UTM

UNIVERSITI TEKNOLOGI MALAYSIA

Assignment 3

Fundamental of Computer Graphics – SCSV 221

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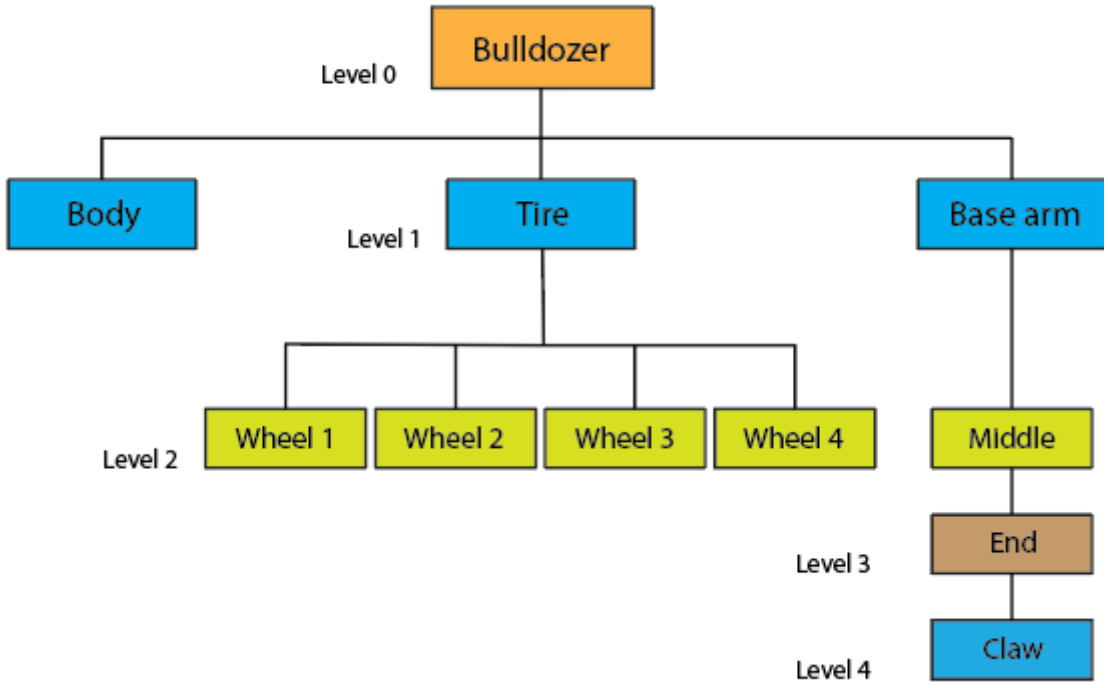
1. INTRODUCTION

This task is given by our Fundamental of Computer Graphics lecturer, Dr. Norhaida bt Mohd Suaib, as the third assignment for us. In this report, we will discuss on making a complex 2d object by using hierarchical modelling.

The objectives of this assignment are student manage to design the structure of a 2D hierarchical model. Student also can implement and generate the 2D hierarchical model that the student had designed using OpenGL functions. Students also manage to prepare suitable documentation and report on what they have done for Assignment 3.

For this assignment, I make a 2D bulldozer that can move forward and backward. The bulldozer also can move its arms that consists of 3 parts- base, middle, and end.

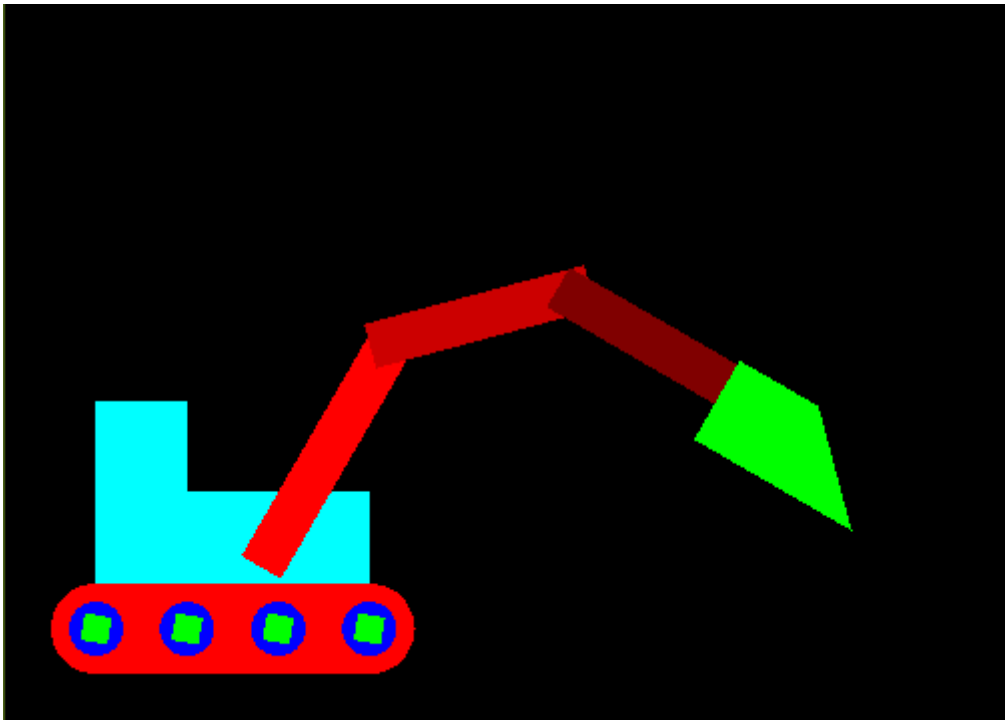
2. 2D Hierarchical Model



Hierarchical Model Diagram for 2D bulldozer

At level 1 there are three parts created that is the body of the bulldozer, the tire of the bulldozer, and the arm of the bulldozer. At level 2, the tire consists of four identical parts that are Wheel 1, Wheels 2, Wheel 3, and Wheel 4. For the arm section, the Base of the arm is extended with the Middle arm, followed by End arm at level 3 and Claw at level 4.

3. STRUCTURE OF CODING



The output of the program

To make this program, I divided the part into three method as in level 1 hierarchical model that is *badan*, *roda*, and *tayar.* To make the body, I combine two different cube to make it into a body of bulldozer by using glutSolidCube(). To make the tire, I combine three objects that is a rectangle and two 2D sphere both at the side of the rectangle by using glutSolidSphere() and glutSolidCube(). For the arm, I combine three rectangles with different colours and a polygon. For this part, I use glutSolidCube(), glutSolidSphere(), and GL_POLYGON to make the objects. To make a hierarchical model, I use glPushMatrix() and glPopMatrix() to combine all the parts.

When the output is displayed, user can move the bulldozer forward and backward. When the bulldozer is moving forward or backward, the wheels will rotate according to the movement of the bulldozer. User also can move the arms upwards and downwards.

4. CONCLUSION

There are several things that I have learnt during finishing this assignment. I learnt how to create a more complex object by using multiple primitives. Besides that, I enhance myself on understanding the function of glPushMatrix() and glPopMatrix(). I also learn how to use gluOrtho2D function more effectively. This function can alter our field of view when displaying program's output.