**Graphics Project Information**

**Team members:**

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| **Your name (s): (3 students)** | **Student number (s):** |
| Samuel Evans-Powell | 32290086 |
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**Nature of Project:**

The team hopes to create a OpenGL graphical demo that models the mechanics of a spaceship in space. Time permitting, we would also like to model orbital mechanics of some kind.

The player will be a pilot controlling a spaceship in space. This will be the user's primary point of interaction with the program. The user will view the world from a first-person point of view. Input will be via keyboard and mouse. The player will use the keyboard to adjust the pitch, yaw and roll of the spaceship. The player will also use keyboard controls to adjust the thrust of the spaceship. The player may use the mouse (in combination with a keyboard shortcut) to “free look” around the environment independent of the motion of the spaceship.

The team will use a simple particle physics engine to implement these features. The spaceship will follow simple classical mechanics. For example, in the event the player initiates a quick burst of thrust (assuming no other forces acting on the spaceship), the spaceship will initially accelarate then continue to move at a constant velocity. This aspect of the project will satisfy the physical modelling requirements of the assignment.

Collision detection with the environment will most likely be via simple bounding spheres.

Time permitting, the player may use the mouse buttons to shoot “gravity wells”. These are projectiles that violently pull surrounding objects towards themselves. The force experienced by the surrounding objects will follow the inverse-square law, meaning objects two units away will experience four times less force than objects one unit away.

Some physics parameters that will be adjustable at run time will include:

- Mass of the spaceship

- Thrust strength

- Strength of gravity

- Strength of drag/damping experienced by the spaceship

The team will use the OpenGL shader pipeline for all graphical effects.