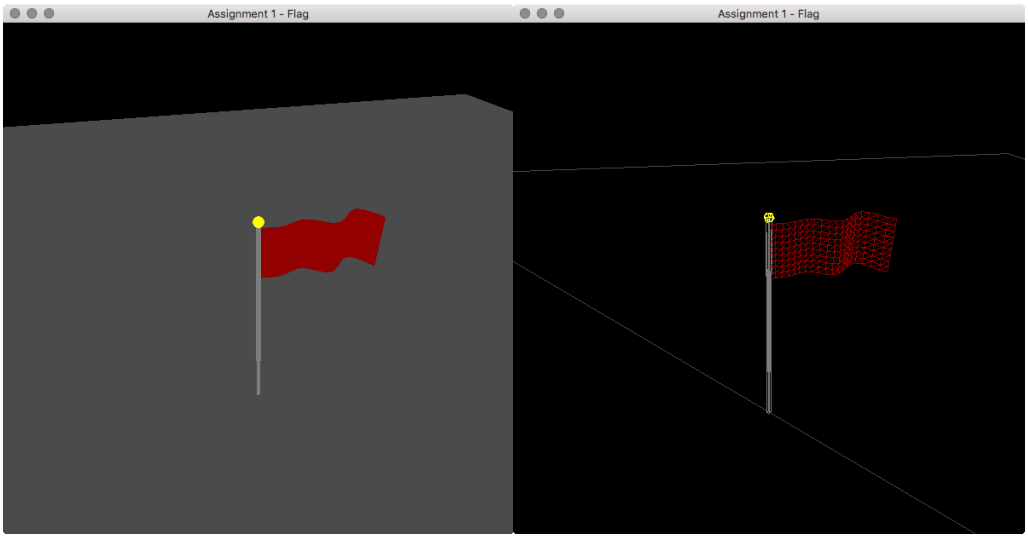
Assignment 1

Deadline:	Hand in by 5:00 p.m. on Friday 20th of March
Evaluation:	10 marks – which represents 10% of your final grade
Late Submission:	Discuss with the lecturer.
Work:	This assignment must be done **individually** – your submission may be checked for plagiarism against other assignments and internet sources. If you adapt any material from the internet you **must** clearly acknowledge your source.
Purpose:	Getting started building a simple 3D graphical application.

Overview

The goal of this assignment is to write an OpenGL program to display a simple 3D scene – specifically a scene with a simple animated flag. An example image of the minimum expected scene is shown below (with wireframe on left):



Requirements

1. The 3D scene must consist of at least four different objects:
- Ground - simple horizontal quadrilateral to act as a reference for the scene.
- Pole - a simple vertical cylinder.
- Finial - the ball on top of the flag pole.
- Flag - an animated mesh of triangles (a simple sine wave animation is sufficient).

2. All Vertex Array Objects and Vertex Buffer Objects should be created **only once**. The animation (updating positions) of the flag must not create a new VBO (copying data into an existing VBO is allowed).

3. The camera should slowly rotate around the scene (centred around the flag pole).

4. There should be no gaps between objects that are supposed to be connected (e.g. between the pole and the ground, between the pole and the flag etc).

5. You must only use: C++, OpenGL Core Profile, GLSL, GLFW (and GLEW if your OS requires). Do **not** use any operating system specific code (`windows.h` etc), any window management and/or input/output should be handled with GLFW. For this assignment you must **not** use any other libraries or APIs.

6. Your assignment should properly delete all memory, buffers when it closes.

(continued)

Considerations

- How will you deal with separate objects? Think about whether it is better to create a single VBO for the entire scene or separate VBOs for each individual object.
- Will you write separate shader programs for each object or use the same program?
- How are you going to generate the geometry for the different objects?
- Will you build a class structure for your objects or just represent them with local variables?

You **must** put the following comments at the top of your program code and provide the appropriate information.

```
% Assignment number, 159.709, 2020 S1
% Family Name, Given Name, Student ID,
% Explain what the program is doing . . .
```

Hand-in: Submit your script electronically through Stream

If you have any questions about this assignment, please ask the lecturer.