

## Lab 3 : OpenGL and Geometry

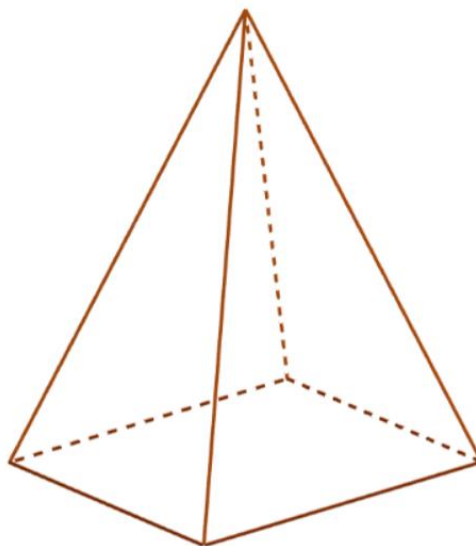
### Task1: Creating a box.

1. Create a function for creating a box. The function receives 4 inputs. The first parameter is the center of the box. The second parameter is the width of the box. The third parameter is the height of the box. The last parameter is the depth of the box.
2. Create a function for indexing vertices of a box. Use the function to generate an EBO to draw a box.
3. Use the functions above to draw a box with OpenGL.

Save your program in '**Lab3\_box.cpp**'. Do not forget to include the relevant files such as vertex and fragment shaders.

### Task2: Creating a pyramid.

A square pyramid consists of a square at the base and four-sided triangles.



*Square pyramid has a square base*

1. Create a function for creating vertices of a square pyramid with mathematical formulas. Given that the function input the center (a 3D point) of the pyramid base and return the vertices of the pyramid.
2. Create a function for indexing vertices of a square pyramid. Use the function to generate an EBO to draw a square pyramid.
3. Use the functions above to draw a pyramid with OpenGL.

Save your program in '**Lab3\_pyramid.cpp**'. Do not forget to include the relevant files such as vertex and fragment shaders.

### Task3: Creating a sphere.

Read how to create a sphere from the website

[https://www.songho.ca/opengl/gl\\_sphere.html#sphere](https://www.songho.ca/opengl/gl_sphere.html#sphere).

1. Create a function for creating vertices of a sphere.
2. Create a function for indexing vertices of a sphere.
3. Use the functions above to draw a sphere with OpenGL.

Please use the **stack-and-sector method** to create a sphere. Save your program in **'Lab3\_sphere.cpp'**. Do not forget to include the relevant files such as vertex and fragment shaders. **Please do not copy the whole class from the website. Write functions that demonstrate your comprehension of the material.**

### Additional

**Note :** You can start implementing each task by using the available code "hello\_triangle\_indexed.cpp".

[https://learnopengl.com/code\\_viewer\\_gh.php?code=src/1.getting\\_started/2.2.hello\\_triangle\\_indexed/hello\\_triangle\\_indexed.cpp](https://learnopengl.com/code_viewer_gh.php?code=src/1.getting_started/2.2.hello_triangle_indexed/hello_triangle_indexed.cpp)