OpenGL L1: Setup and "Hello world"

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What is OpenGL?

- OpenGL is a graphic API, but not a platform, more specifically a group
- Usually use C++
- Use graphics card manufacturers develop the libraries (NVidia, AMD, etc)

Task 1: Creating a window

- Create an OpenGL context and application window
- Some popular libraries: GLUT, GLFW, SFML, ...

GLFW

- Download from official website
- Pre-built binaries (use 32 bit version) and header files vs. source code
- Use CMake to build solution
- Build in VS (on Windows), or gcc (on Linux)
- Find libraries and headers

Create a new project

- Link the libraries to the project
- Project Properties -> VC++ Directories -> Include Directories, Library Directories

Configuration: Active(Debug)

Common Properties
 Configuration Properties

Debugging

Manifest Tool

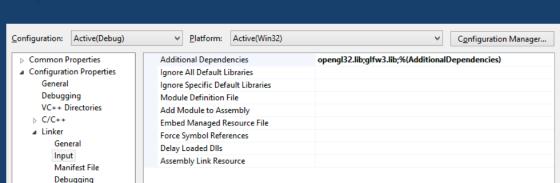
VC++ Directories

General

b C/C++

b Linker

- Project Properties -> Linker -> Input -> Additional Dependencies
- oglfw3.lib, opengl32.lib
- Include <GLFW\glfw3.h>



✓ Configuration Manager...

\$(VCInstallDir)bin;\$(WindowsSDK_ExecutablePath_x86);\$(VSInstallDir C:\Users\Joey\Dropbox\OpenGL\Libraries\Includes;\$(IncludePat

C:\Users\Joey\Dropbox\OpenGL\Libraries\Libs;\$(LibraryPath)

\$(VCInstallDir)atImfc\src\mfc;\$(VCInstallDir)atImfc\src\mfcm;\$(VCI

\$(VCInstallDir)include;\$(VCInstallDir)atImfc\include;\$(WindowsSDK)

\$(VCInstallDir)atImfc\lib;\$(VCInstallDir)lib

\$(WindowsSDK MetadataPath)

→ Platform: Active(Win32)

■ General

Executable Directories

Reference Directories

Library WinRT Directories

Include Directories

Library Directories

Source Directories

Exclude Directories

GLAD

- Ease the process of finding functions location
- Go to the website, make sure select core, and generate a loader
- Get a zip, setup link, import gald.c to your project
- #include <glad/glad.h>

Code

```
int main()
{
    glfwInit();
    glfwWindowHint(GLFW_CONTEXT_VERSION_MAJOR, 3);
    glfwWindowHint(GLFW_CONTEXT_VERSION_MINOR, 3);
    glfwWindowHint(GLFW_OPENGL_PROFILE, GLFW_OPENGL_CORE_PROFILE);
    //glfwWindowHint(GLFW_OPENGL_FORWARD_COMPAT, GL_TRUE);
    return 0;
}
```

```
GLFWwindow* window = glfwCreateWindow(800, 600, "LearnOpenGL", NULL, NULL);
if (window == NULL)
{
    std::cout << "Failed to create GLFW window" << std::endl;
    glfwTerminate();
    return -1;
}
glfwMakeContextCurrent(window);</pre>
```

Code

```
if (!gladLoadGLLoader((GLADloadproc)glfwGetProcAddress))
{
    std::cout << "Failed to initialize GLAD" << std::endl;
    return -1;
}</pre>
```

GLAD

```
glViewport(0, 0, 800, 600);

void framebuffer size callback(GLFWwindow* window, int width, int height);

void framebuffer_size_callback(GLFWwindow* window, int width, int height)
{
    glViewport(0, 0, width, height);
}

glfwSetFramebufferSizeCallback(window, framebuffer_size_callback);
```

Viewport

Code

```
while(!glfwWindowShouldClose(window))
{
    glfwSwapBuffers(window);
    glfwPollEvents();
}
```

Render loop

```
glfwTerminate();
return 0;
```

Release resource

Assignments

- Create a window whose title is your name and student #
- Change the window's background color
- write something in the window
- Screenshot result with your pc background wallpaper