G53GRA Coursework Report

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# Hierarchical Modelling

In my scene there is a robot, which is comprised of several body parts: two arms, two legs, and a body. It also includes two orbital models that spin around the top of the robot. All of these parts are modelled hierarchically around the body of the robot. Each piece has an x, y, and z position, which is used to translate with before drawing. The body has the centre location, with each other part having a position equivalent to an offset; the body may have a position of 50,0,50, and the other parts positions of 5,0,0, showing their offset from the body.

Each arm and leg is made from several parts in themselves, each offset from the main body, but using values relative to each other.

The main body moves around the scene, following a path, and the rest of the robot goes with it.

# Animation

I have several animated objects in the scene.

The smallest is the campfire embers. They are simple GL\_POINTS that move up and down to emulate a fire.

The turret in the middle of the scene tracks where the robot is moving, and rotates to point towards it. It then fires projectiles that move toward the robot before colliding with it.

The robot itself has the most animated parts. The arms and legs loop a walking animation, as well as rotating when the body rotates to turn corners in the path. There are also orbiting blocks that loop a square ring animation above the robot’s head.

The arms and legs of the robot use thresholds to alternate between moving one direction and the other. The orbital blocks use keyframes based on how much time has passed, with 1 second between each keyframe.

# Lighting and Texturing

## Lighting

I have several lights within my scene. The first is a spotlight on the front of the robot, which illuminates the path in front of him. It uses linear attenuation to have a cut-off point, emulating a torch or similar light, shining a circle of white light.

The other lights are smaller, in the campfire. These lights are ambient lights that illuminate an area around them, again using linear attenuation to only light up a small area around them.

## Texturing

All the models and other objects in the scene are textured. They all use a bmp file for a texture. The robot changes its texture colour when it is hit by a projectile from the central turret.

The texture is mapped to each vertex in a shape (QUAD/TRIANGLE) using parts of an overall texture image. Some objects use a repeating texture, whereas other objects use different parts of the texture for different parts of the object.

# Novel Features

There are a collection of novel features present in my scene, some of which have already been mentioned. The first is