

CT4510: Computer Graphics

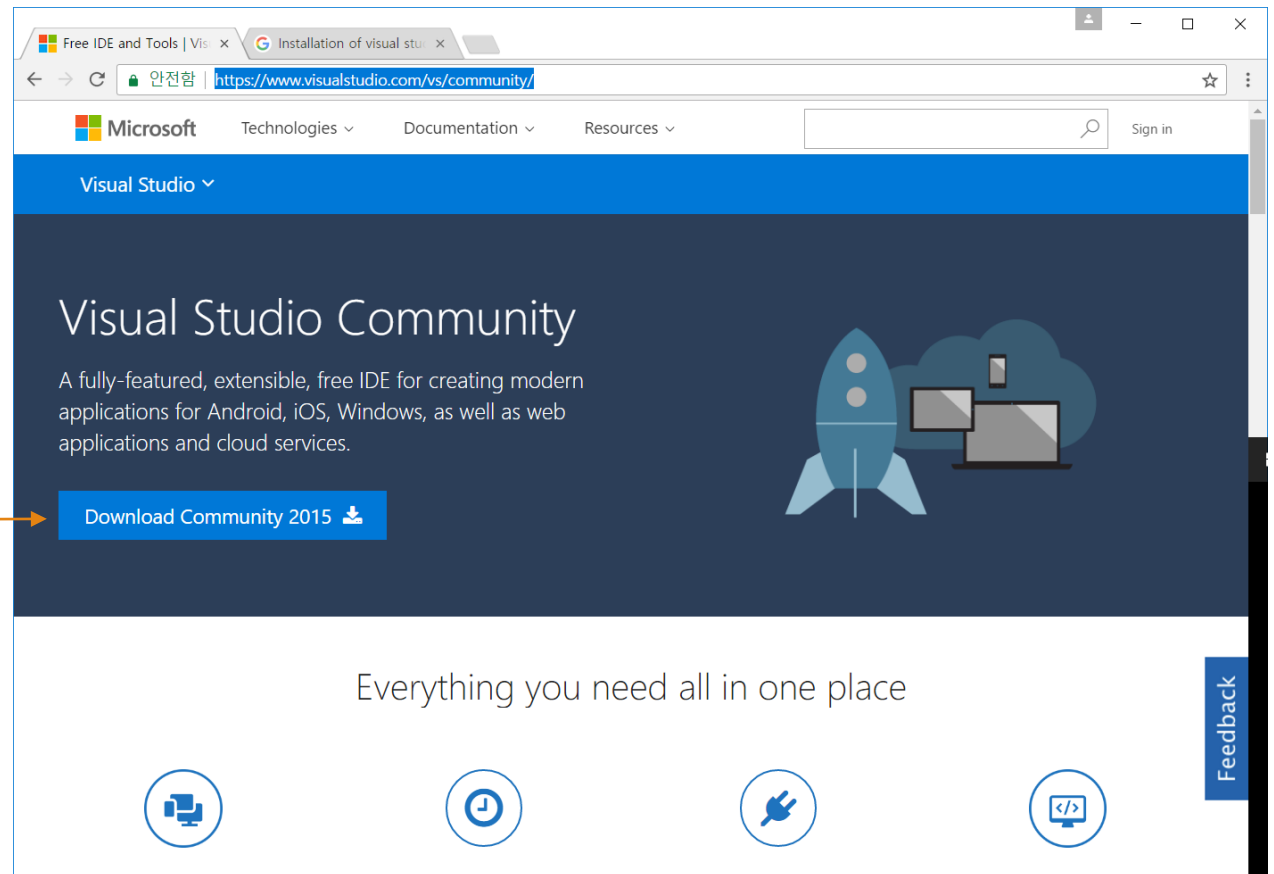
# OpenGL – Hello Triangle

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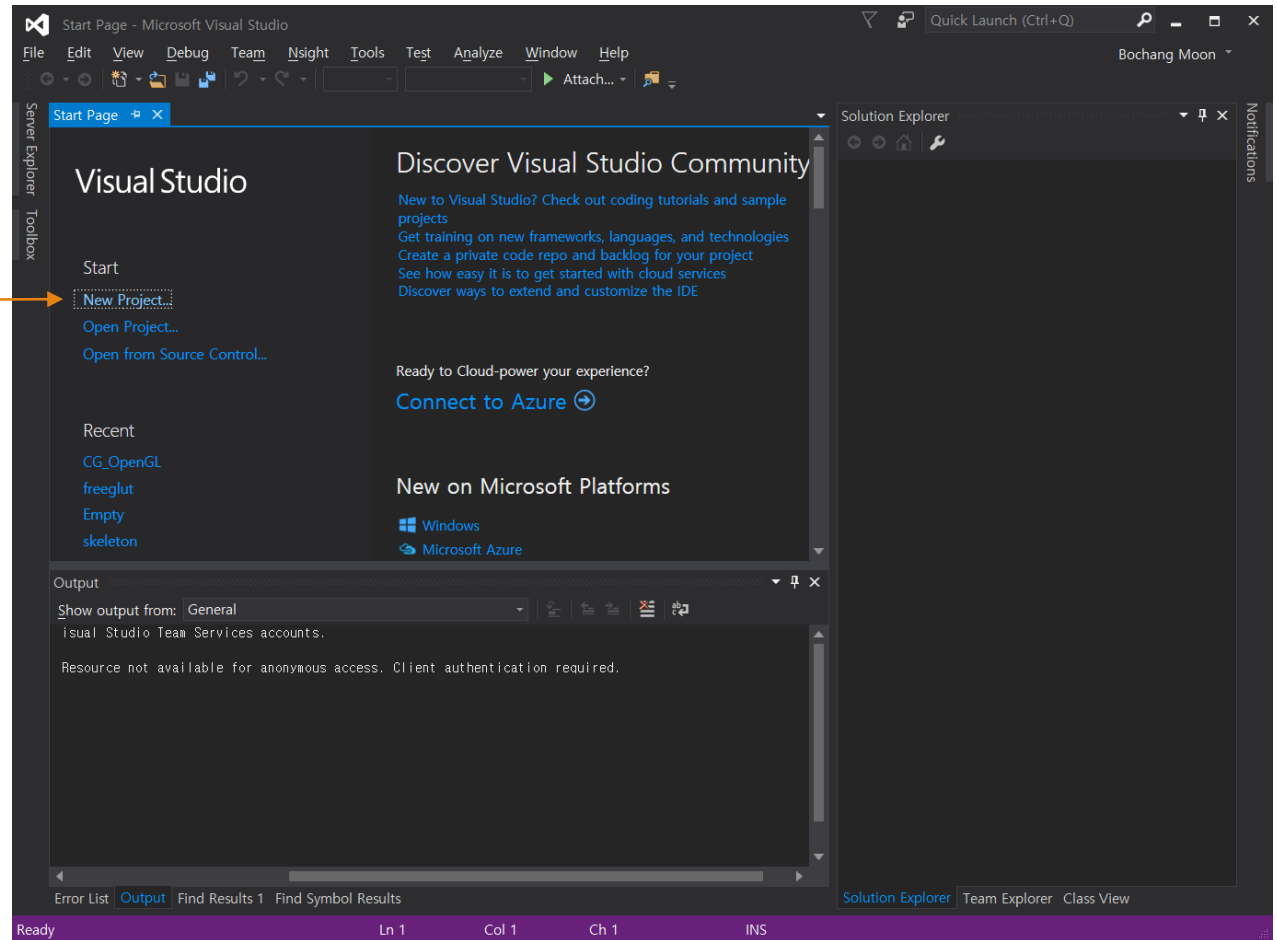
BOCHANG MOON

# Installation of Visual Studio

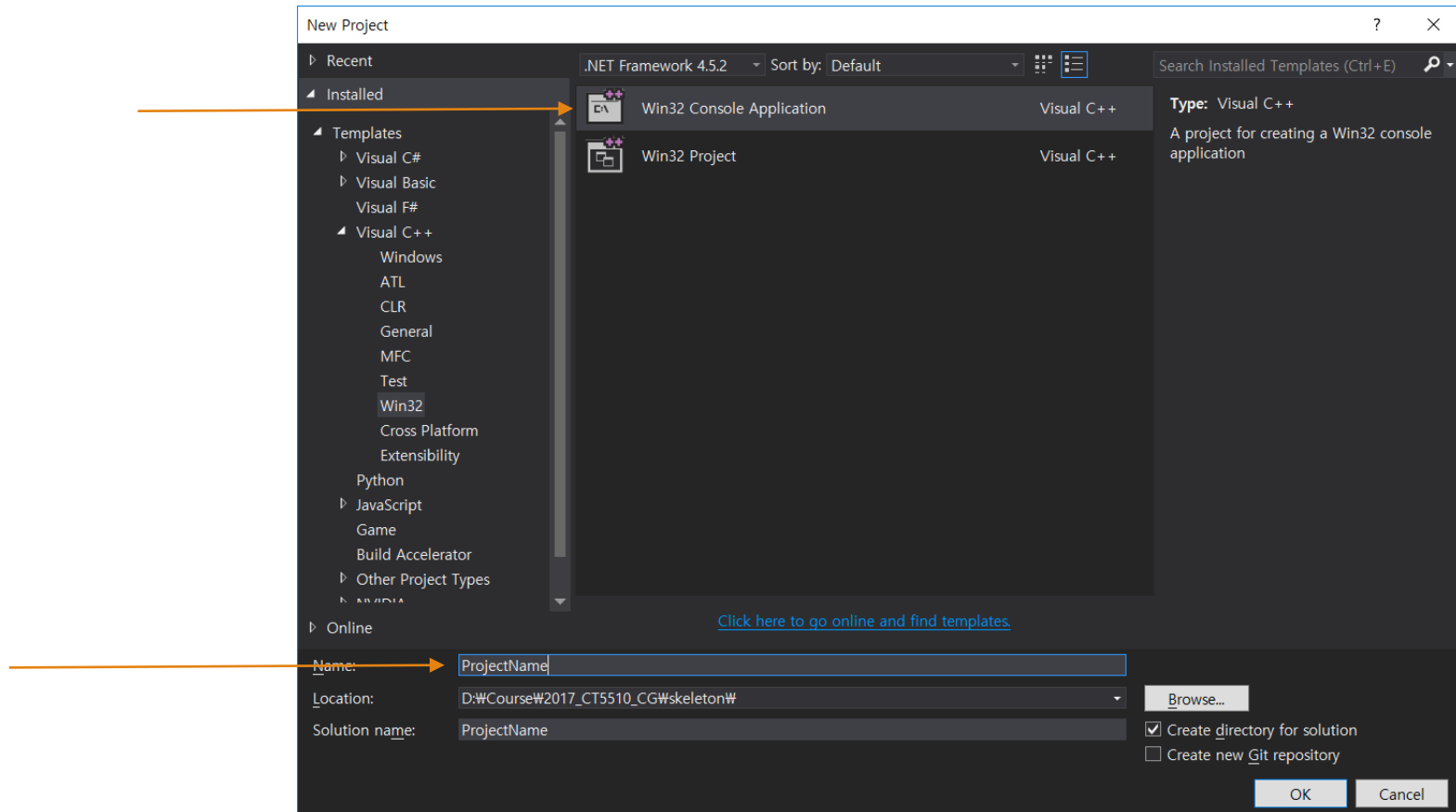
- <https://www.visualstudio.com/vs/community/>



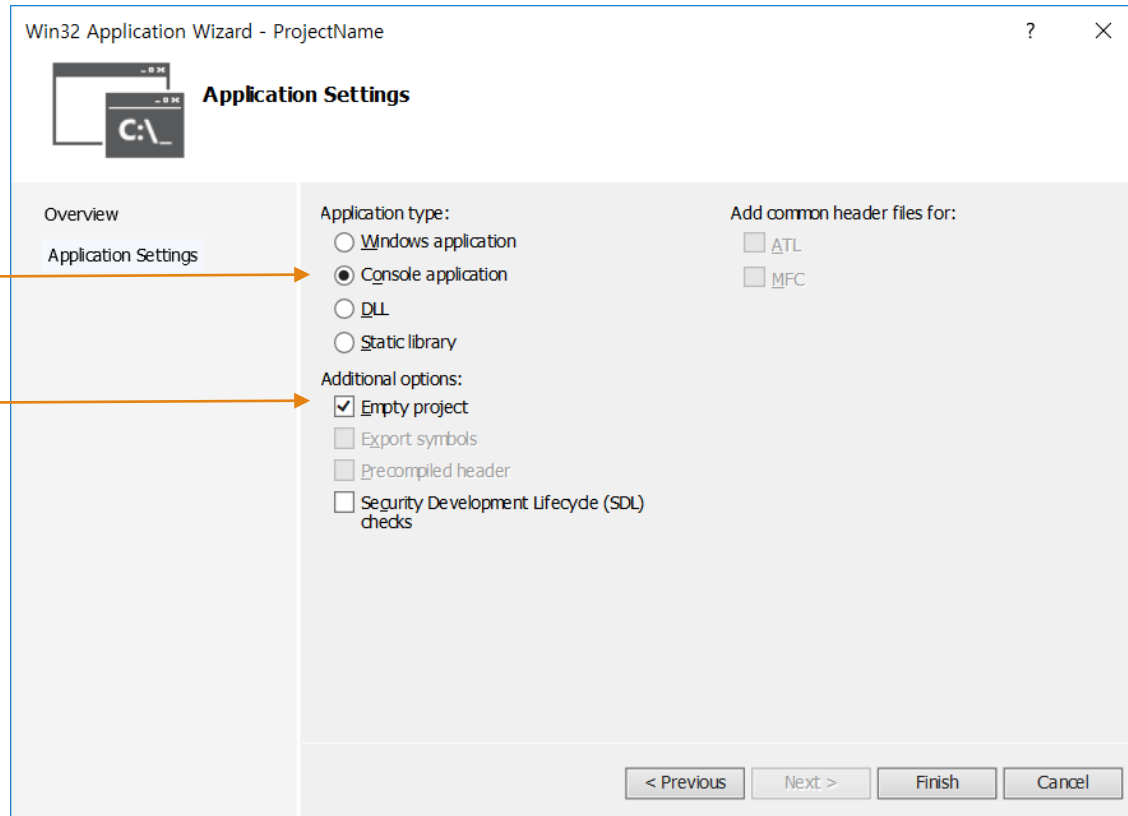
# Test Hello World



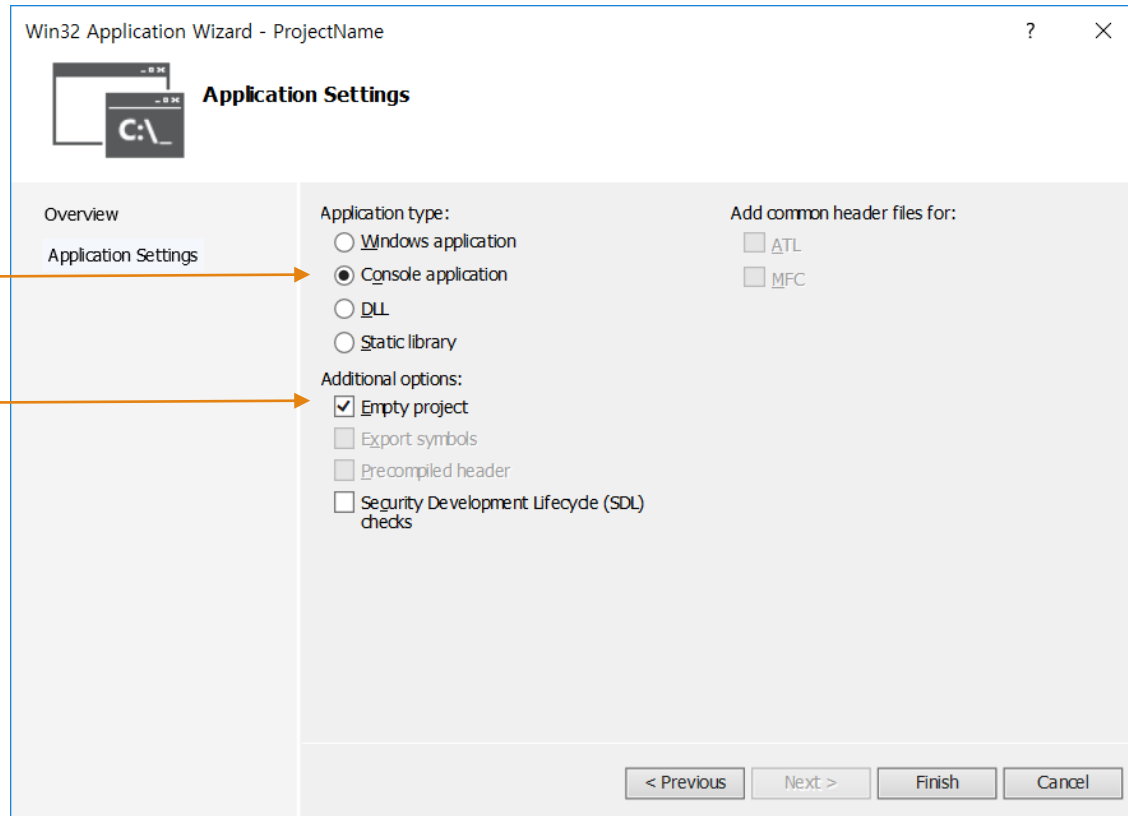
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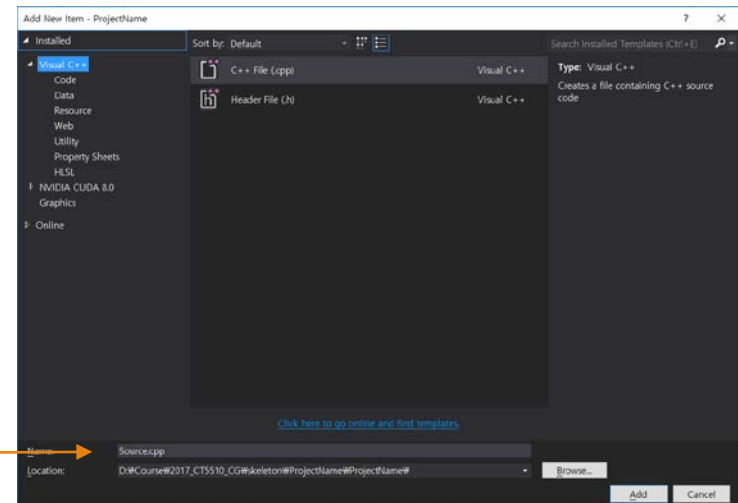
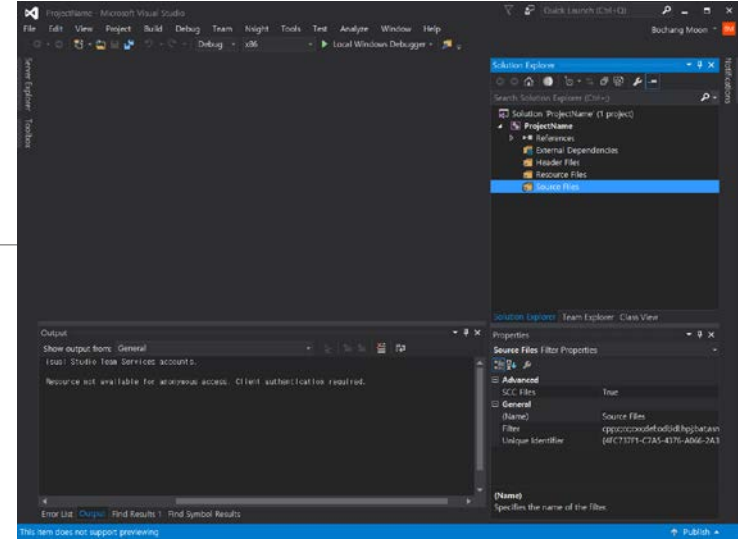


# Test Hello World



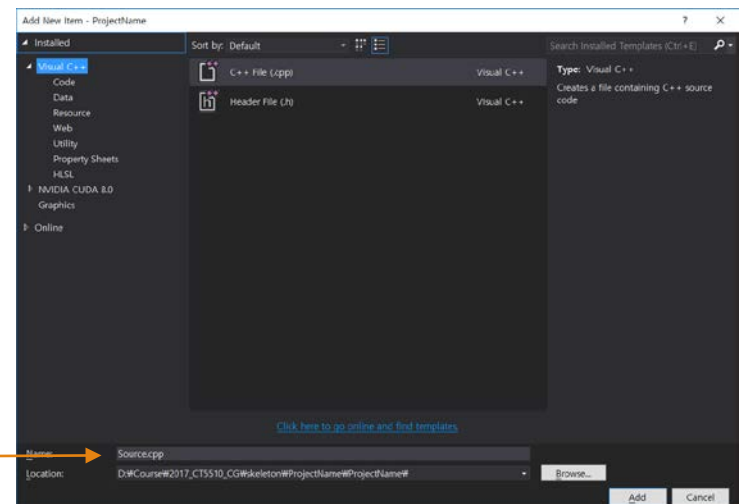
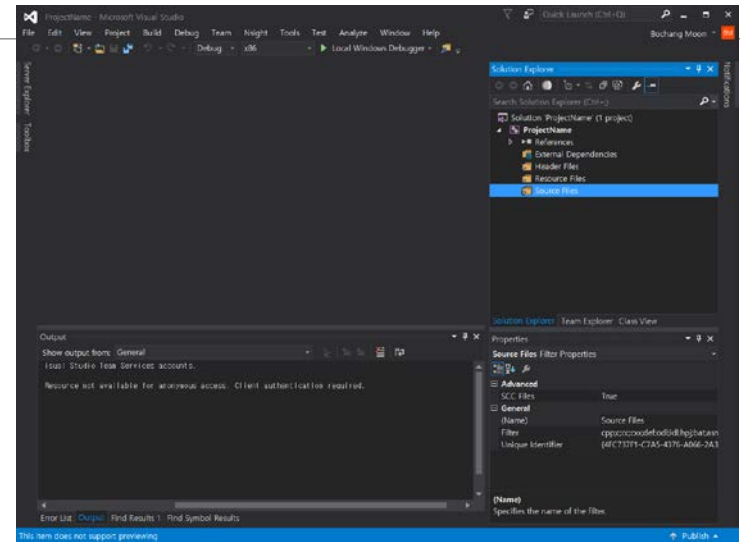
# Test Hello

- Add a new code
  - Ctrl+Shift+A
- Remain your file name
  - e.g., main.cpp



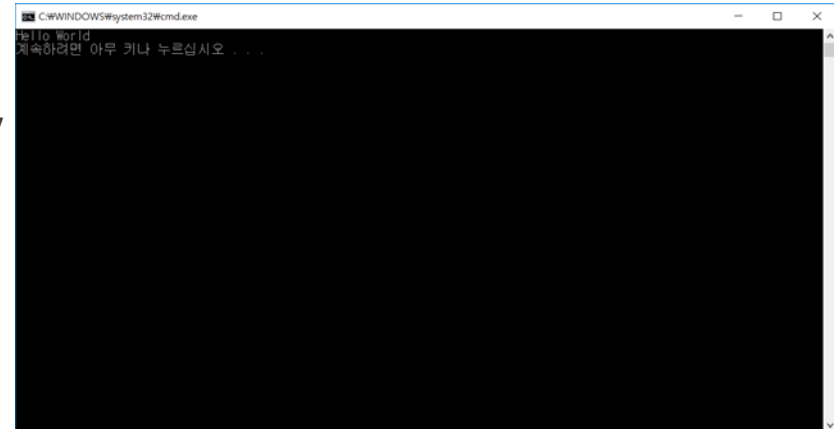
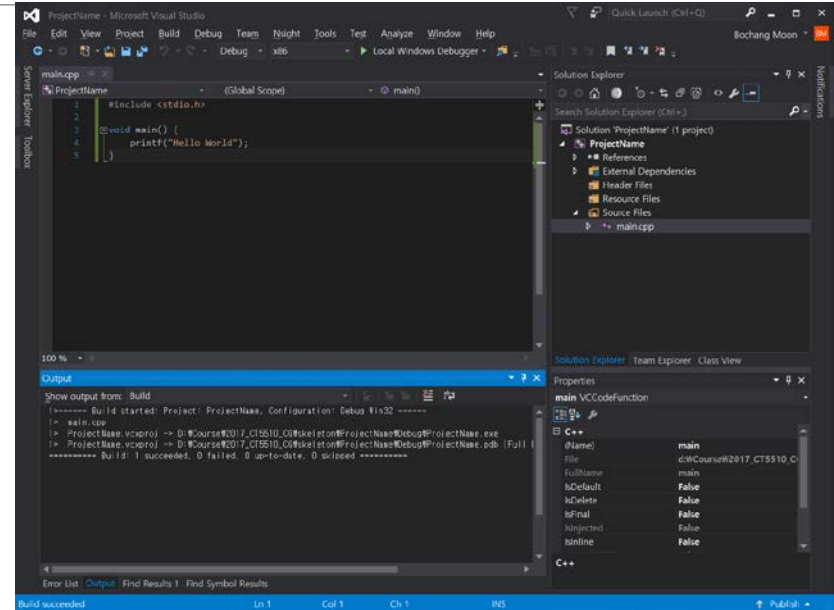
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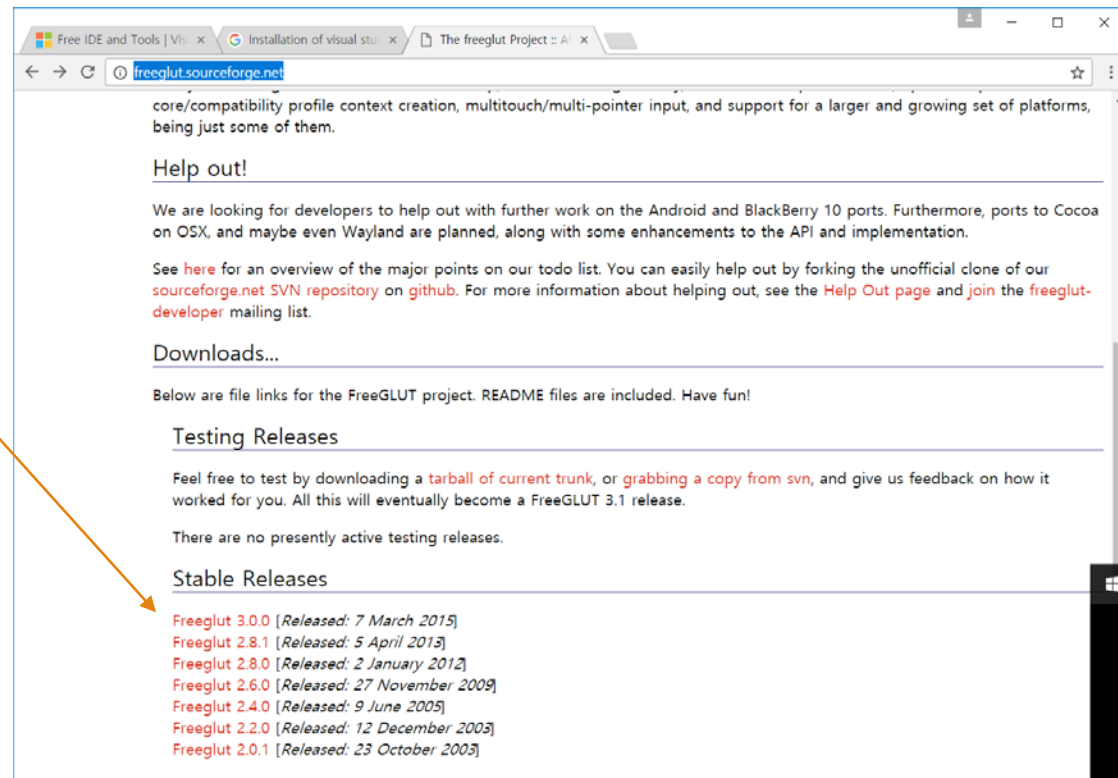
# Test Hello World

- Write down your code in the main.cpp
  - #include <stdio.h>
  - void main() {
  - printf("Hello World\n");
  - }
- F7
  - Compile and check whether your code is okay
- Ctrl+F5
  - Run your code



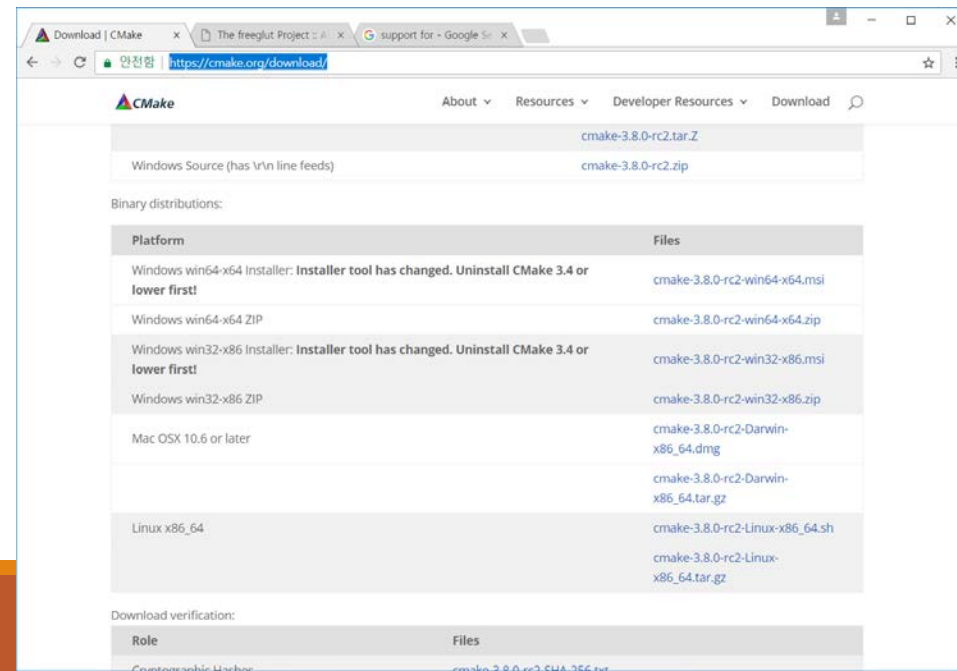
# Installation of FreeGlut

- Go to <http://freeglut.sourceforge.net/>
- Click here (Freeglut 3.0.0)
  - Download it and unzip the code



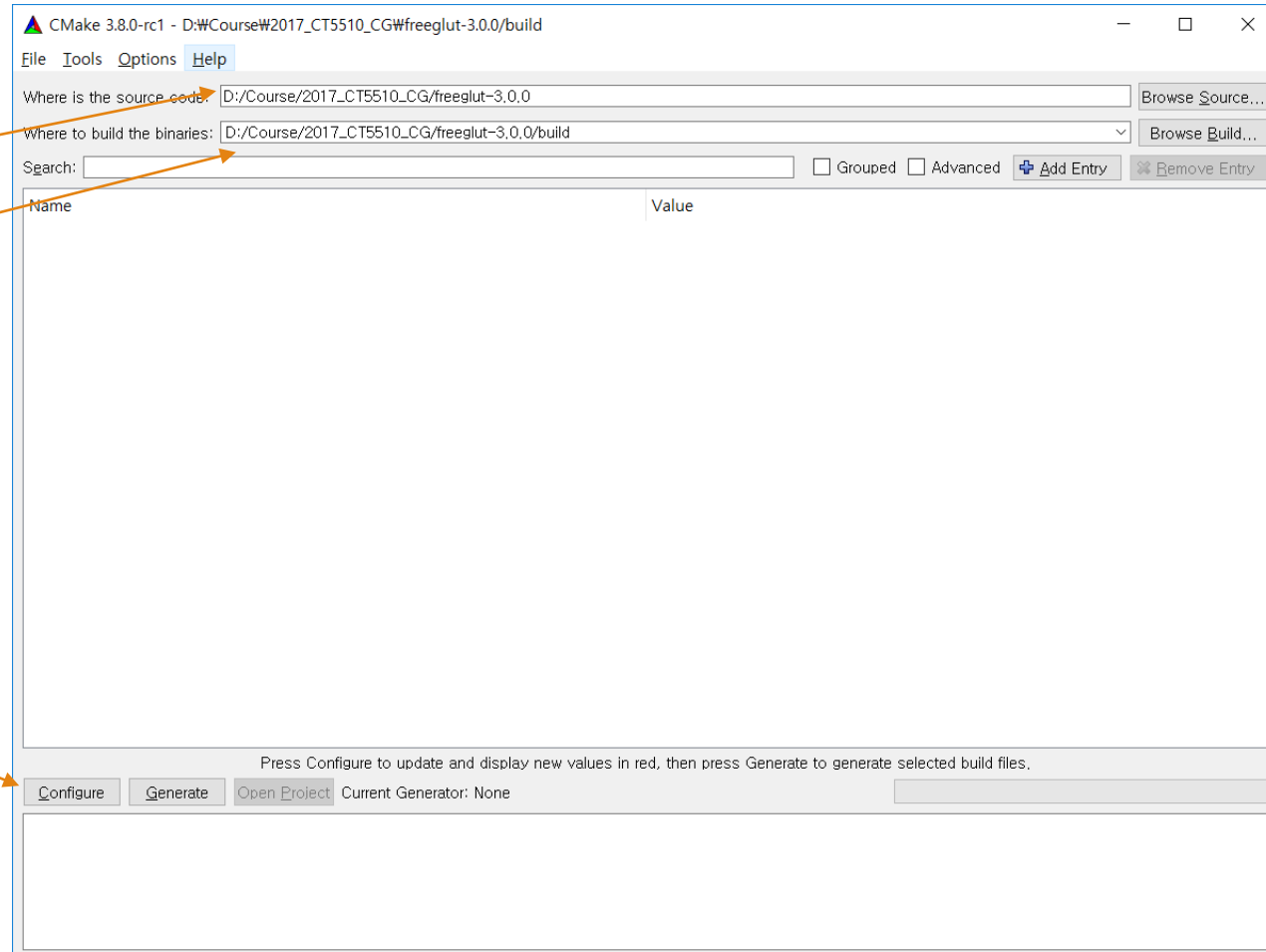
# Generate FreeGlut lib. files

- Issues: no visual studio solution files...
  - How to compile and run?
- Cross-platform OpenGL utility and you need to make your solution file
- CMake
  - Widely-used program that supports for cross-platform solution
  - Go to <https://cmake.org/download/>
  - Install a Cmake version for your platform



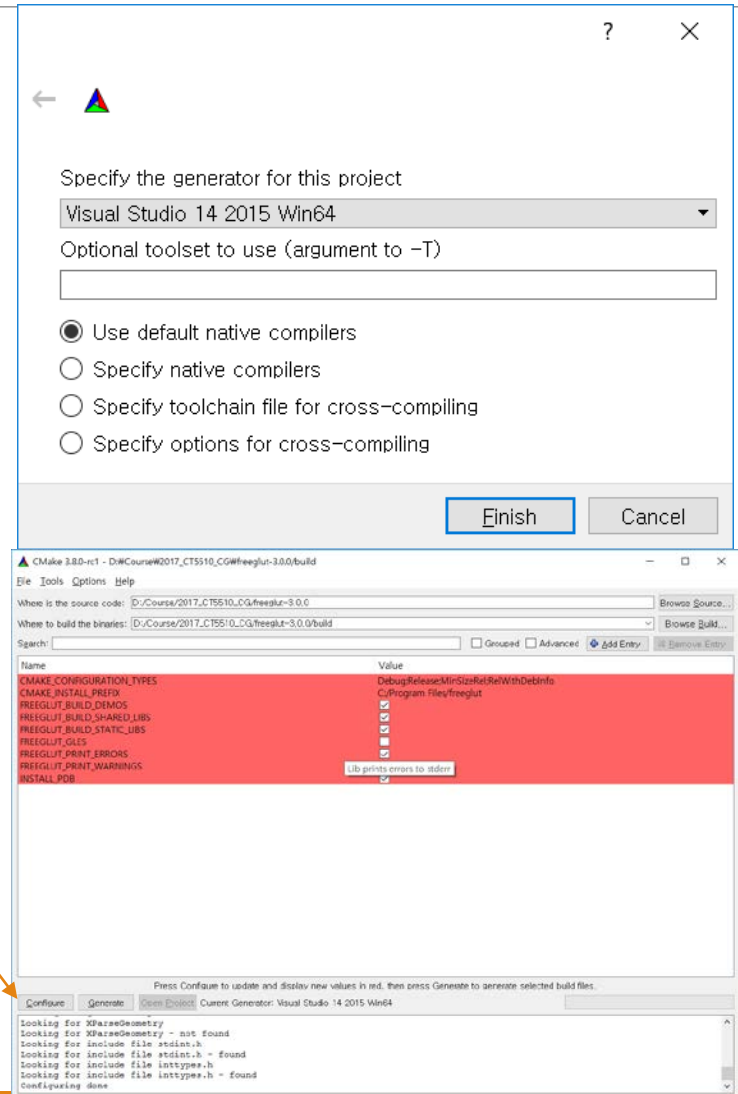
# Generate FreeGlut lib. files

- Run CMake (a recent version 3.8.0)
- Specify the location of the freeglut
  - A common name
    - ../build
- Click Configure



# Generate FreeGlut lib. files

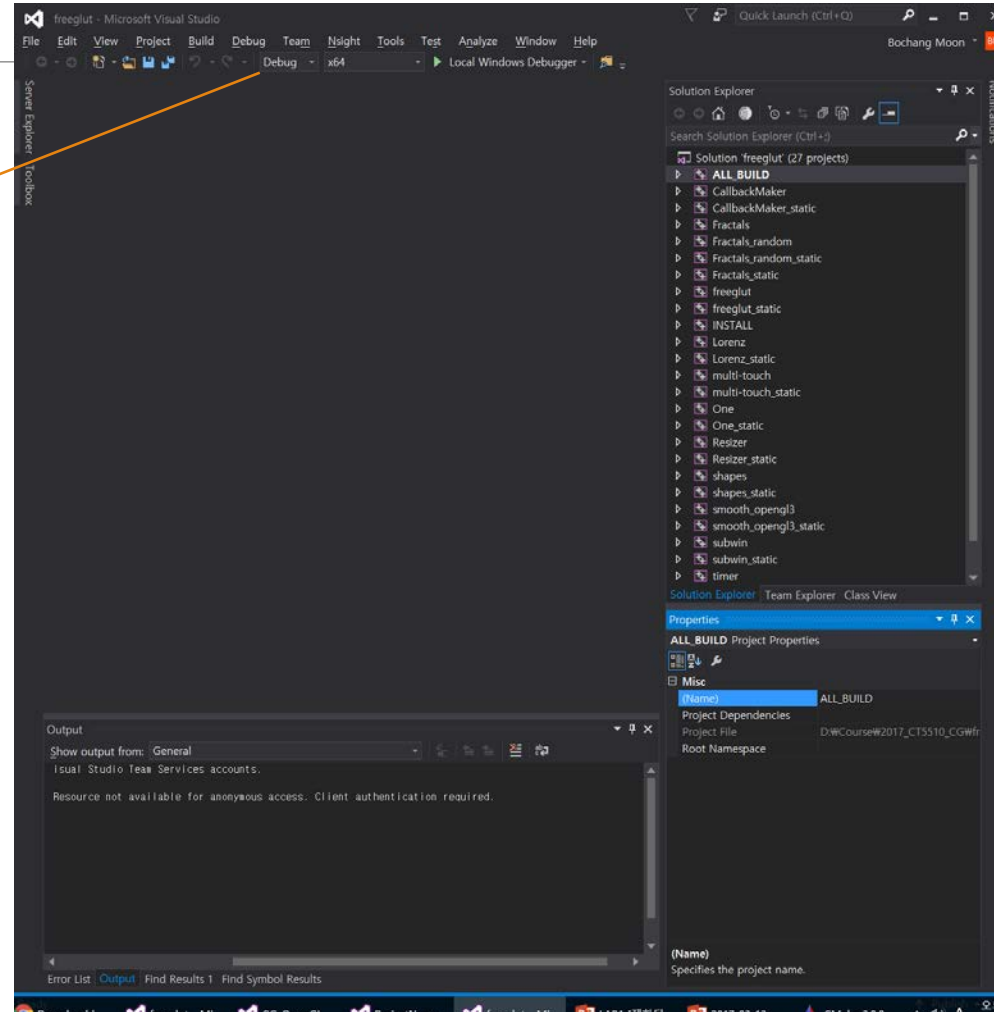
- Specify your visual studio version
- Click Configure again





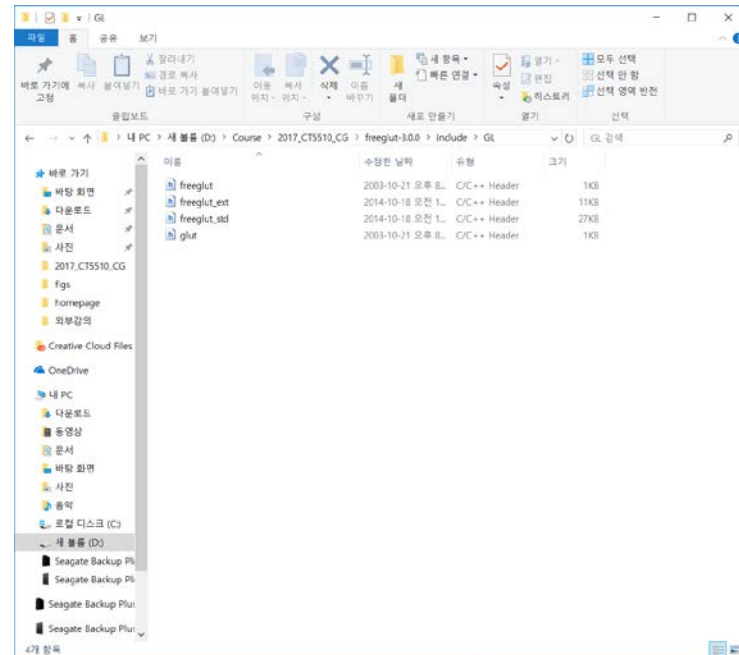
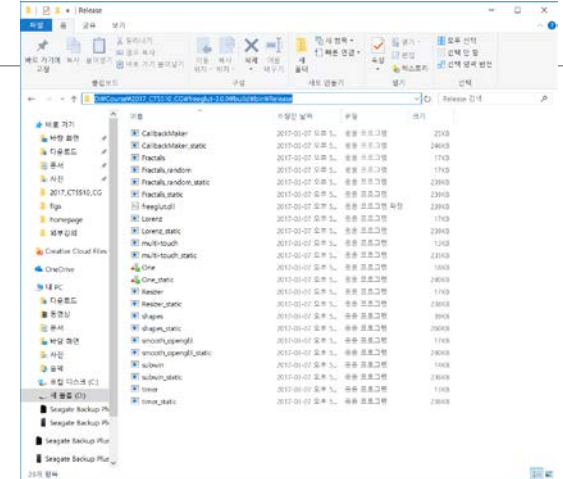
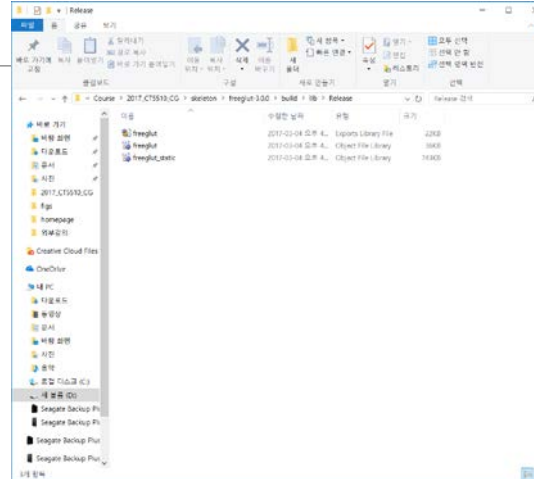
# Generate FreeGlut lib. files

- A solution with many projects
- Change the configuration “Debug” to “Release”
  - Debug: slow (only used for your debugging – i.e., finding bugs)
  - Release: fast (used for distributing your program)
- Compile (F7)



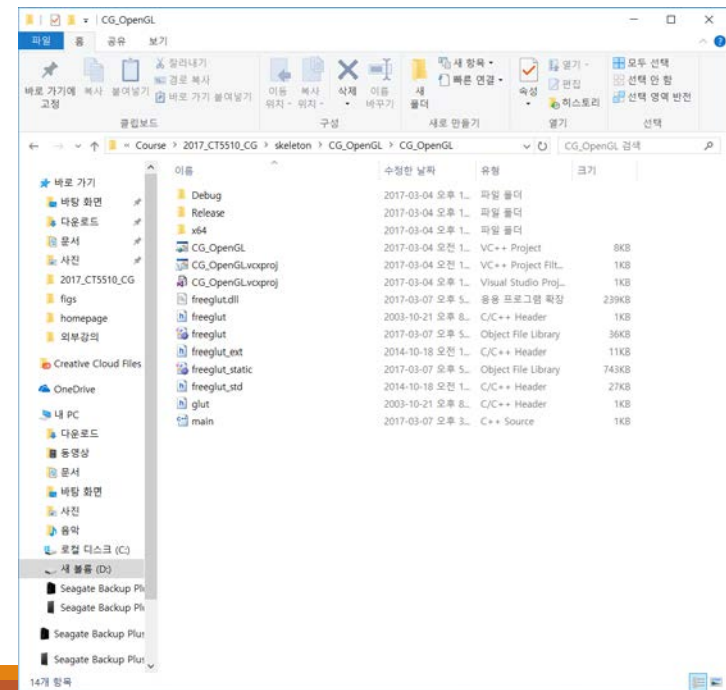
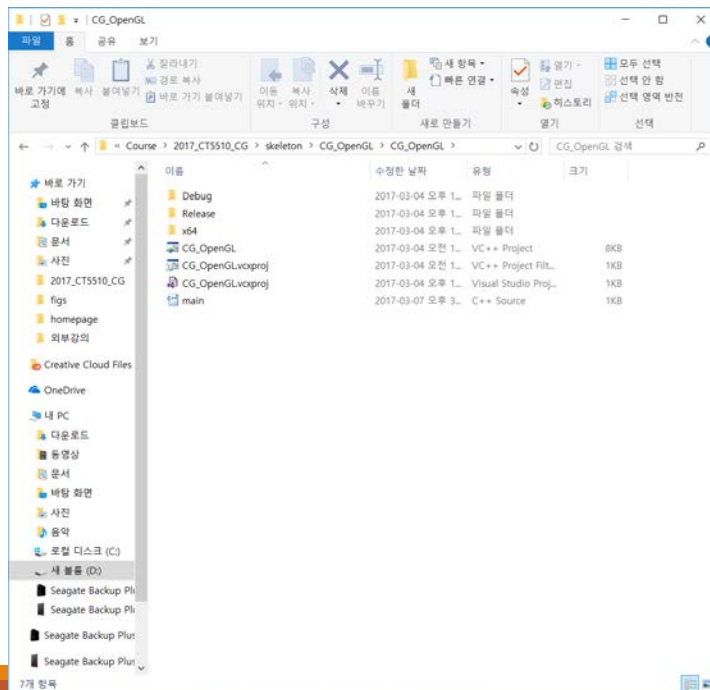
# Generate FreeGlut lib. files

- Static library files
  - Your Folder/freelut-3.0.0/build/lib/Release/\*.lib
- Dynamic library files
  - Your Folder/freelut-3.0.0/build/bin/Release/\*.dll
- Header files
  - Your Folder/freelut-3.0.0/include/GL/\*.h



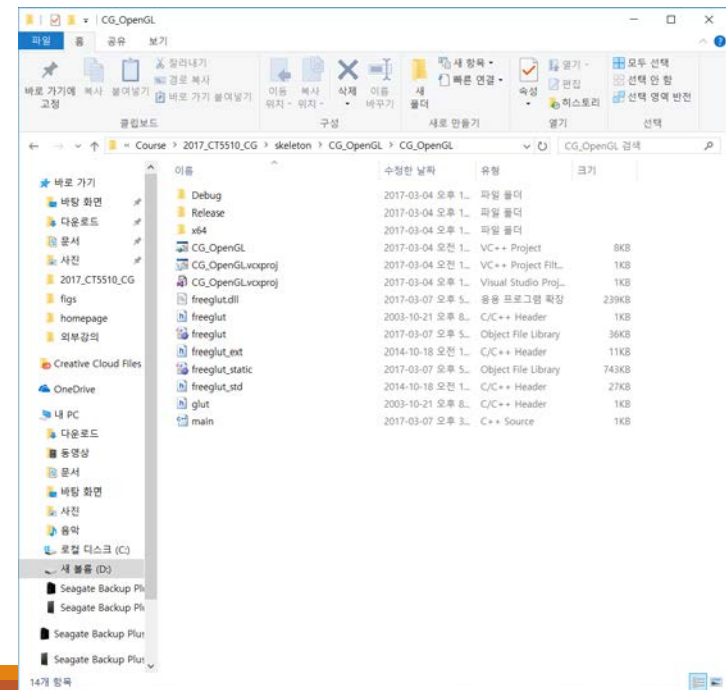
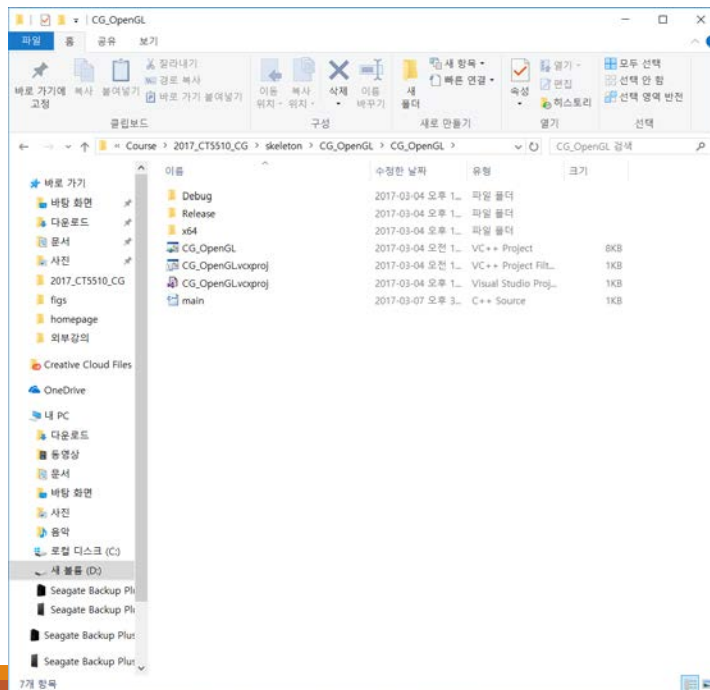
# Copy the lib. files to your project

- Copy those files to your hello world **project** folder
  - Static library files
  - Dynamic library files
  - Header files



# Copy the lib. files to your project

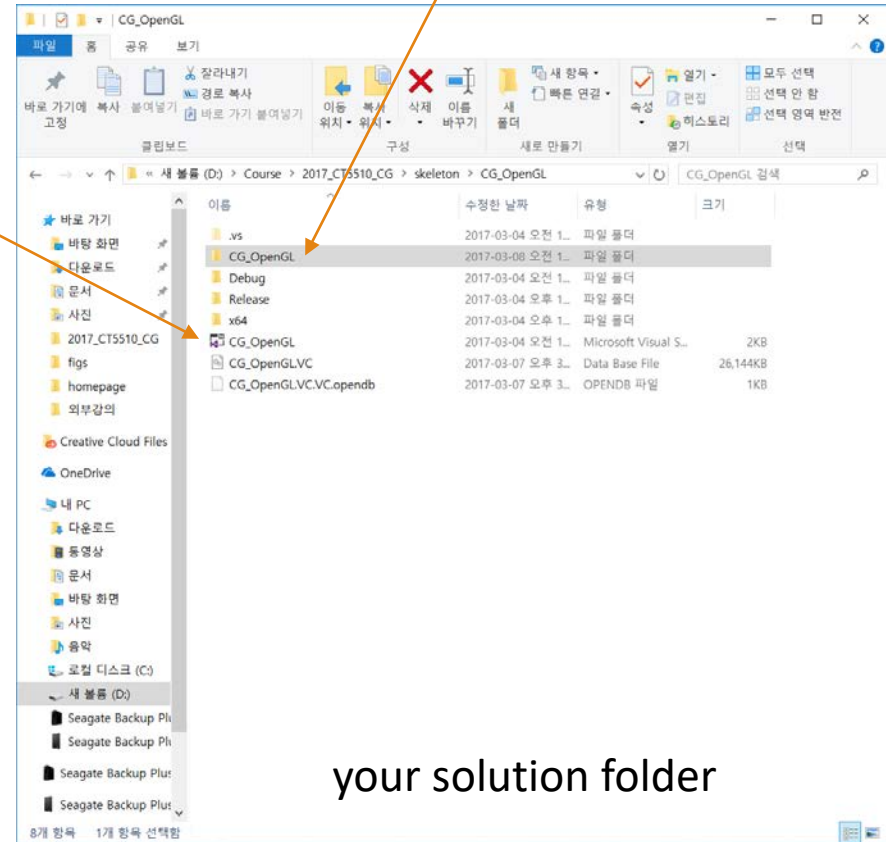
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  - Static library files
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  - Header files



# Start with Simple OpenGL

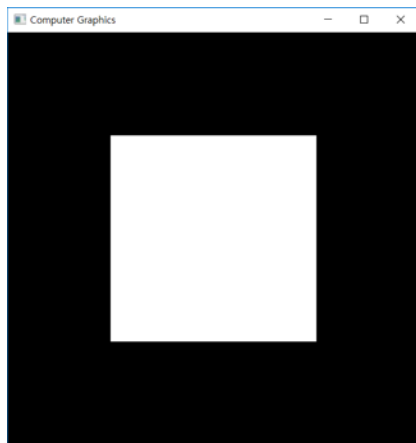
- Open your solution file
  - Your Solution Name.sln

your project folder



# Start with Simple OpenGL

- Write down this simple code
- Compile it (F7) and run (ctrl+F5)

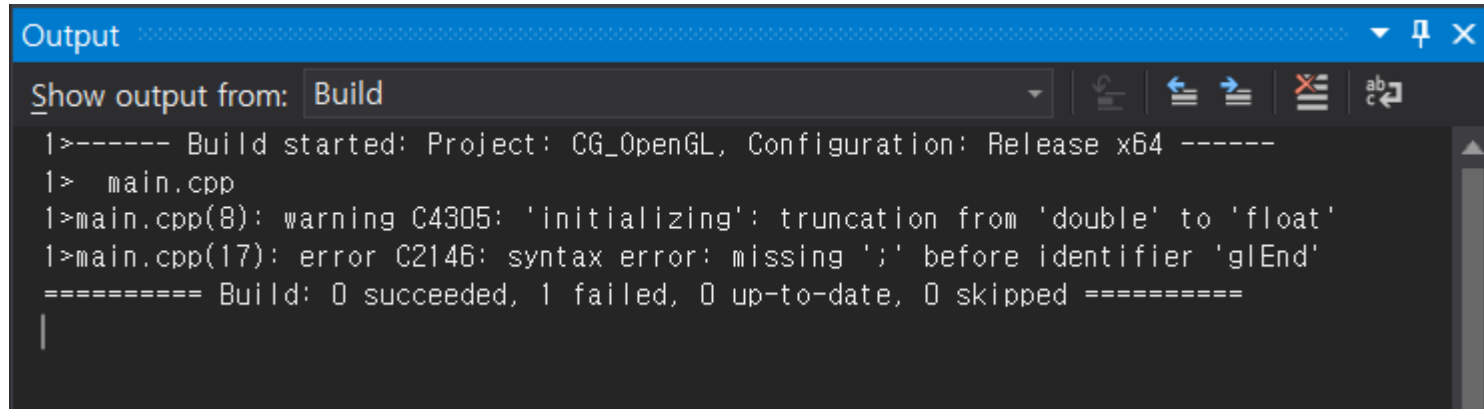


```
main.cpp*  X
CG_OpenGL (Global Scope)
1  #pragma comment(lib,"opengl32.lib")
2  #pragma comment(lib,"glu32.lib")
3  #pragma comment(lib,"freeglut_static.lib")
4  #include "freeglut.h"
5  #include <GL/glu.h>
6  #include <math.h>
7
8  const float PI = 3.14159265359;
9
10 void display() {
11     glClearColor(0, 0, 0, 0); // Clear the screen
12     glBegin(GL_QUADS);
13     glVertex2d(-0.5, -0.5);
14     glVertex2d(-0.5, 0.5);
15     glVertex2d(0.5, 0.5);
16     glVertex2d(0.5, -0.5);
17     glEnd();
18     glFlush();
19 }
20
21 void main(int argc, char* argv[]) {
22     glutInit(&argc, argv);
23     glutInitDisplayMode(GLUT_SINGLE | GLUT_RGBA);
24     glutInitWindowSize(512, 512);
25     glutInitWindowPosition(100, 100);
26     glutCreateWindow("Computer Graphics");
27     glutDisplayFunc(display);
28     glutMainLoop();
29 }
```

# Can't compile?

- Check your output window
  - Compiler will give some hints
- Still unclear?
  - Google the error code (C2146)

```
void display() {  
    glClearColor(0, 0, 0, 0); // Clear the screen  
    glBegin(GL_QUADS);  
    glVertex2d(-0.5, -0.5);  
    glVertex2d(-0.5, 0.5);  
    glVertex2d(0.5, 0.5);  
    glVertex2d(0.5, -0.5);  
    glEnd();  
    glFlush();  
}
```



The screenshot shows the 'Output' window of an IDE. The title bar is blue with a search icon and a close icon. Below the title bar, there is a dropdown menu set to 'Build' and several icons for clearing, navigating, and refreshing the output. The main area contains the following text:

```
1>----- Build started: Project: CG_OpenGL, Configuration: Release x64 -----  
1> main.cpp  
1>main.cpp(8): warning C4305: 'initializing': truncation from 'double' to 'float'  
1>main.cpp(17): error C2146: syntax error: missing ';' before identifier 'glEnd'  
===== Build: 0 succeeded, 1 failed, 0 up-to-date, 0 skipped =====  
|
```