Introduction to OpenGL

Outline

☐ What is OpenGL

☐ OpenGL version

☐ What is GLUT

☐ Install OpenGL and GLUT

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What is OpenGL

 Open Graphics Library (OpenGL) is a cross language, cross platform API for rendering 2D and 3D vector graphics.

- No window system
- No input handling

 The API is typically used to interact with a graphics processing unit (GPU), to achieve hardware accelerated rendering.

3D model → Application → OpenGL → Hardware → Render image

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OpenGL version

- Legacy OpenGL (1.0 ~ 2.1)
  - Fixed (function) (rendering) pipeline
  - Version 2.0 add the OpenGL Shading Language (GLSL)

- Modern OpenGL (3.0 ~ 4.5)
  - Programmable (rendering) pipeline
  - Fixed pipeline functions were declared deprecated
  - Core (no deprecated API) and compatibility (all)

What is GLUT

- OpenGL Utility Toolkit(GLUT) is a window system independent toolkit for writing OpenGL programs.
- It implements a simple windowing application programming interface (API) for OpenGL.

Install OpenGL and GLUT - 0

 Install Visual Studio (version: 2019~) (Must install C++ Desktop Tool)

OpenGL 4.6

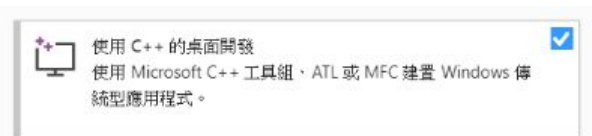- Make sure your driver is ready
- https://www.khronos.org/opengl/wiki/Getting_Started

 GLUT 3.7

- Download glut header file, .lib, . Dll
- https://www.opengl.org/resources/libraries/glut/glutdlls37beta.zip

Install OpenGL and GLUT - 1

1. Open a new visual studio project
2. Select empty project
3. Set any project name you want

Install OpenGL and GLUT - 2

☐ Make "include", "lib", "dll" directory

☐ Put downloaded glut files into corresponding directory

☐ (Red word is additional file for this howmework)

★ProjectName
- ○ ProjectName
  - ■ include
    - ● glut.h
    - ● Object.h
    - ● stb_image.h
  - ■ lib
    - ● glut.lib
    - ● glut32.lib
  - ■ dll
    - ● glut.dll
    - ● glut32.dll
    - ● Pikachu.obj
    - ● Pikachu.png
    - ● clock.obj
  - ○ Object.cpp
  - ○ ProjectName.sln

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Install OpenGL and GLUT - 2

Install OpenGL and GLUT - 2
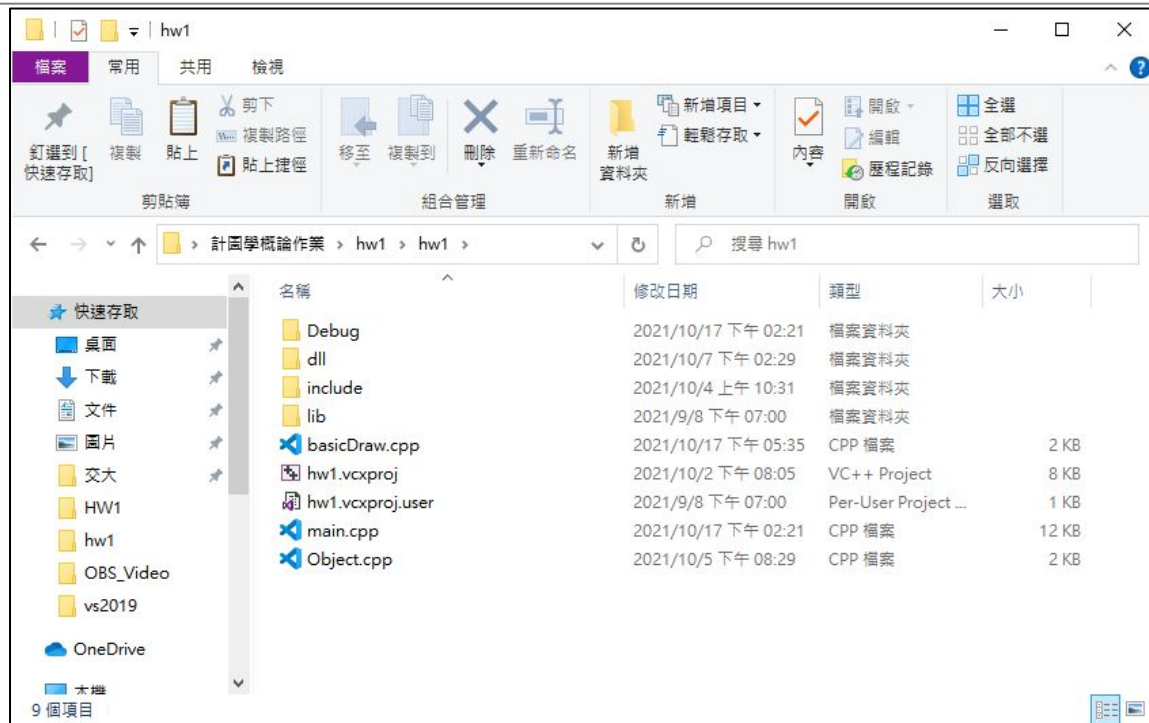
Install OpenGL and GLUT - 3

 Right click "ProjectName"

 Click "property"

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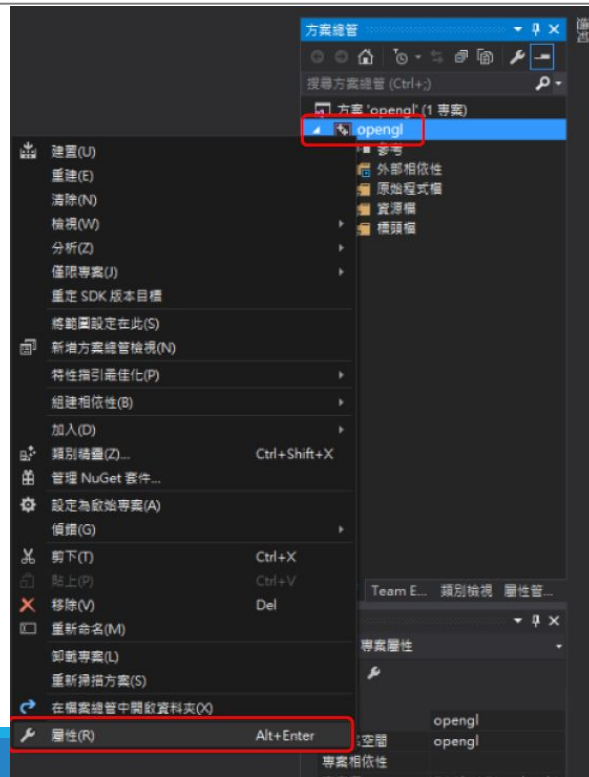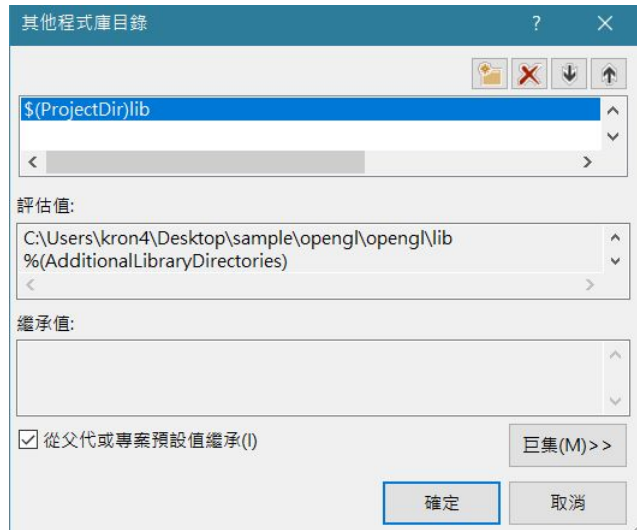
Install OpenGL and GLUT - 4

 Click "VC++ directory"

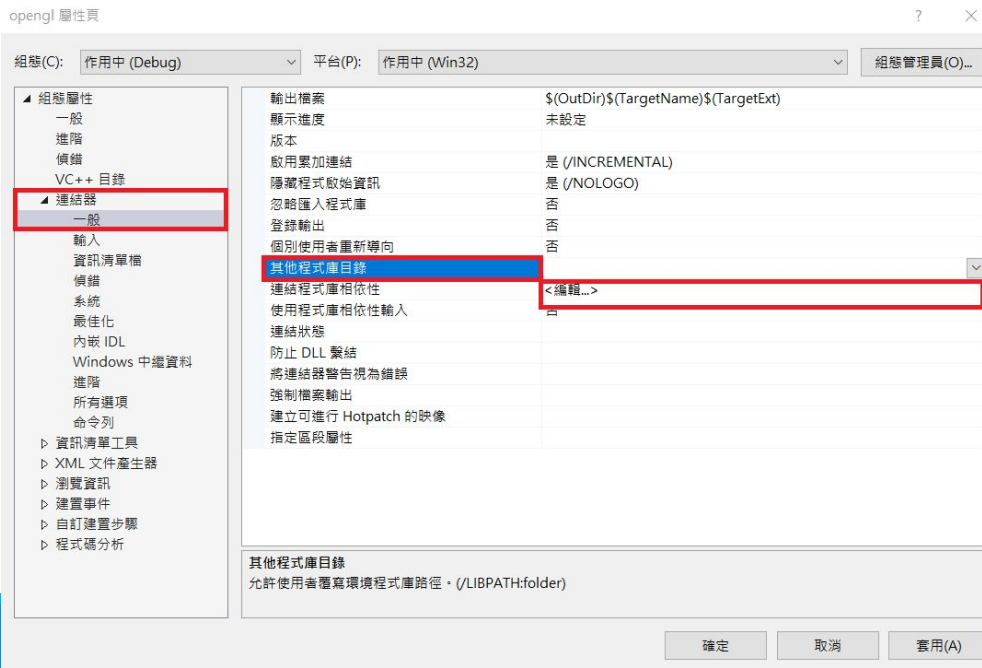 Set "include directory" into "$(ProjectDir)include"
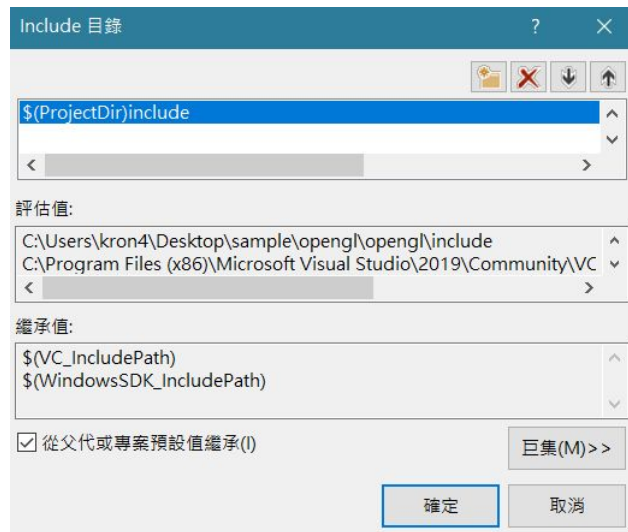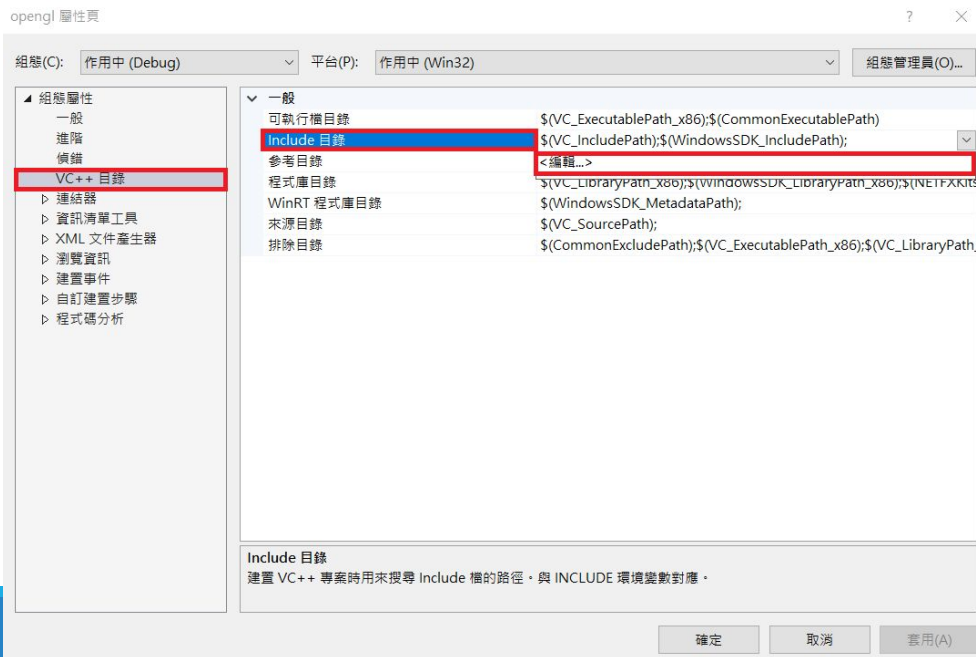
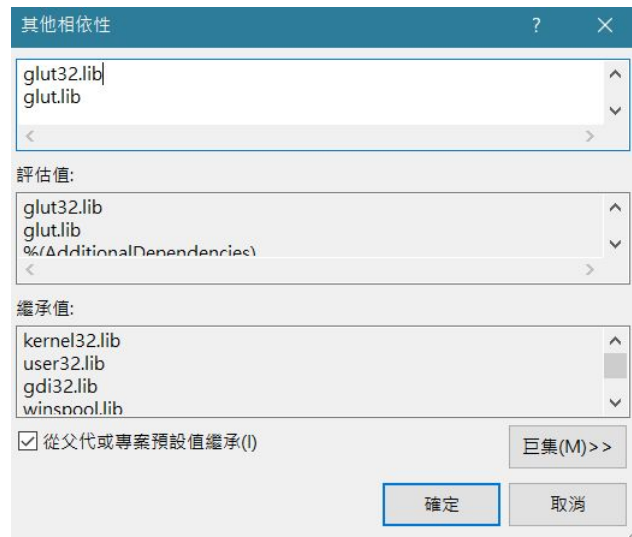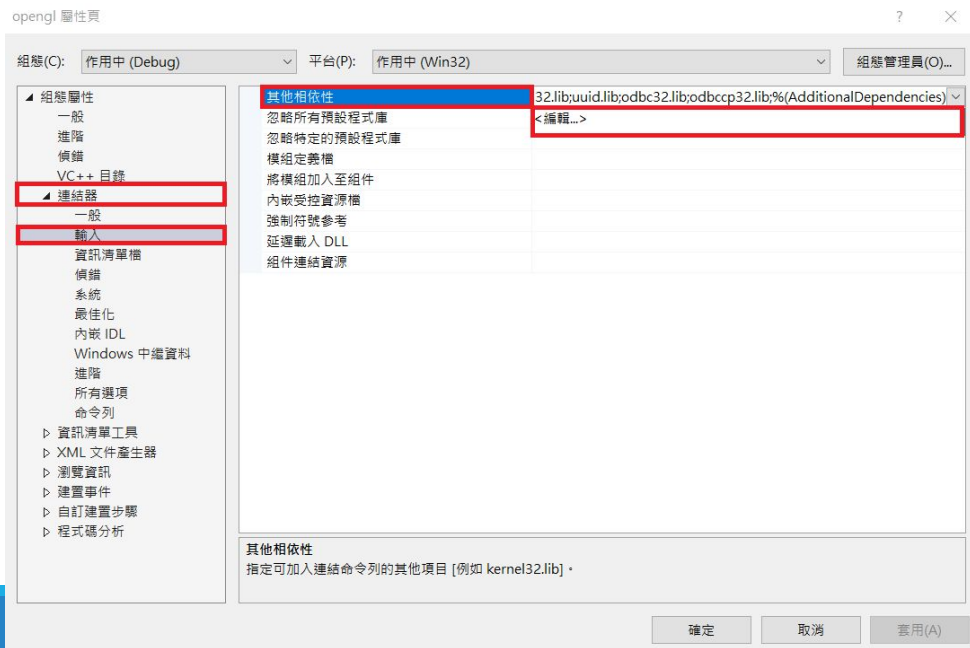# Install OpenGL and GLUT - 5

☐ Click "linker" -> Click "general"

☐ Set "additional library directories" into "$(ProjectDir)lib"
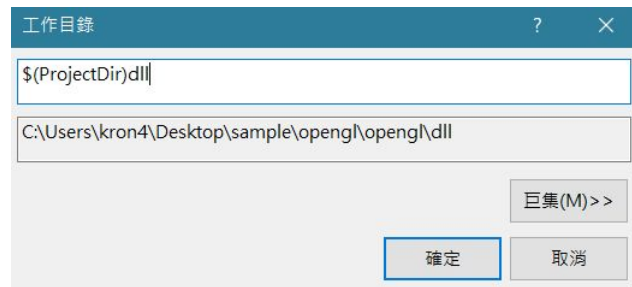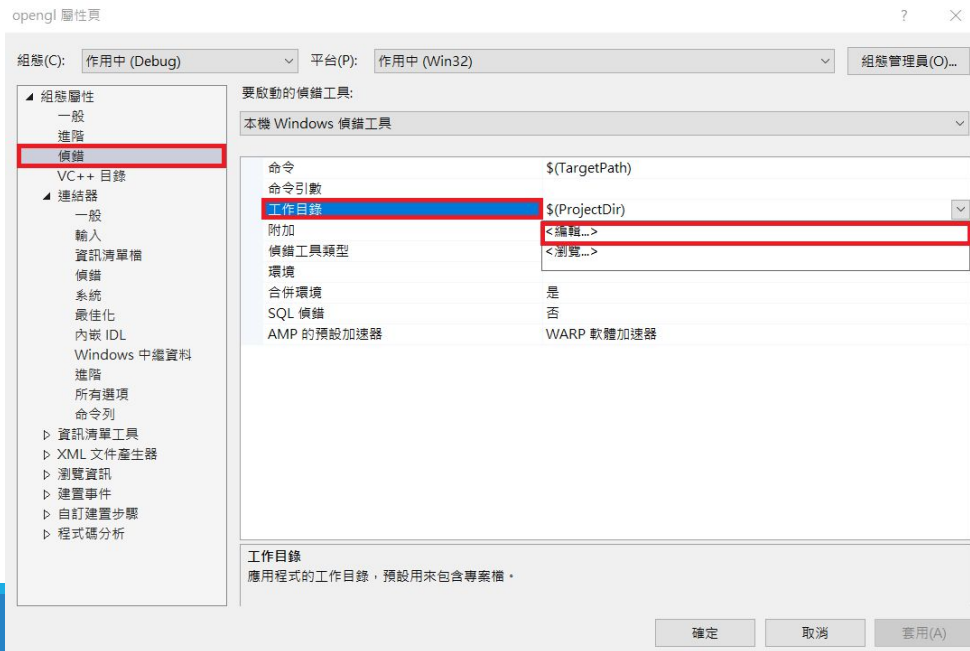
Install OpenGL and GLUT - 6

 Click "linker" -> Click "input"
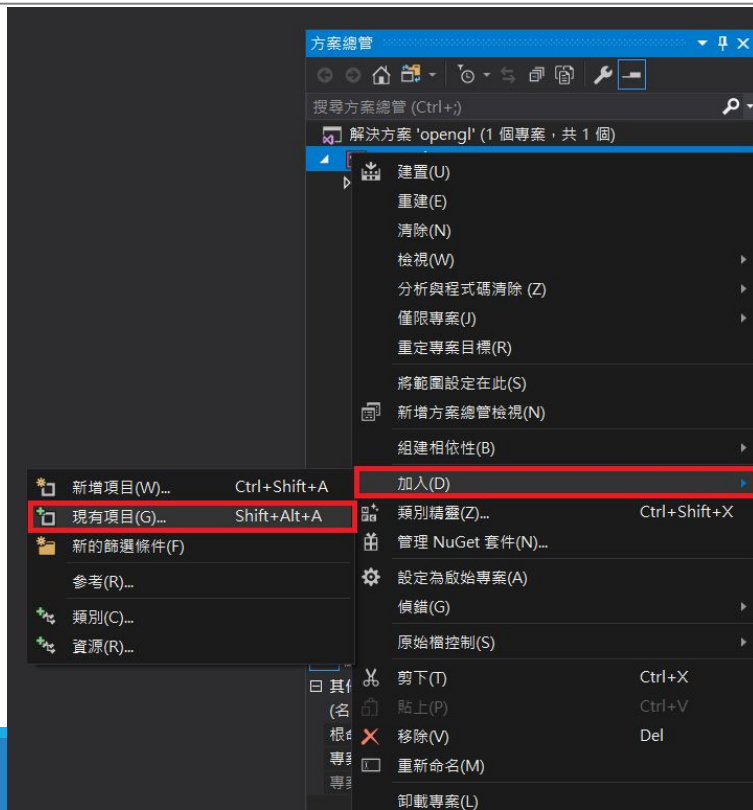
 Set "additional dependencies" into "glut32.lib;glut.lib"

Install OpenGL and GLUT - 7

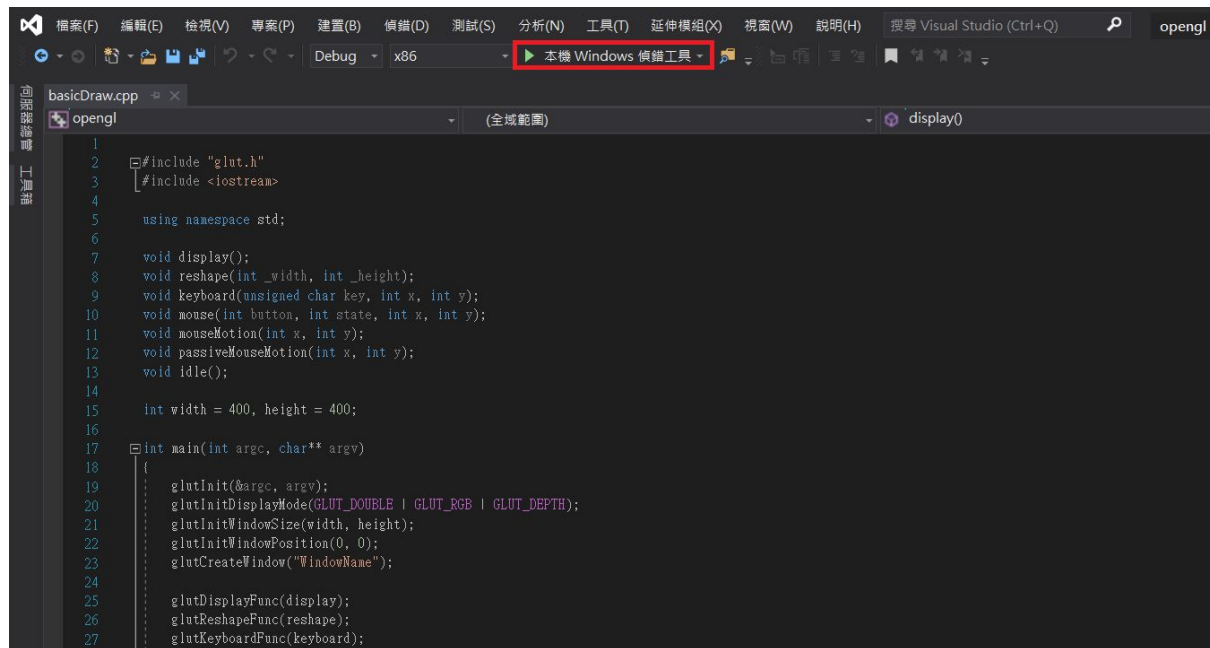 Click "debugging"

 Set "working directory" into "$(ProjectDir)dll"

Install OpenGL and GLUT - 8

 Right click "ProjectName"

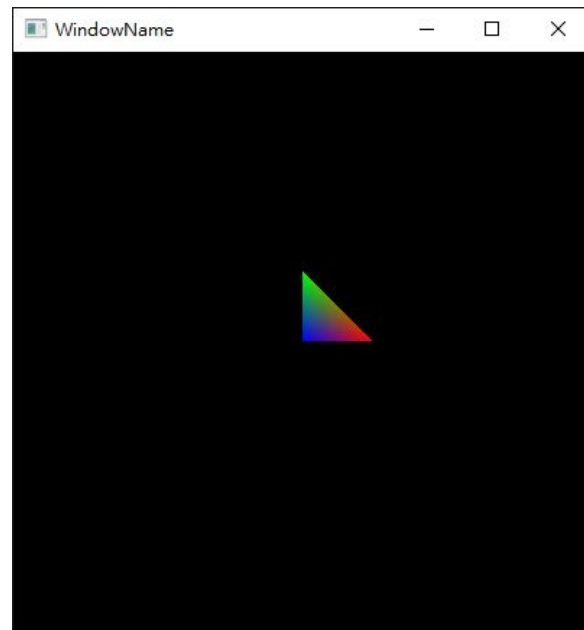 Click "add"

 Click "existing item"

 Choose "basicDraw.cpp"

Install OpenGL and GLUT - 9

Exception

 When you run the code and get error message like this,

 you can try "not to set additional dependencies" in "Install OpenGL and GLUT – 6" step.