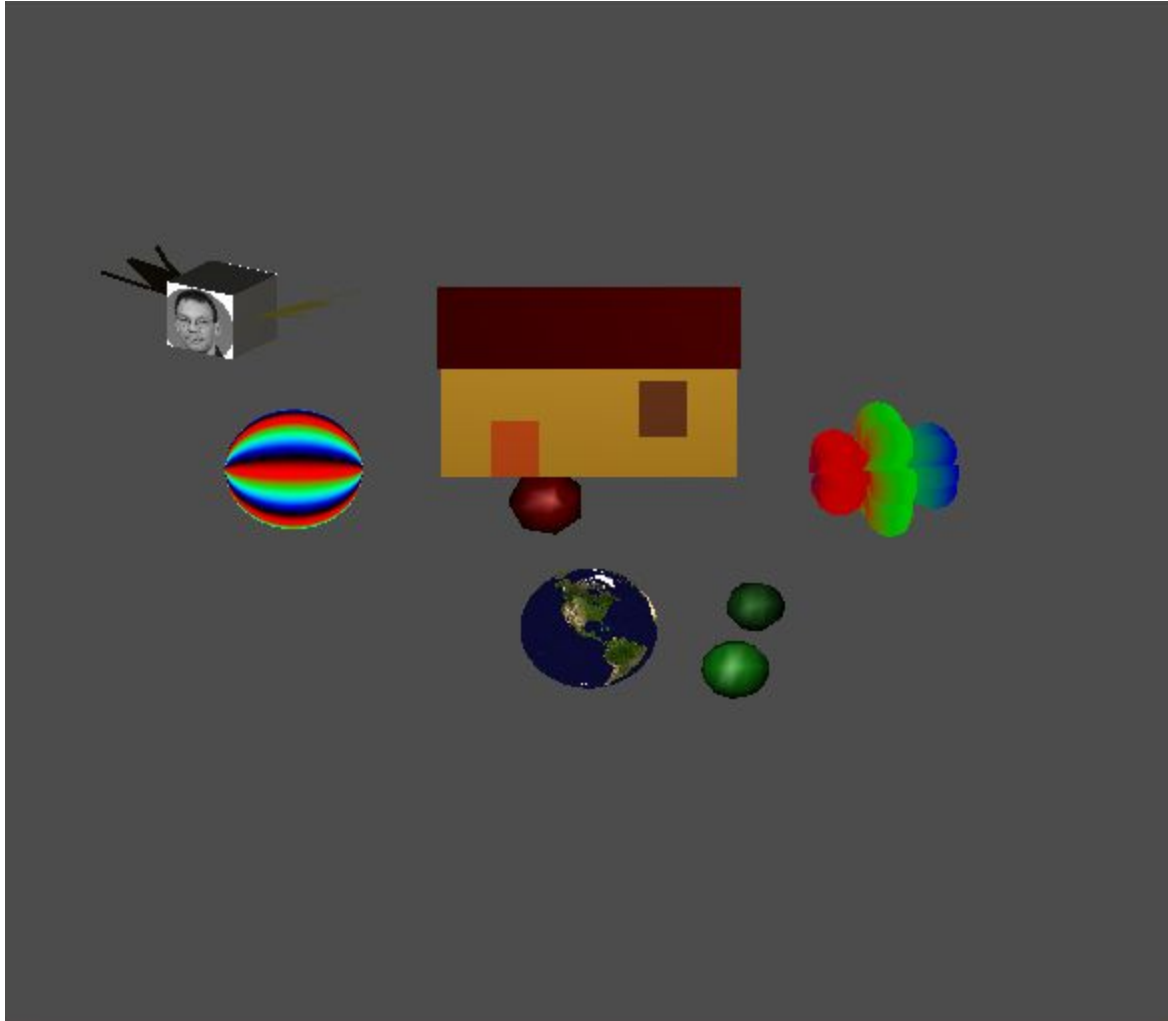


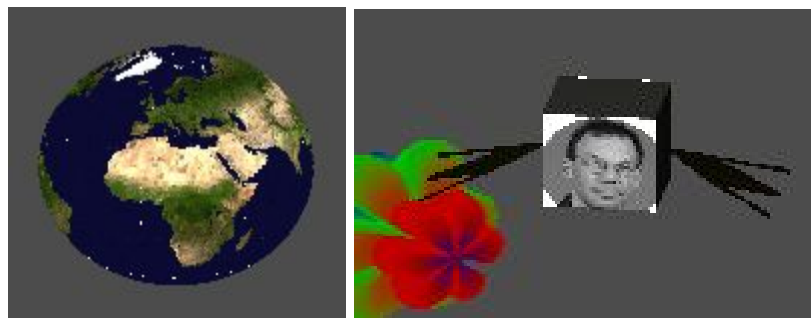
Graphics coursework 2



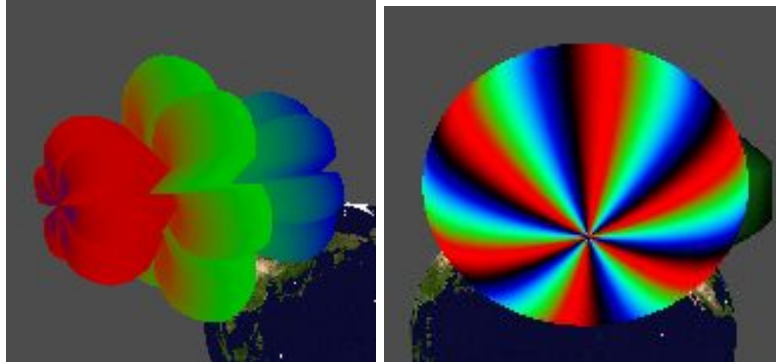
The scene I have created doesn't really show something that was designed to make sense. It is made out of shapes and a solar system that doesn't make sense to be together. The solar system has planets rotating around the Earth in an irregular torus shape. They would go up and down or move closer or further from the Earth like planets would in real life. There are 2 shapes with interpolating colour. One is a sphere and the other one was made using a superformula¹. In the center there is a house made out of polygons and a window. Around all of that rotates a bird with flapping wings. The house and planets that rotate around the Earth are made using materials rather than colour or textures.



At the bottom of the window there is a slider that rotates the scene around to give users a change to view all the object and see if the materials and normals are right. The 4 spinboxes change the supershape on the left. The formula uses 4 constants that change how the shape looks. By changing the values the shape changes. I am unsure how the values change the shape but sometimes it would get so big it can't fit on screen but changing the values back brings it back to normal. The last form of interaction is the tick box. If the box is ticked the bird would fly around the scene and flap its wings.



The earth in the middle of the solar system contains the earth texture provided. It rotates around itself. The texture is loaded and then rendered using triangle strips using the points on the sphere rather than a glut object. After loading the texture is duplicated to make a square. So when rendering the texture I go from 0 to 1 and 0 to 0.5 on the other axis. This way the texture doesn't appear duplicated. The rendering of the Earth is done with a function call to function system in the Scene.c file which then calls the function draw_tex that renders the earth at 0, 0 of the scene. When I first rendered the texture I was using a sphere made out of 36 x 36 points. The texture then appeared low resolution. To fix it I increase the resolution of the sphere to 124 x 124 points. This way the sphere appears like it would on a glut object. The face I put on the cube rotating around the sphere. The bird has 2 faces on the back and one on the front. The bird is drawn using the function call bird and a function call to wing that renders a wing rotate by a given angle.



In my scene I have 3 convex object. One is the rotating colour interpolated sphere on the left. They are generated when the applications load using the functions sphere and super_sphere. They generate the points and store them in a vector which is then used by drawShape to render a shape made out of points. On the right I have a shape again with interpolating colour and you can change it using the spinboxes. It is again made using triangle strips and points that I calculate when OpenGL loads and store in a vector of vectors. When drawing I iterate over the vector and make triangle strips to draw the shapes. The last convex object is the earth with the texture. When rendering it I use the same points of the coloured sphere I just translate and rotate to place it in the right place. All these objects rotate around themselves.

The hierarchical object I made is a bird with Marc's face. The bird is just a glut cube and has 2 wings going out of it. The wings flap when the bird is flying. The wings are actually drawn using the same function but rotated in 180 degrees. They are made using a polygon shape. The textures of the face are on separate polygons placed on the front and back of the cube. The bird as a whole rotates and flaps its wings around the scene and there is a tickbox to stop it from rotating or start it.

References:

1 - <https://en.wikipedia.org/wiki/Superformula>