SCIT

School of Computing & Information Technology

CSCI336 – Interactive Computer Graphics
SIM Session 1 2026

Assignment 2

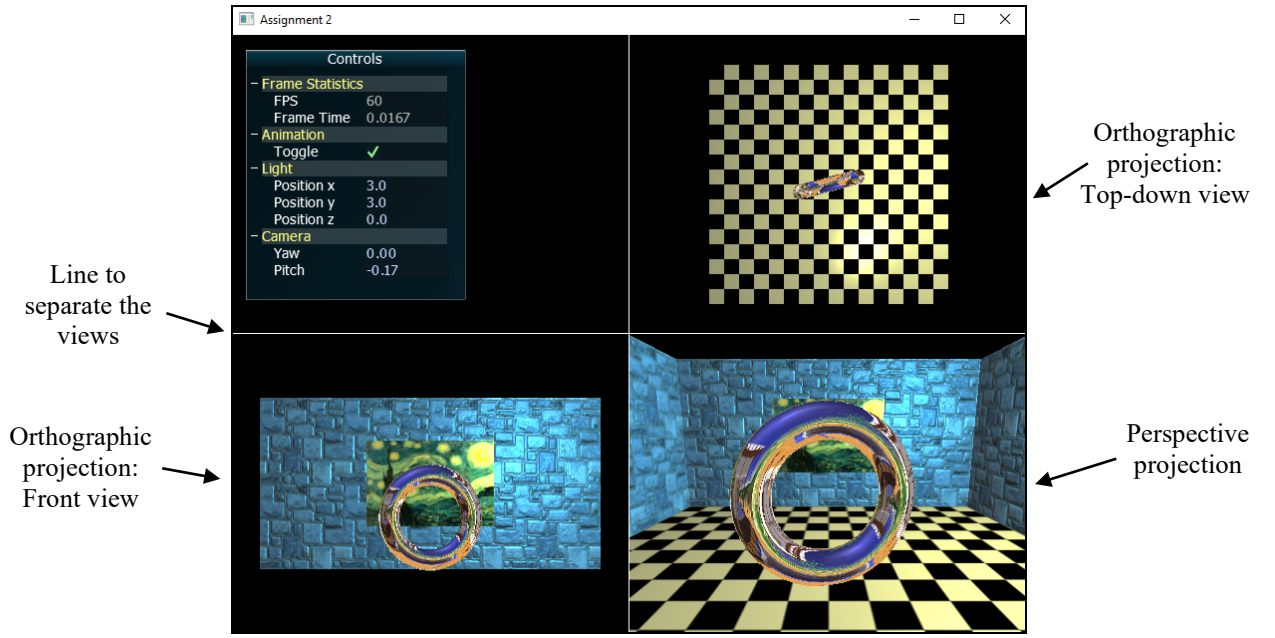

Figure 1: Multiple viewports display.

Write an OpenGL program using the libraries covered in this subject to display a 3D scene viewed from multiple camera positions, as shown in Figure 1 above.

- Multiple viewports (5 marks)
  - Each viewport is to have a different view and projection:
    - A top-down view of the scene (using orthographic projection).
    - A front view of the scene (using orthographic projection).
    - A perspective view (using perspective projection).
    - Draw two lines to separate the views.
- 3D scene (10 marks)
  - The scene should be that of a room with 4 walls and a floor (a ceiling is not required). The room should be lit with a single point light source.
    - The floor should be textured.

        - The walls are to be rendered using normal mapping.
    - The room should contain a painting on the wall and a rotating ornament.
        - Use textured polygons for the painting.
        - The ornament is to be rendered using cube environment mapping. It should rotate by updating its transformation matrix.
- User interaction (5 marks)
    - Allow the user to control certain aspects of the scene using a control panel.
        - Display the frame statistics: frames per second and frame time.
        - Allow the user to toggle the animation (i.e. pause and unpause).
        - The user should be able to move the position of the light.
        - Allow the user to change the yaw and pitch of the camera for the perspective view.

    Figure 2 below illustrates this. The images show the light at different positions and the perspective view looking in different directions.

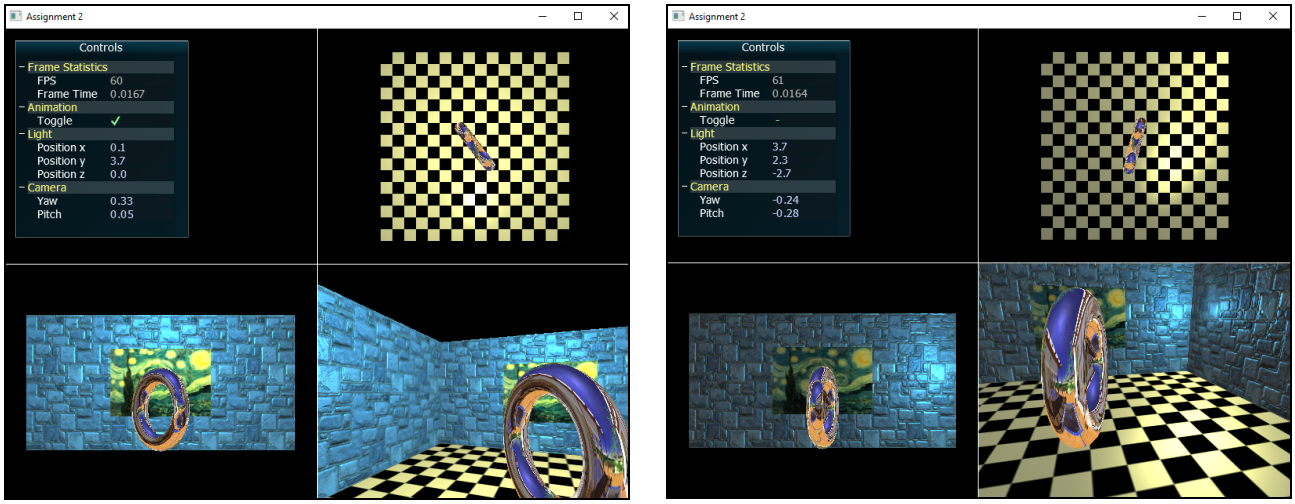

Figure 2: Images that show differences in the display based on different settings.

Report with Screenshots

In your submission, include a report that includes screenshots demonstrating your program in operation and the implemented features. Follow all instructions from your tutor.

Instructions and Assessment

Follow all instructions from your tutor.

The purpose of this subject is to enable students to learn, understand, and apply computer graphics techniques. As such, generative AI tools are **NOT** permitted for assessments in this subject.

Assignments must be implemented using modern shader-based OpenGL with the libraries covered in this subject. The use of other libraries is not permitted.

The assignment must be your own work. If asked, you must be able to explain what you did and how you did it. Marks will be deducted if you cannot correctly explain your code. The mark allocations shown above are merely a guide. Marks will be awarded based on the overall quality of your work. Marks may be deducted for other reasons, e.g., if your code is too messy or inefficient, if you cannot correctly explain your code, etc. For code that does not compile, does not work or for programs that crash, the most you can get is half the marks (i.e. 10 marks or less). It is better to comment out sections of your code that do not work and include a note for the marker.

