Introduction to OpenGL

Outline

- What is OpenGL
- OpenGL version
- What is GLUT
- Install OpenGL and GLUT

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.

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.

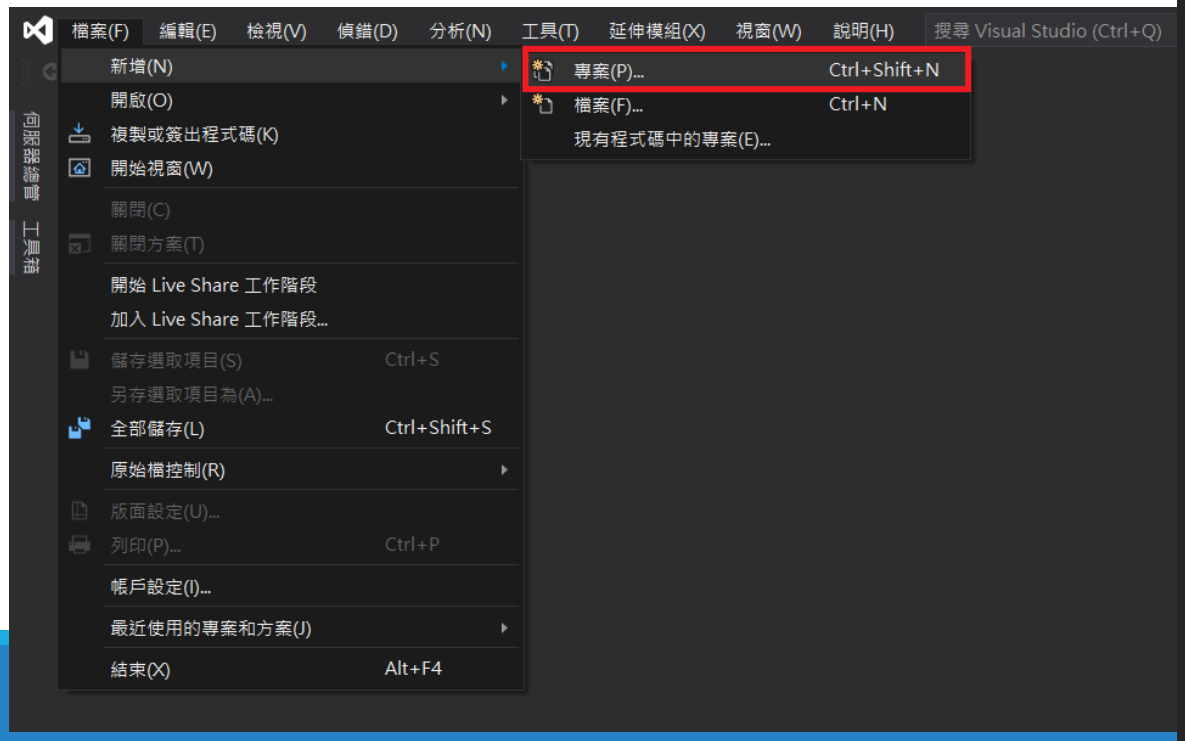
Install OpenGL and GLUT - 0

- Install Visual Studio (version: ~2017 or 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

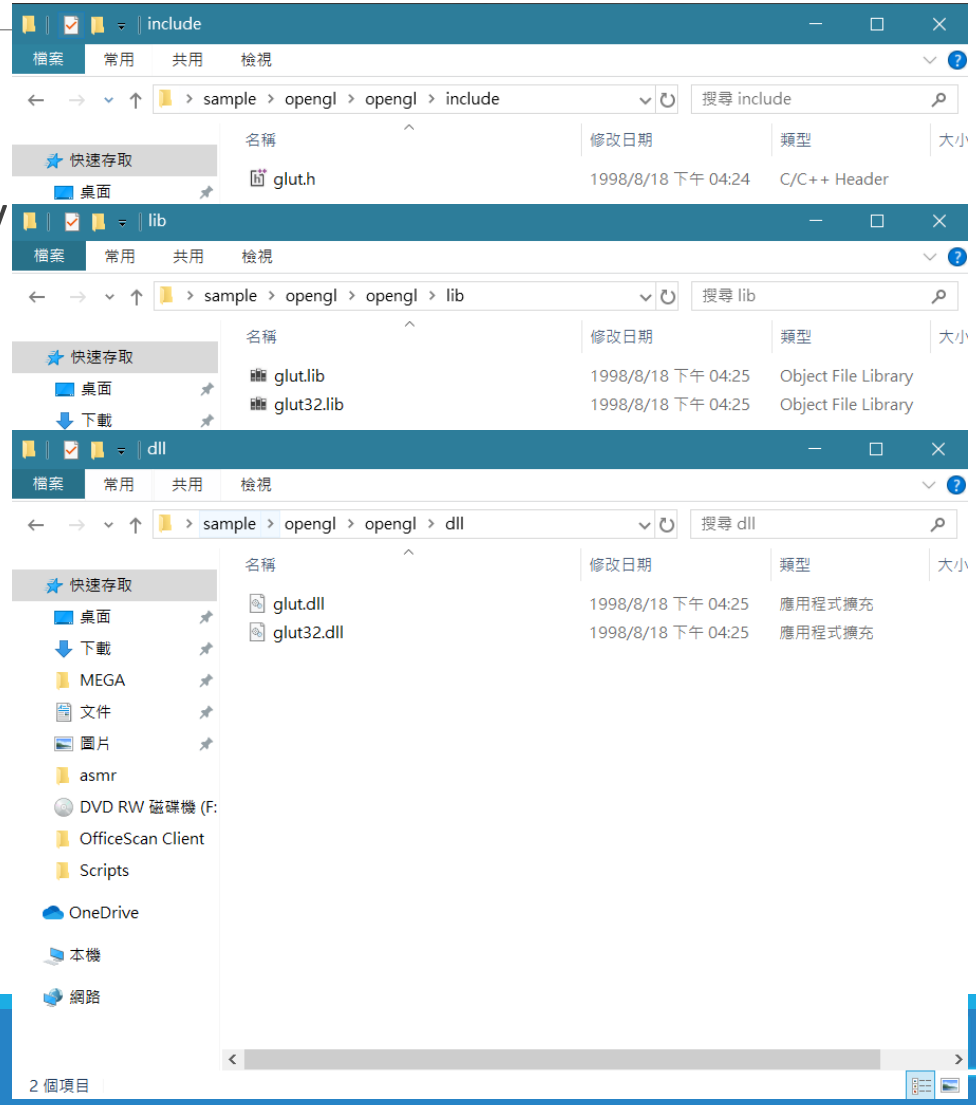
Install OpenGL and GLUT - 1

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



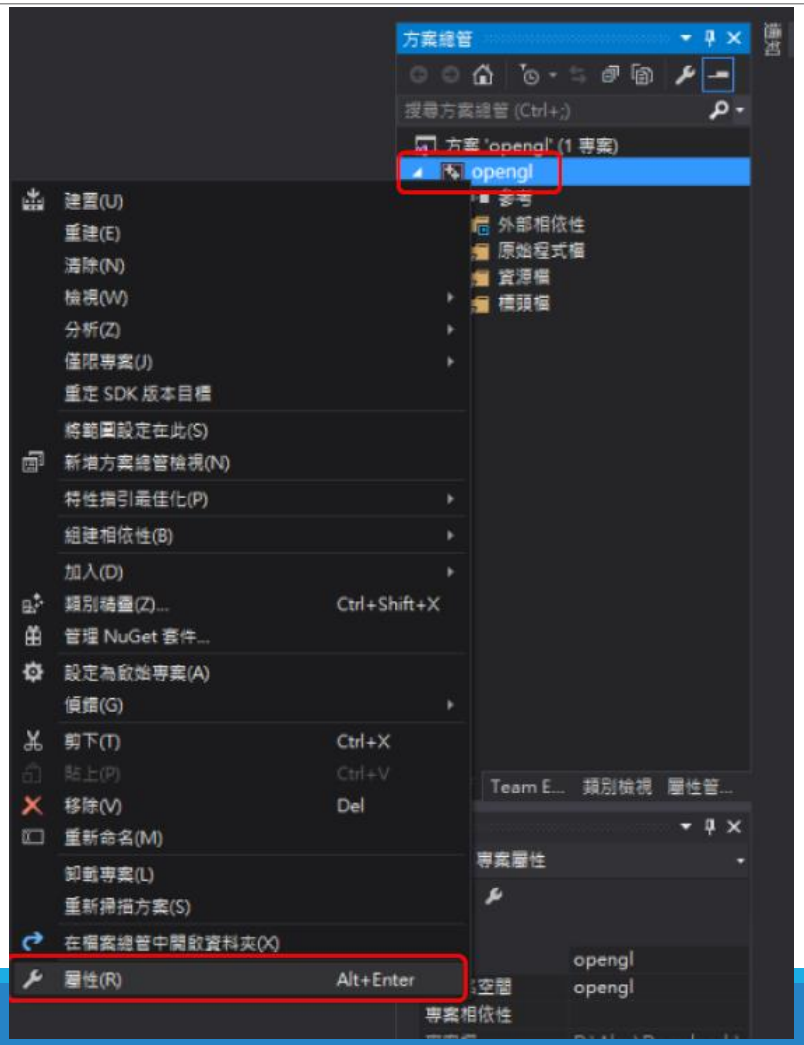
Install OpenGL and GLUT - 2

- Make “include”, “lib”, “dll” directory
- Put downloaded glut files into corresponding directory
- ProjectName
  - ProjectName
    - include
      - glut.h
    - lib
      - glut.lib
      - glut32.lib
    - dll
      - glut.dll
      - glut32.dll
  - ProjectName.sln



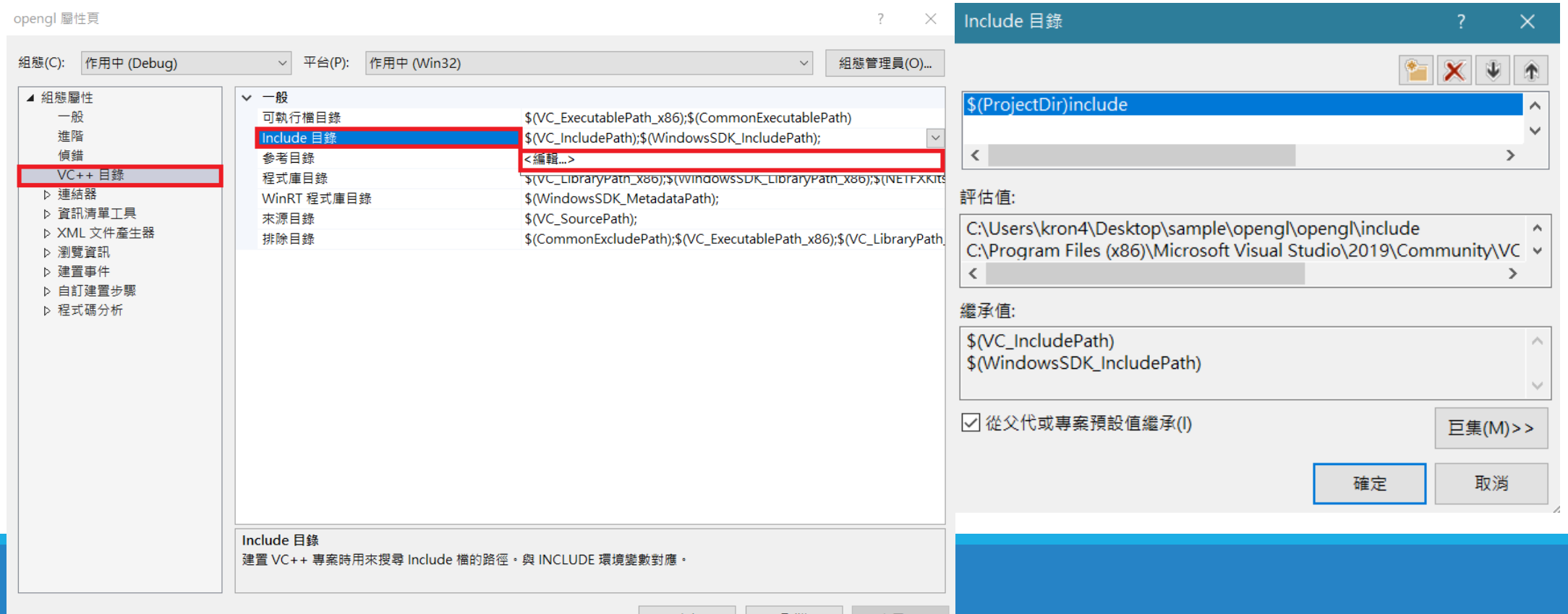
Install OpenGL and GLUT - 3

- Right click “ProjectName”
- Click “property”



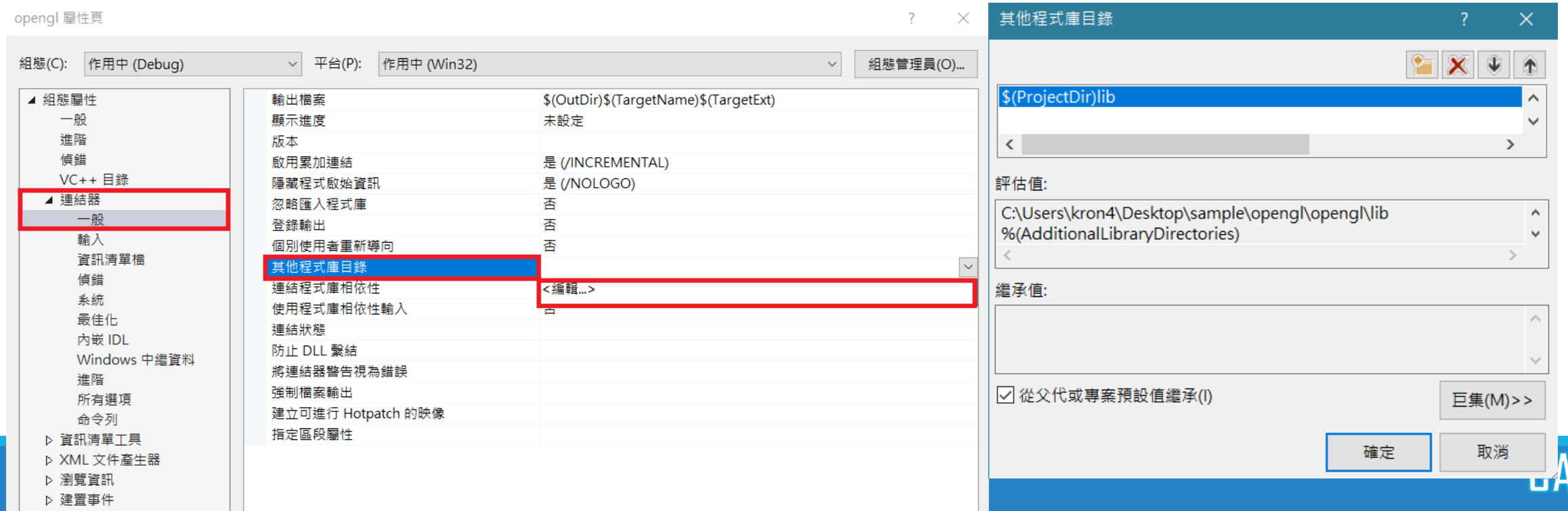
Install OpenGL and GLUT - 4

- Click “VC++ directory”
- Set “include directory” into “$(ProjectDir)include”



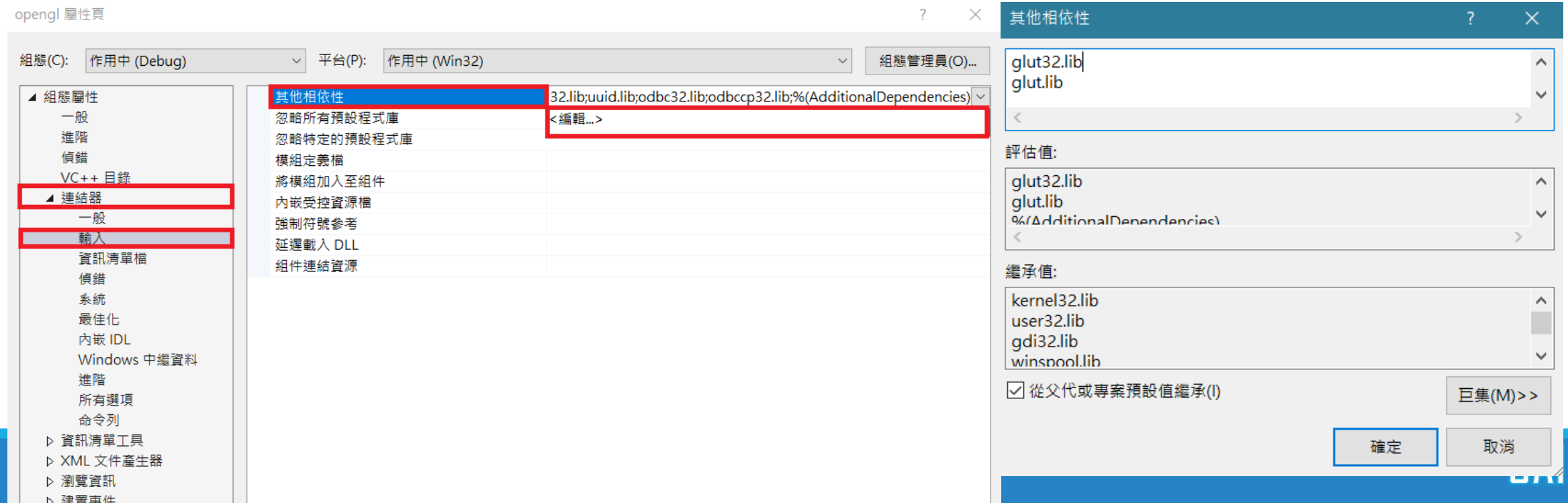
Install OpenGL and GLUT - 5

- Click “linker”
- Click “general”
- Set “additional library directories” into “$(ProjectDir)lib”



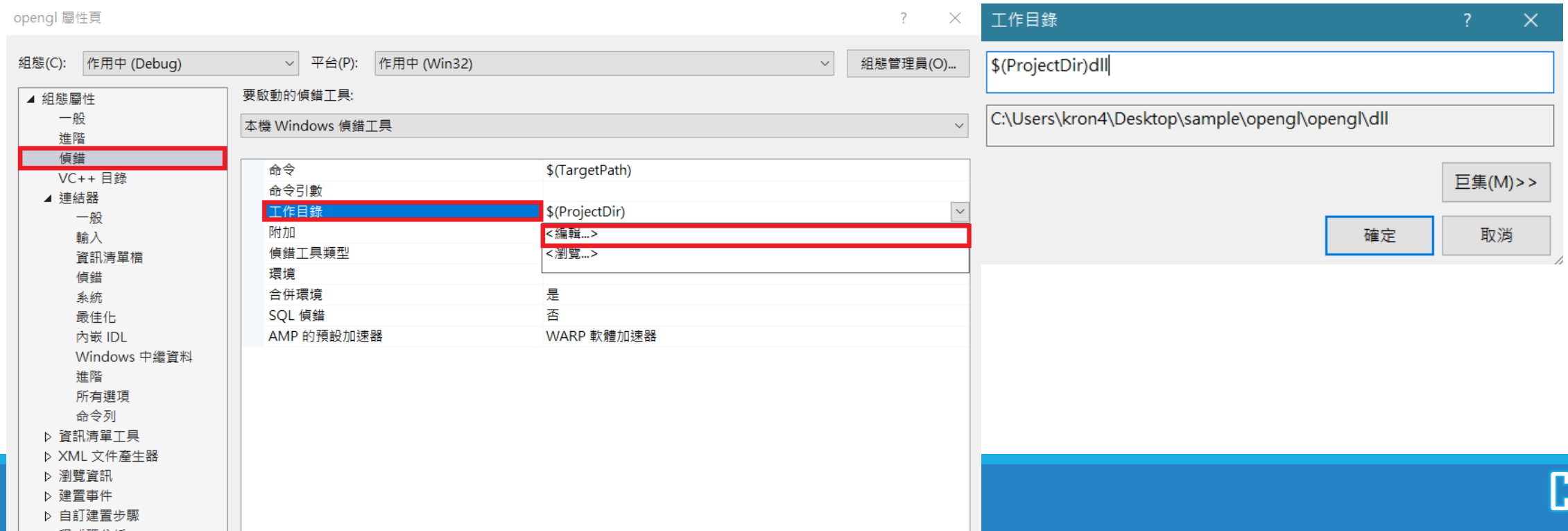
Install OpenGL and GLUT - 6

- Click “linker”
- Click “input”
- Set “additional dependencies” into “glut32.lib;glut.lib”



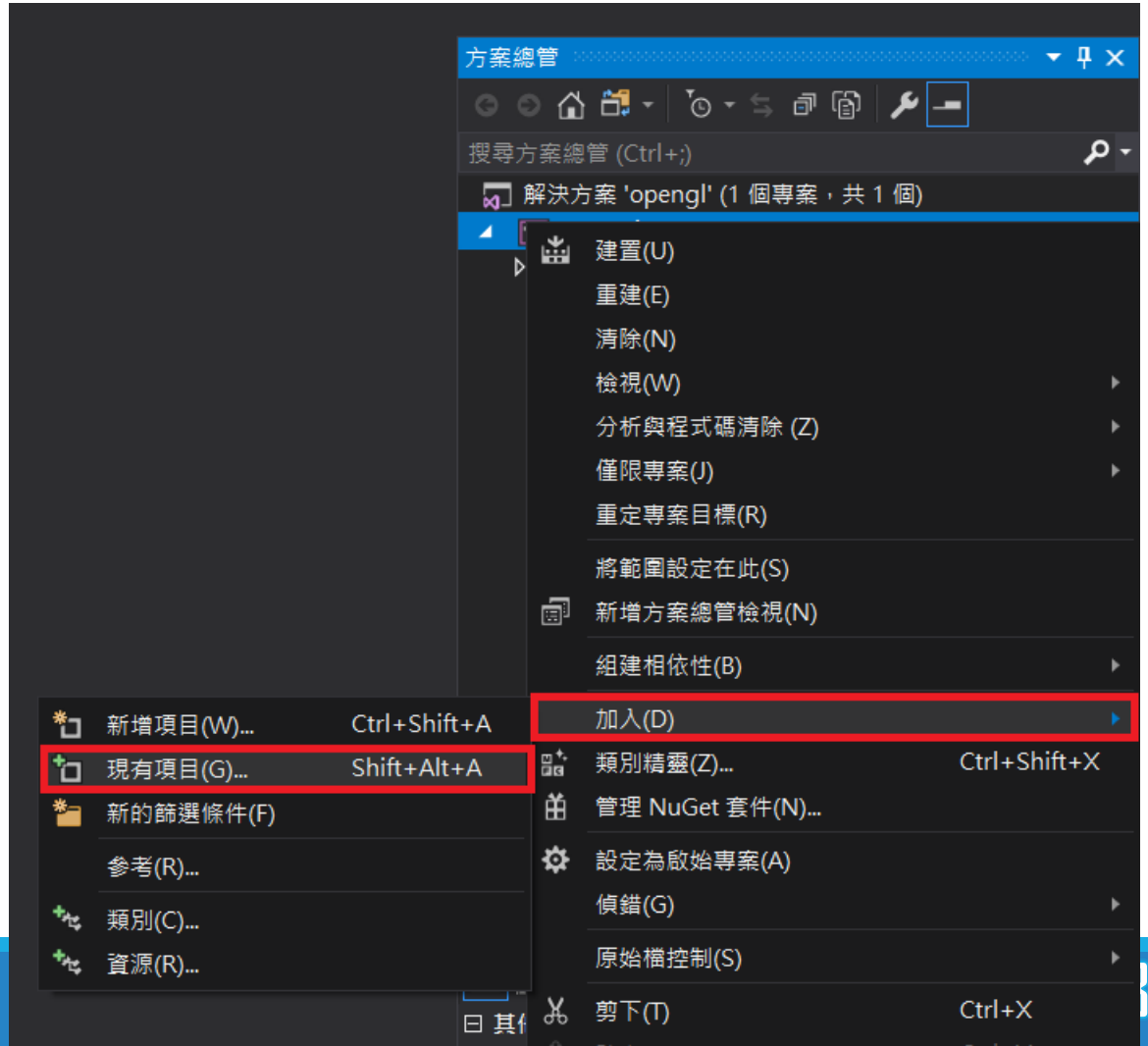
Install OpenGL and GLUT - 7

- Click “debugging”
- Set “working directory” into “$(ProjectDir)dll”

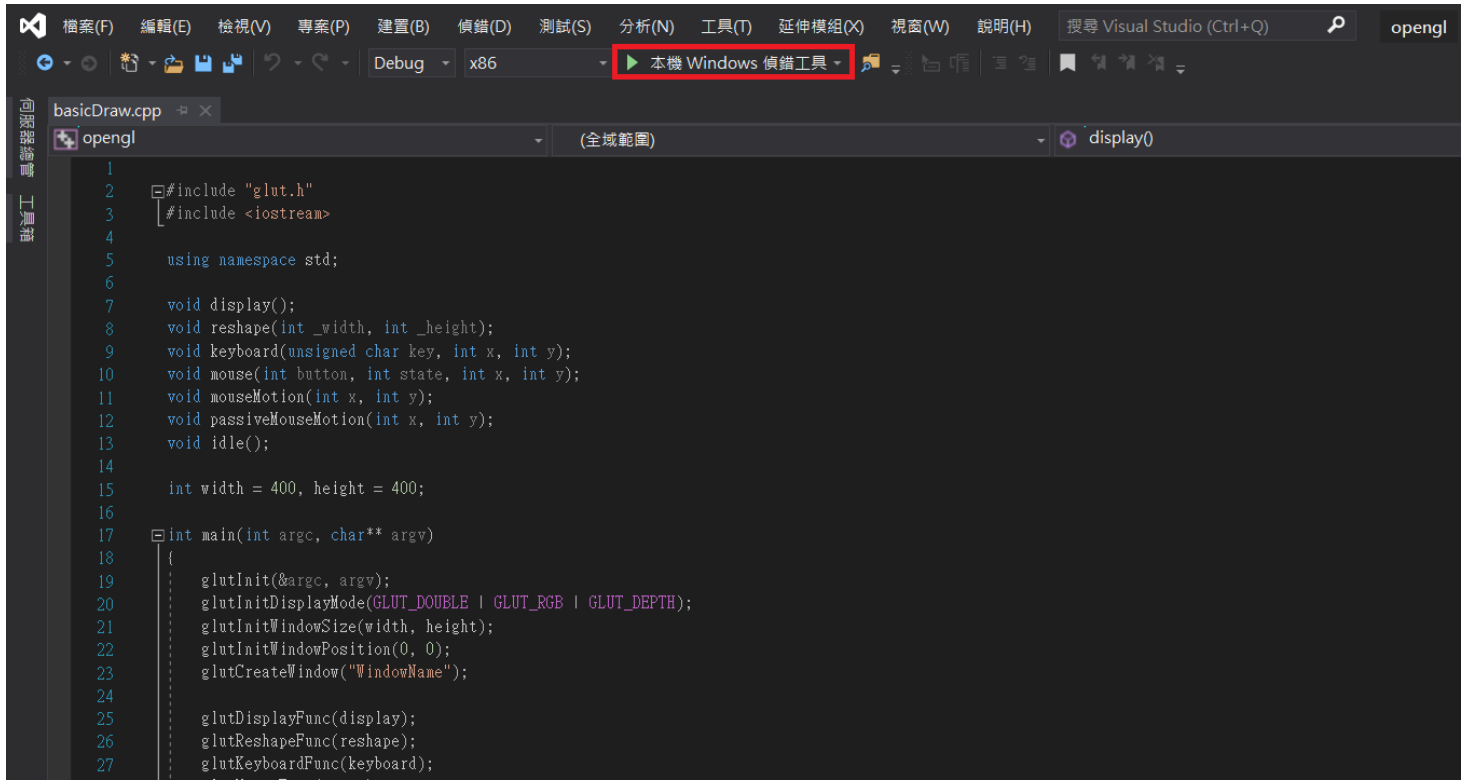


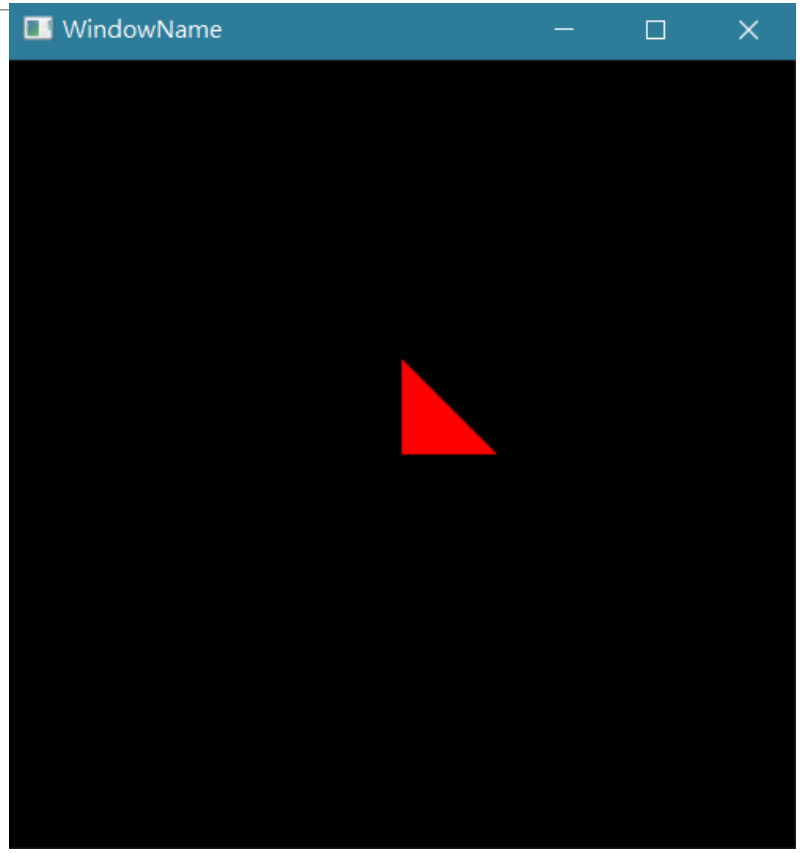
Install OpenGL and GLUT - 8

- 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.