Assignment #01: Rotations

Coursework %: approximately 5%

The purpose of this lab is to familiarise you with orientation and rotation formats

1. This assignment is strictly **individual** (no groupwork).
2. You are required to create a simple model of an aeroplane and use the keyboard and mouse input to display pitch, roll and yaw rotations of the aeroplane – you should also implement three extra features, as described in the Requirements below;
3. You can use the glm maths library (or other), or create your own. Remember that OpenGL uses column-order matrices so if you are using a math library that assumes row-order, you will have to get the transpose of the resulting matrix. Remember to check the structure of the translation matrix to help figure this out. You can also download the basic cylinder object class from Blackboard, if you would like to use a cylinder to represent the aeroplane.
4. You are required to submit a pdf file via Blackboard with your **report** by midnight on **Tuesday 14th February**. It should be in the required format (see Report Template below). Submissions must be on Blackboard as we will not be accepting submissions via email. Your pdf report should include screen shots of the features and code snippets, particularly for the quaternion implementation;
5. You are required to demonstrate your assignment **in person** during the lab session from 11-12 on **Wednesday 15th February**.

Note 1: If you fail to submit your report on time, or you do not attend your live demo, you will be reported as absent and will receive a grade of 0%.

Note 2: Be aware that submitting a project that was not fully created by you is considered **plagiarism** and will be reported as such.

Requirements

Your program should have the following features:

- Simple representation of a plane with pitch, roll, and yaw rotations, using Euler Angles (~40%)
  (Observe gimbal-lock occurring when 2 axes are aligned)

- Extra Features (~60%):
  - Overcome gimbal-lock using quaternions to represent the rotations (~20%)
  - Hierarchical moving elements (e.g., propeller, wheels) (~20%)
  - Switch between first-person and third-person views (~20%)
  - Good visual appearance of the plane (e.g., Using 3D model rather than Cylinders) (~20%)
  - Other?

Note: The [approximate] marking scheme provided shows the maximum marks that can be obtained for each section if completed perfectly. Merely attempting a section does not imply the full score indicated.

CS7GV5 Report Template

Name:	
Student ID:	

Required feature: pitch, roll, and yaw rotations, using Euler Angles, demonstrate gimbal lock
Screenshot(s) of feature:
Code Snippet:

Extra Feature 1: Feature_Name
Screenshot(s) of feature:
Pseudocode and Code Snippet(s):

Extra Feature 2: Feature_Name
Screenshot(s) of feature:
Pseudocode and Code Snippet(s):

…

Extra Feature 3: Feature_Name
Screenshot(s) of feature:
Pseudocode and Code Snippet(s):