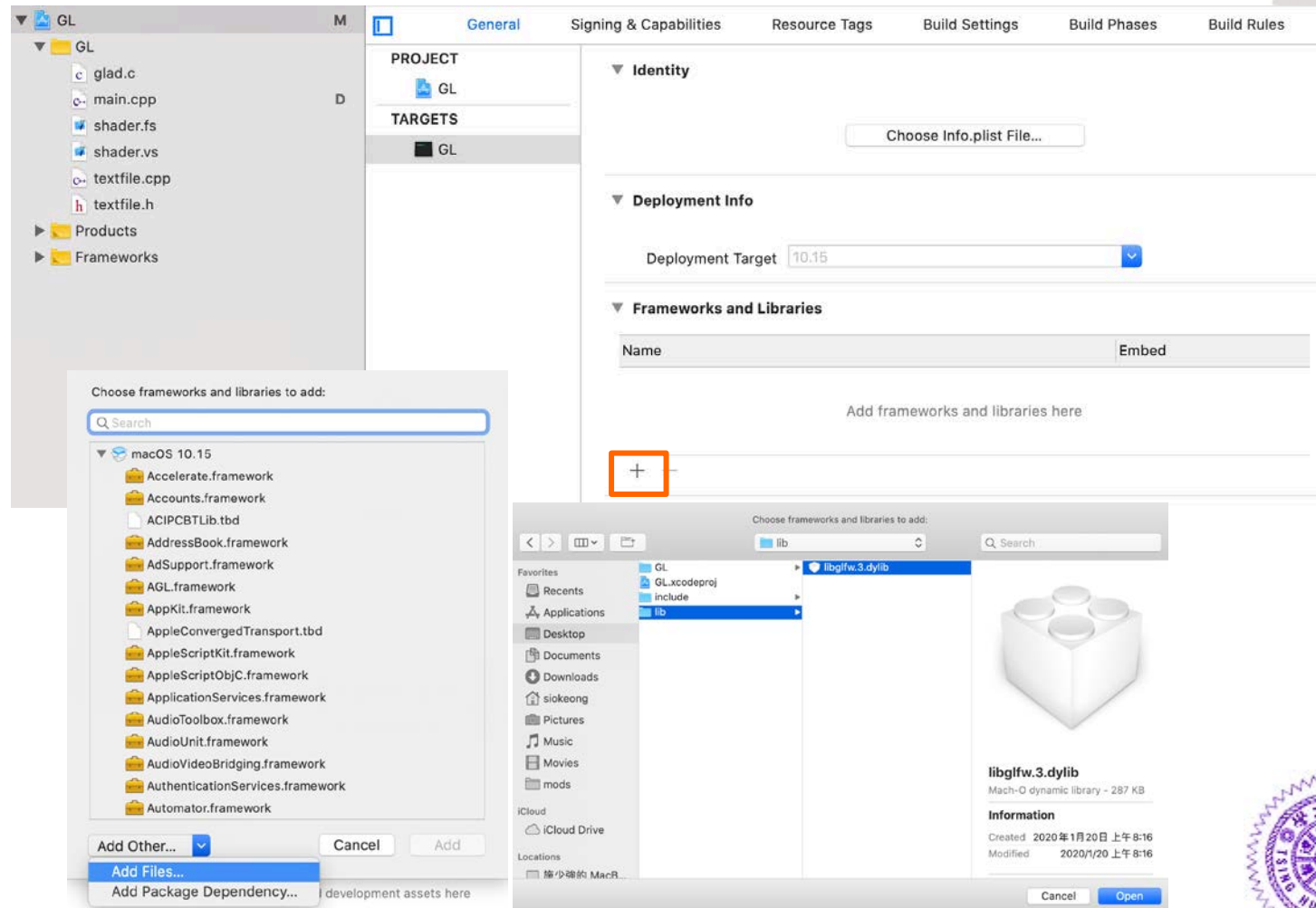
Xcode

- ◆ Add include path to header search paths.
- ◆ `$PROJECT_DIR` means the location of `projectName.xcodeproj`.



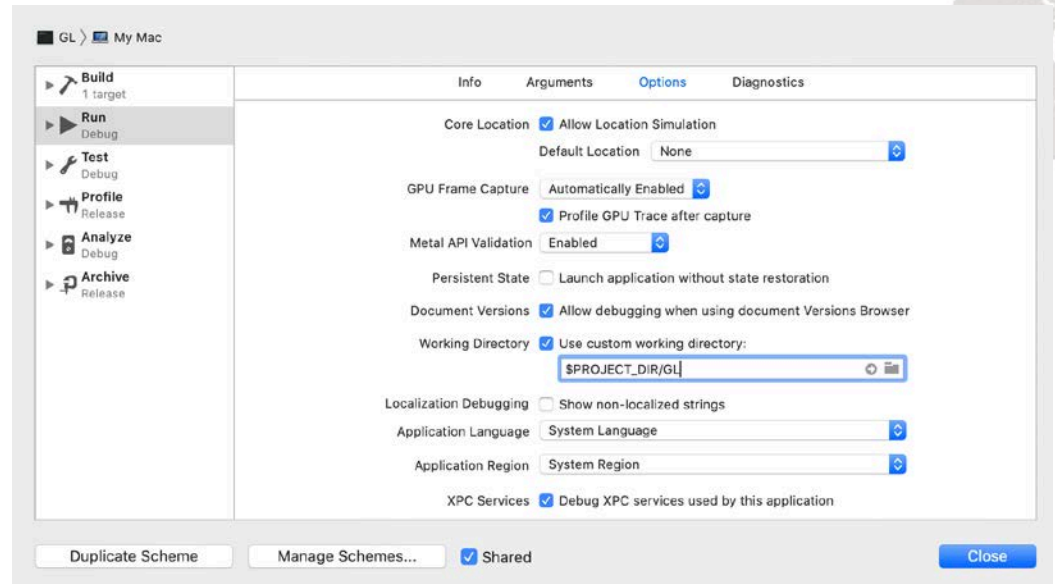
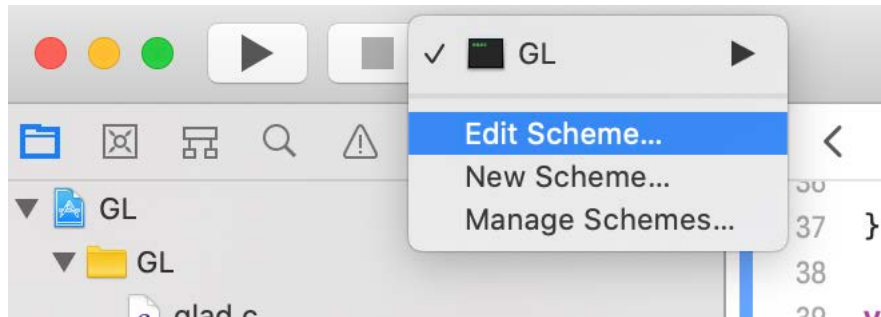
Xcode

◆ Add lib file to libraries list.



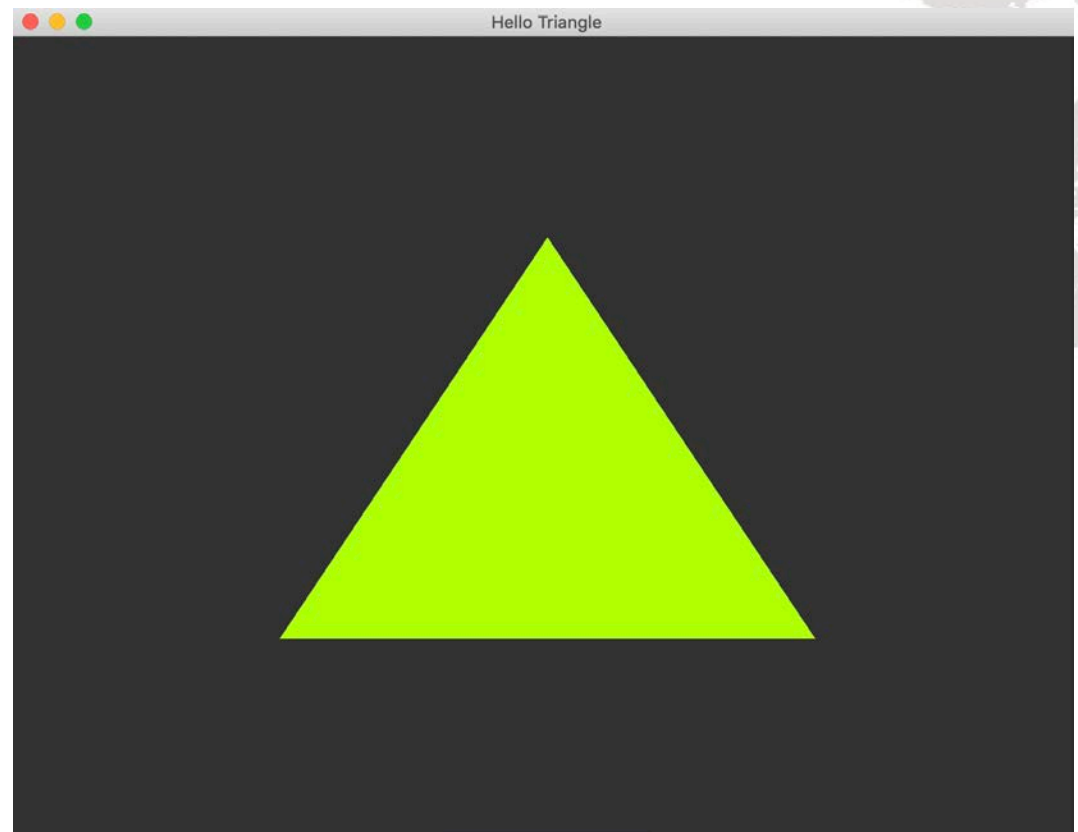
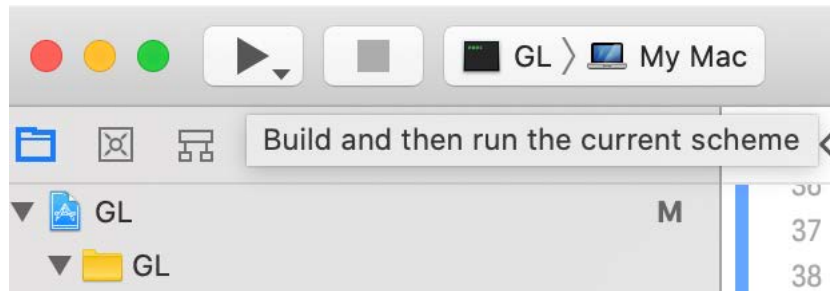
Xcode

- ◆ Set the working directory to correct folder.
- ◆ We recommend set the path to `$PROJECT_DIR/projectName`.



Xcode

◆ Build and run.



Sample Code

- ◆ Download “HelloTriangle.zip” available from iLMS, unzip the downloaded file.
- ◆ The file contains a framework already setup for VS2017 and Xcode, choose a framework depends on your OS.



Reference

- ◆ <https://www.glfw.org/>
- ◆ https://www.khronos.org/opengl/wiki/OpenGL_Loading_Library
- ◆ <https://glad.dav1d.de/>

