Log book

13 th /may 2 pm to 3.30

Meet with the tutor and discussed over the project decided to use gl translate to make the submarine and all the parts for it be in the right place;

15th /may 4 pm – 6pm

Started to work on the submarine getting the dimensions and the look

After some googling I found out that gl.glscale() allows you to change the look of the glut objects

I decided to make a sphere and scale it and well as s cone for the end of the submarine and then a propeller

26th /may 6-9 pm

Working on making the submarine got the submarine to draw but I could not figure out the matrix to get everything working correctly

Had a submarine class an in that had 2 draws inside one being the body one being the cone at the end

30th may

Working on the matrix to get every thing working talked to a class mate on how to aproch the subject he told be that I can make a matrix in a class and gave me an idea of how to make the propeller move correctly

```
gl.glPushMatrix();
{
    submarine.think();
    submarine.draw(gl, glut);
}
gl.glPopMatrix();
```

```
public Submarine(){
    pos = new Vector(0, 0, 0);
    body = new Body();
    prop = new Propeller();
    bum = new SubEnd();
    sub_pos = new double[] {pos.x,pos.y,pos.z};
}
```

```
gl.glPushMatrix();
{
    gl.glScaled(2f, 2f, 2f);
    gl.glTranslatef(pos.x, pos.y, pos.z);
    gl.glRotatef(sub_y_rot, 0, 1, 0);
    // body matrix
    gl.glPushMatrix();
    {
        gl.glScalef(sub_body_scale_x, sub_body_scale_y, sub_body_scale_z);
        body.draw(gl, glut);
    }
    gl.glPopMatrix();
    //subend matrix
    gl.glPushMatrix();
    {

        gl.glTranslatef(0, 0, sub_end_pos_z);
        gl.glRotatef(sub_end_angle, 0, 1, 0);
        bum.draw(gl, glut);
    }
    gl.glPopMatrix();
    // propeller matrix
    gl.glPushMatrix();
    {
        gl.glTranslatef(0, 0, sub_end_pos_z-1f);
        prop.draw(gl, glut);
    }
    gl.glPopMatrix();
```

```
public void draw(GL2 gl, GLUT glut){

    gl.glPushMatrix();
    {
        current_rotation += rotation_speed;
        if(current_rotation >360f){
            current_rotation = 0f;
        }

        gl.glRotatef(current_rotation, 0f, 0f, 1f);
        //first blade
        gl.glPushMatrix();
        {
            gl.glRotatef(90f, 0f, 0f, 1.0f);
            blade.draw(gl, glut);
        }
        gl.glPopMatrix();
        //second blade
        gl.glPushMatrix();
        {
            gl.glRotatef(180f, 0f, 0f, 1.0f);
            blade2.draw(gl, glut);
        }
        gl.glPopMatrix();
    }
    gl.glPopMatrix();
}
```

It worked well then I began to work on the movement managed to get movement up and down that was eazy +- pos.y

1st June 1pm-12pm

Worked on movement some more talking with friends and looking on stack over flow managed to get the movement to work with out on the x ,z ,y plains and rotation to also work

```
public void up(){
    pos.y = pos.y-.1f;

}
public void down(){
    pos.y = pos.y+.1f;
}
public void forward(){
    pos.z = pos.z+.1f;
}
public void backward(){
    pos.z = pos.z-.1f;
}
public void left(){
    pos.x = pos.x+.1f;
}
public void right(){
    pos.x = pos.x-.1f;
}

public void rotLeft() {
    sub_y_rot += rot_angle;
    if (sub_y_rot > 360) {
        sub_y_rot = 0;
    }
    }
}

public void rotRight() {
    sub_y_rot -= rot_angle % 360f;

}
```

this will not work with actual movement, but it allows to be to see the submarine and all its moving parts properly

June 2nd 3pm – 5pm

Talking with the tutor about how to make movant work correctly as I could not quite figure out how to make the submarine work with the trig that I adapted from my solar system code.

We refracted my code to be more tree like for better code practice

We also went though my code and changed the movement and added the flowing camera

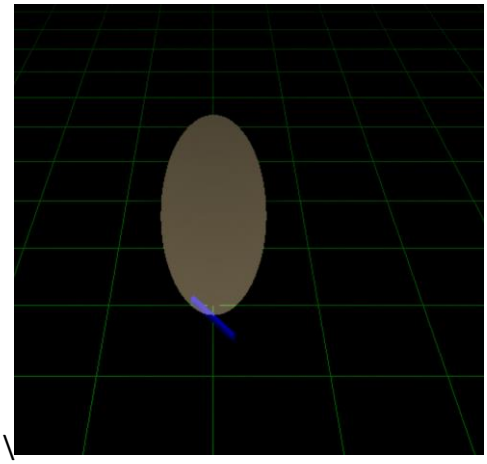
```
// update my position
if (forward || backward) {
    double speed = forward ? SPEED : -SPEED;
    double pitch = Math.toRadians(rotation.x);
    double yaw = Math.toRadians(rotation.y);
    double y_dist = ticks * speed * Math.sin(pitch);
    double xz_dist = ticks * speed * Math.cos(pitch);

    position.x += (float)(xz_dist * Math.sin(yaw));
    position.y += (float) y_dist;
    position.z += (float)(xz_dist * Math.cos(yaw));

    // change rotating speed of the propeller
    propeller.setRotationSpeed(forward ? 900.0f : -900.0f);
} else {
    propeller.setRotationSpeed(250.0f);
}
```

June 3rd 12am -12pm

Working on getting the textures to load and apply properly ran in to some problems with them as they would apply to the submarine and not the land


\

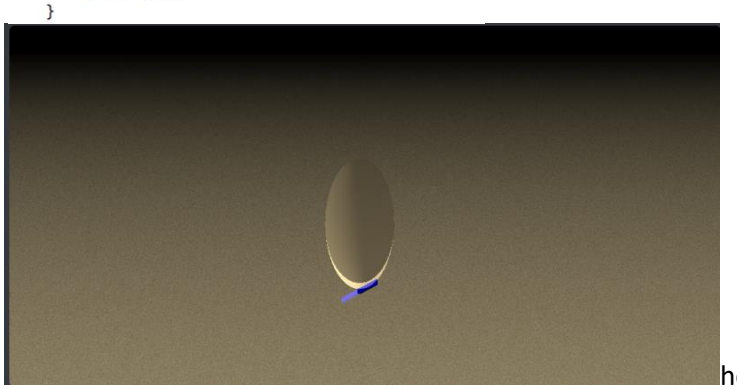
I found out it wasn't applying to the land needed to comment out these

```
        //gl.glPolygonMode(GL2.GL_FRONT_AND_BACK, GL2.GL_LINE);

        grid.draw(gl);
        //gl.glPolygonMode(GL2.GL_FRONT_AND_BACK, GL2.GL_FILL);
```

after removing that the texture still did not apply to the grid but it will applied to the submarine I had forgotten to add it too the grid

```
for (float x = start; x < end; x += step) {
    for (float z = start; z < end; z += step) {
        gl.glBegin(GL2.GL_QUADS);
        gl.glTexCoord2d(0, 0);
        gl.glVertex3f(x, 0, z);
        gl.glTexCoord2d(1, 0);
        gl.glVertex3f(x+step, 0, z);
        gl.glTexCoord2d(1, 1);
        gl.glVertex3f(x+step, 0, z+step);
        gl.glTexCoord2d(0, 1);
        gl.glVertex3f(x, 0, z+step);
        gl.glEnd();
    }
```

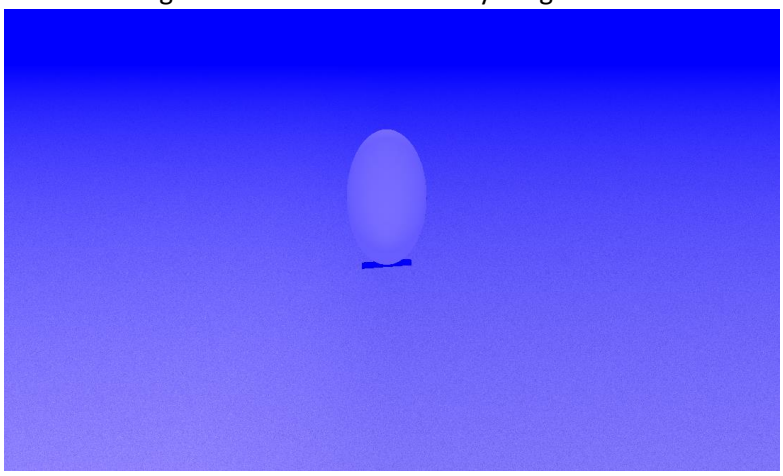
 how ever that made that everything have the same texture

After talking to the tutor and some friends I hadn't added the texture matrix so it was applying to everything

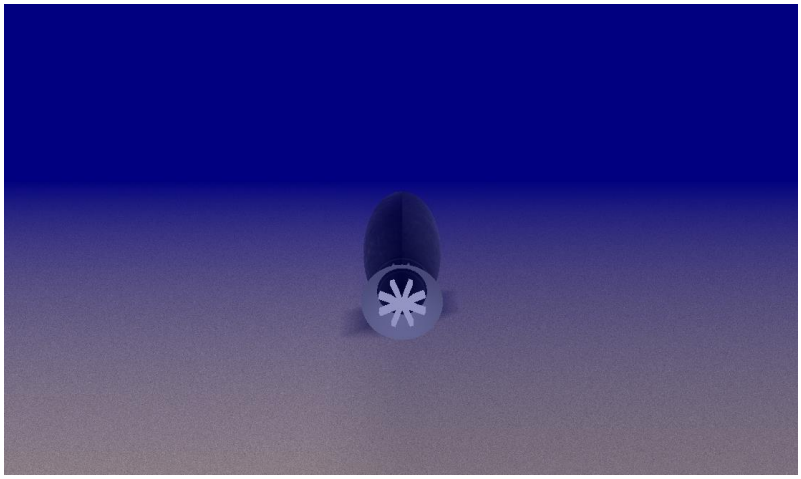
June 4th

Added some more stuff to the submarine and put a texture on the submarine it self also allowed the camera to move separately with the arrow keys.

Added the fog as well but it turned everything to while and blue



Im not to sure what I did but I remade the code and it worked



```
GL2 gl = gld.getGL().getGL2();
gl.glClearColor(fogColor[0], fogColor[1], fogColor[2], fogColor[3]);
// clear the depth and color buffers
gl.glClear(GL2.GL_COLOR_BUFFER_BIT | GL2.GL_DEPTH_BUFFER_BIT);
```

Reflection

I left this project to late and I should have started earlier but with other projects and work commitments I pushed it too far back to finish them.

I feel that I made the submarine well and the objects in it but it took me too long to make them properly and there's were my short comings are im not very good at understating how to code it requires a lot of explaining and going over and over things for me to finally get it

To do feel that with the tutors help I managed to get more coding practices in my head like with the inheritance and the classes and understanding the tree a bit better I hope to be able to apply theses practices to my future projects.

When it come to the application so far it does not have coalitions with the outside grid. The grid also does not have texture up and down hills and valleys. In future I would apply that to the grid .

It does collide with the ground in a way when the submarine hits a vector in the y it stops moving and there is a max Hight to but in future I would like it to actually collide with the terrain. So that when the terrain has hills and valleys it will collide with the in the right way.