# Computer Graphics Coursework – Self Assessment Document

**Name:** Luca Iaccio **ID number:** *22525195*

Complete the self-assessment grid below by writing a short explanation of how you have satisfied the requirement and how it has implemented in your code.

|  |  |  |
| --- | --- | --- |
| **Learning outcome** | **Mark** | **Weighted mark** |
| 1. Use appropriate mathematical tools (40%) |  | 0 |
| 2. Develop a 3D graphics application (30%) |  | 0 |
| 3. Write shader code (30%) |  | 0 |
|  | Total | 0 |

Your mark for each Learning Outcome (LO) is the highest mark achieved based on the criteria specified in the self-assessment grid. Note that you will need to have satisfied all criteria at the lower mark bands to be awarded marks in the higher mark bands, e.g., to get a mark in the 70 - 80 band for a learning outcome you will have needed to have satisfied all criteria in the 40 – 50 and 50 – 60 mark bands.

## Learning Outcomes:

**LO1** Select and use appropriate mathematical tools for constructing and manipulating geometry in 3D space.

**LO2** Develop an interactive 3D graphics application using an industry-standard API.

**LO3** Write shader code for the programmable pipeline on modern graphics hardware using an industry standard shader language.

## Self-assessment Grid

|  |  |  |
| --- | --- | --- |
| **Mark** | **Criterion** | **Comments (state how and where you have achieved the criterion)** |
| 42, 45, 48 | LO1: Basic use of vector and matrix objects | I have achieved this in the object struct e.g. struct Object  {  glm::vec3 position = glm::vec3(0.0f, 0.0f, 0.0f);  glm::vec3 rotation = glm::vec3(0.0f, 1.0f, 0.0f);  glm::vec3 scale = glm::vec3(1.0f, 1.0f, 1.0f);  float angle = 0.0f;  std::string name;  }; |
| LO2: Application compiles and runs without alterations to the source code of CMake file. |  |
| LO3: Implementation of shaders to apply appropriate textures to objects. | On line 110,111 and 112 I add a normal , displacement and specular maps to the planet objects e.g.  heart.addTexture("../assets/normalMap.PNG", "normal");  heart.addTexture("../assets/DisplacementMap.PNG", "Displacement");  heart.addTexture("../assets/SpecularMap.PNG", "Specular"); |
| 52, 55, 58 | LO1: Basic use of translation, rotation and scaling transformations. | I have used basic translation, rotation and scaling in my object transformations e.g. for (unsigned int i = 0; i < 24; i++)  {  object.position = teapotPositions[i];  object.rotation = glm::vec3(1.0f, 1.0f, 1.0f);  object.scale = glm::vec3(1.0f, 1.0f, 1.0f);  object.angle = Maths::radians(20.0f \* i);  objects.push\_back(object);  } |
| LO1: Implementation of glm library functions for calculating view and projection matrices. | I have created my own functions for the view and projection matrices on line 243 e.g.g camera.target = camera.eye + camera.front;  camera.calculateMatrices(); |
| LO2: 3D virtual world has been created using instances of a single object type. | In coursework.cpp I use two different objects , stars and spheres in lines 102 and 103 e.g.  Model teapot("../assets/teapot.obj");  Model sphere("../assets/sphere.obj");  Model heart("../assets/sphere.obj"); |
| LO3: Use of shaders to apply dynamic lighting from point light sources | After line 125 I create multiple different light source types such as point lights , spot lights and directional lights to create the effect on the stars. |
| 62, 65, 68 | LO1: Implementation of students own functions for calculating view and projection matrices. | I have created my own functions for the view and projection matrices on line 243 e.g.g camera.target = camera.eye + camera.front;  camera.calculateMatrices(); |
| LO2: 3D world created using multiple object types. | In coursework.cpp I use two different objects , stars and spheres in lines 102 and 103 e.g.  Model teapot("../assets/teapot.obj");  Model sphere("../assets/sphere.obj");  Model heart("../assets/sphere.obj"); |
| LO2: Users can navigate the virtual world using keyboard and mouse inputs. | On line 313 I have a mouse input function to take mouse inputs and on line 294 a function to take keyboard inputs. |
| LO3: Use of shaders to apply dynamic lighting from different types of light sources. | After line 125 I create multiple different light source types such as point lights , spot lights and directional lights to create the effect on the stars. |
| 72 75, 78 | LO1: Implementation of students own functions to replace glm functions (e.g., glm::length(), glm::dot(), glm::cross() etc.). |  |
| LO1: Implementation of quaternions to calculate rotation matrix. |  |
| LO2: Interactive dynamic aspects of the virtual word and controllable by the user (e.g., position of objects, location and function of light sources etc.). |  |
| LO3: Appropriate implementation of normal and specular maps. |  |
| 85, 90, 100 | LO1: Use of quaternions to calculate view matrix. |  |
| LO1: Use of SLERP to smooth out changes in camera direction. |  |
| LO2: Implementation of a third person camera with the ability to switch between first and third period view. |  |
| LO2: The position of the camera or character obeys the constraints of the physical space (e.g., can’t pass through objects, can’t hover in midair etc.). |  |
| LO3: Use of shaders to apply parameter driven effects within the scene, e.g., light properties controlled using camera/character position. |  |