**CPSC 3710 Project Report**

**Design and Implementation**

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Our program consists of a main program, Boot, which initializes and runs the game environment and control features. The components of the game environment such as the robot, the city, the streets, the city blocks, and the buildings are within separate classes which are utilized by the main program. The most recent build of this game implements robot movement, city generation, and camera movement according to the set specifications.

The data structures used in this project primarily consist of arrays, as the use of arrays allows for easy iteration during the creation of objects. Arrays are also valid inputs in several common OpenGL functions.

Assumptions made during this project by our group members included the assumption that the robot’s direction of movement would need to change depending on which direction it faced, rather than rotating the world around the robot and moving the robot in a consistent direction. It was also assumed that the buildings in the city could not all be rendered simultaneously, and would need to be rendered selectively depending on the robot’s position in the world. Ultimately these assumptions proved useful in the implementation of our final project.

**Division of Labour**

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Our group’s division of labour was not strictly enforced, as the elements each group member would work on would overlap at times. The overall design and implementation of the game was contributed to by members who also focused on specific elements of the game. However, in terms of general areas of focus, the division of our group’s efforts in implementation can be defined as:

* David Adams: Buildings
* Matthew Davison: Robot, Blocks
* Jeffrey Deurloo: Streets
* Jordan Duncan: shooting functionality

**OpenGL Feature Implementation**

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Throughout the development of our project, several features of OpenGL were explored. One of the main aspects of OpenGL we had to explore was control over the projection matrix, particularly in combination with the view’s relation to the movement of the robot. The implementation of a view which would change based on a player’s actions was a challenging issue to resolve, as was the implementation of randomized visual objects in OpenGL.

However, the OpenGL features which required the most learning were likely those associated with the picking and selecting of objects on the screen. This feature involved the use of a stencil buffer, which no members of this project’s group were previously familiar with. Overall, the project proved a good learning experience for the tools and methods associated with using OpenGL, and in graphics implementation in general.