AC41001 Stuart Douglas Assignment 1

Overview

Concept

The concept for the assignment was clock gears, aiming to show the interconnection cogs moving and interacting with each other. with the end goal of having a clock face which would show the time however the clock face was not possible, however I was able to create cogs.

Scene

The scene I have created is a section of interconnecting cogs which are generated given a number of edges, the cylinder is generated with teeth, the teeth are created during the calculating of points of the cylinder. A additional option I would wish to add if I had more time would be to able to define the size of the teeth.
Since I implemented fog in 2 of the 3 shaders in the fragment shaders I found that you didn't get the effect of the fog, so I created another model called **plane** this is used for the ground which can be seen at the bottom of the scene. The plane object is a modified cube where I have manually define the positions and normals, it is then positioned and scaled to fill the scene.
The lighting being used in the scene is a point light, due to the shader I noticed that the defuse affected the colour of models in the scene, where white objects shown grey. The solution to this was to add in a gamma correction to the fragment shader, this means that we can adjust the gamma in a scene to better fit the display that is displaying it.
If you press the `1` key you switch between the shaders that I have added to the scene, these include:

- point light with fog
- directional light
- directional light with fog

> *All shaders have gamma correction applied to it.*

Alongside the cogs in the main view there are larger cogs in the background, this was to show a sense of depth and add character to the scene since cogs are of all shapes and sizes.

Controls

Controls was an issue I wish I covered earlier on, since over time more and more controls were being added. I have added a file in the directory called **controls.md** or **controls.pdf**. The file was created due to the console output not being the best display for controls.

Animations

animations in the scene are handled using a global variable which is applied to all of the cogs, to create the moving motion, however each cog is moving at different speeds and have options to have speeds changed for each separate cog.

Issues

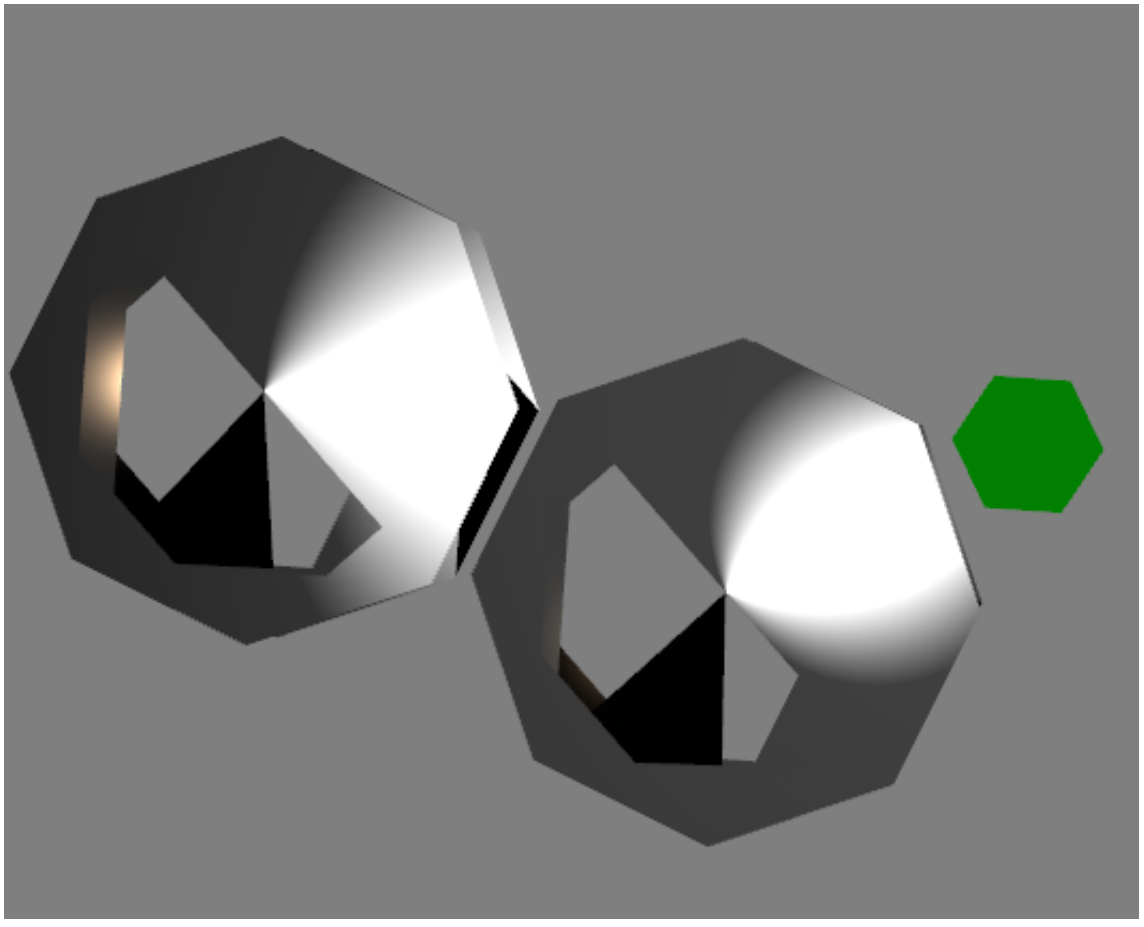
- Create complex objects: One area where I spent most of the assignment working on, however now towards the end of the assignment I have a much better understanding.
- Migrating to classes: this wasn't a huge issue but ended up resulting in more time moving over logic to work with classes.
- The main difficulty was calculating the right values using the algorithms and assigning them to right coords.

Things I attempted

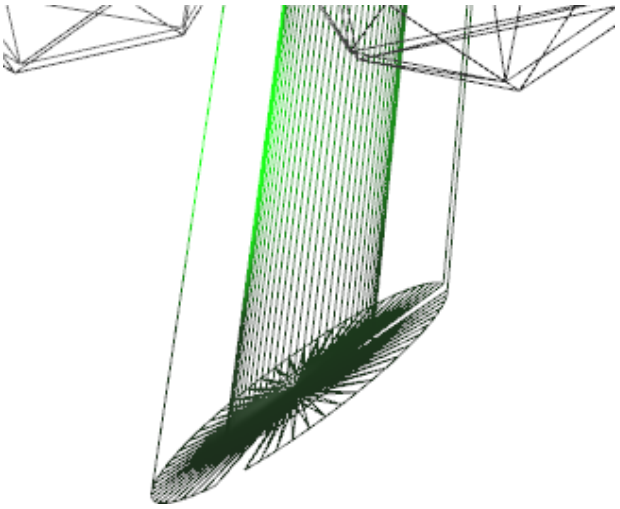
- Text, Object libraries: However due to cmake issues where the wrong binaries are being generated and/or issues with libraries not being able to compile due to other issues.

Earlier Attempts

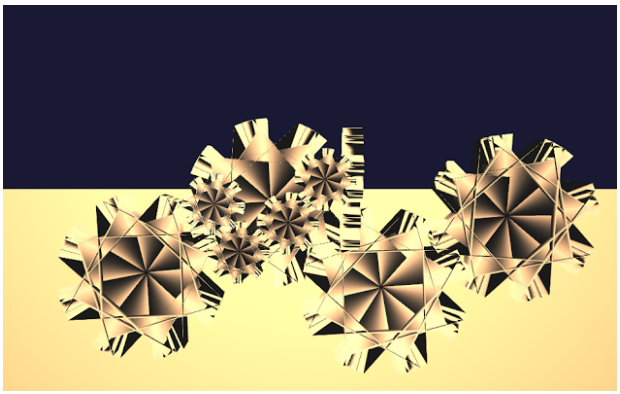
Below are some screenshots of the progress of developing my scene:

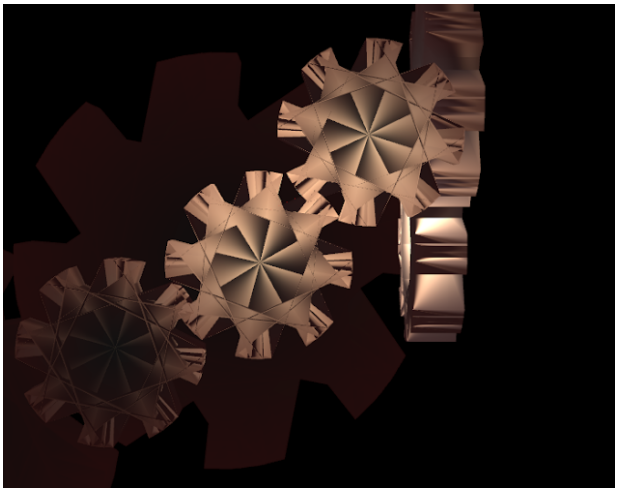


This is the first gear models I created for the assignment, the issue with these models was overlapping triangles which caused a glitching motion and inconsistent points. It was removed however the code can be seen in **disc.cpp.**



During the time I spend in calculating the points I created many weird and wonderful shapes and effects.





Towards the end when I had the more complex model I played around with shaders. The image on the left is directional light and the right shows a reg fog which lit up the background cogs.

Overview

I found the assignment very difficult, from lack of understanding and remembering how to program again in c++. However I found it very interesting and started to really understand how things worked when trying out new things. There is alot I would change in my project from demoing more models to using an obj in the scene. I feel now after this assignment I was able to take what I learned and start to understand it better by applying it in my own way to create my own scene. Things I would do different would to develop using a language I am more comfortable in and keep a backlog of