COSC342 Assignment 1 Report

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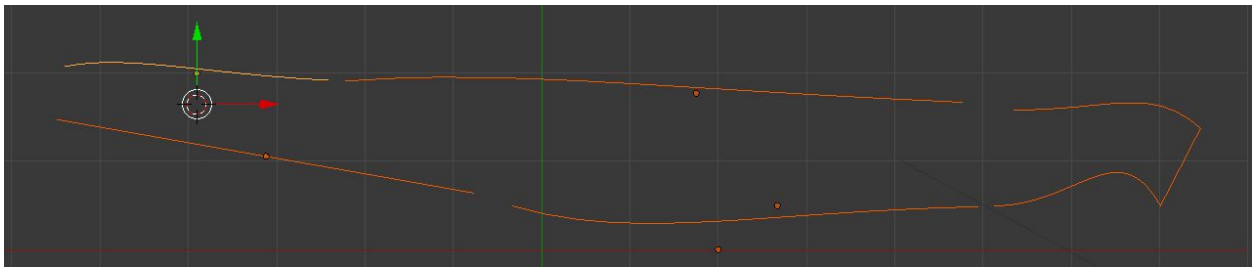
Figure 1: Final project.

I started off by measuring the peg and creating a to-scale wireframe on gridded paper. I decided to double the measurements in my Blender project (1:2) to make it easier to work with and have more precise detail. I began my project by creating the edges of the face of one half of my peg, primarily with bezier curves and for straighter edges, using short paths. Once I created the outline of my object, I selected all of the individual curves and converted them to meshes, joined them so I could edit them all in edit mode, and then joined them together by selecting two vertices and creating a face between them. I found it difficult at first to ensure that all of my curves were being created in the same plane, and frustrating that it was only at the stage of joining them that I noticed that some of the faces being created were vertical or diagonal, indicating the curves were not in the same plane. This stage took a lot of trial and error before I managed to get a handle on location of vertices.



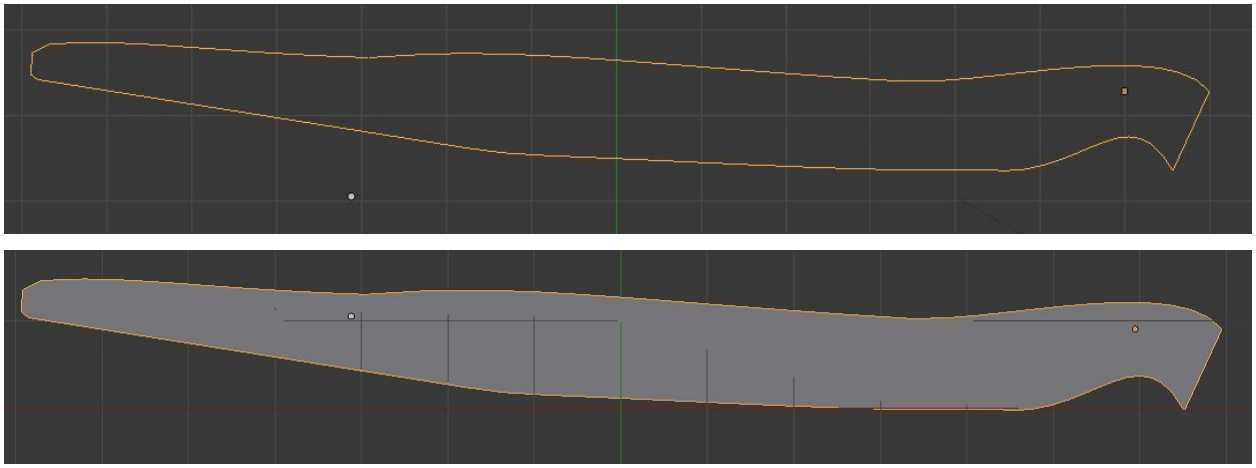


Figure 2: Process of creating the initial shape of the peg.

Once I had connected the edges and created an outline of the peg shape I was happy with, I selected all vertices and created a face, then extruded it to make it thicker, later changing the Z dimension to 2 units. At this point I started adding detail to my peg by creating an S shape out of bezier circles, the "N.Z." in lines and circles then extruding, and the finer indenting and holes in small cubes and cylinders.The "S" and "N.Z." were joined to the main peg and the small cubes were subtracted from the peg by using the Boolean difference operator.

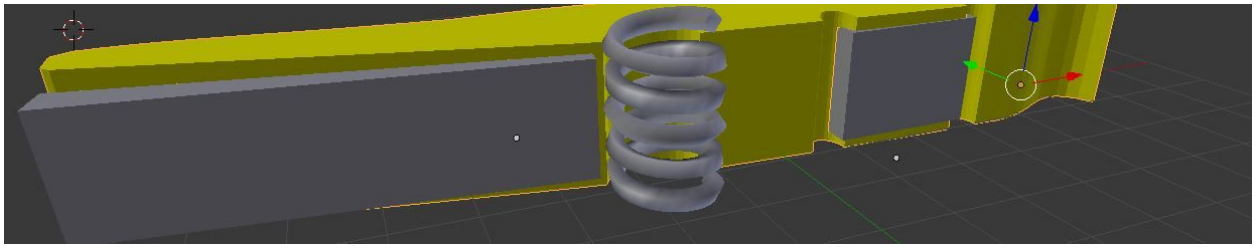


Figure 3: Using Boolean difference to subtract objects from the main peg and create indentation.

I ensured that all of these details were sticking to the scale of the peg and in proportion. After the finishing the peg's detail, I duplicated and mirrored it to create the other half of the peg.
I created the spring by creating an archimedean spiral and increasing the height and bevel depth from half to full, and adding 7 turns. The top and bottom of the spiral was then extended to make the metal extension on either side of the peg by selecting and dragging out 2 vertices, lowering one into the groove on the peg and extending it ¾ of the way down such as in the real model. My first attempt in making the spring was by using the screw modifier on a bezier circle which resulted in a really strange looking joined screw. I watched YouTube tutorials and sought help from the lecturers to ensure I had an accurate spring before continuing,

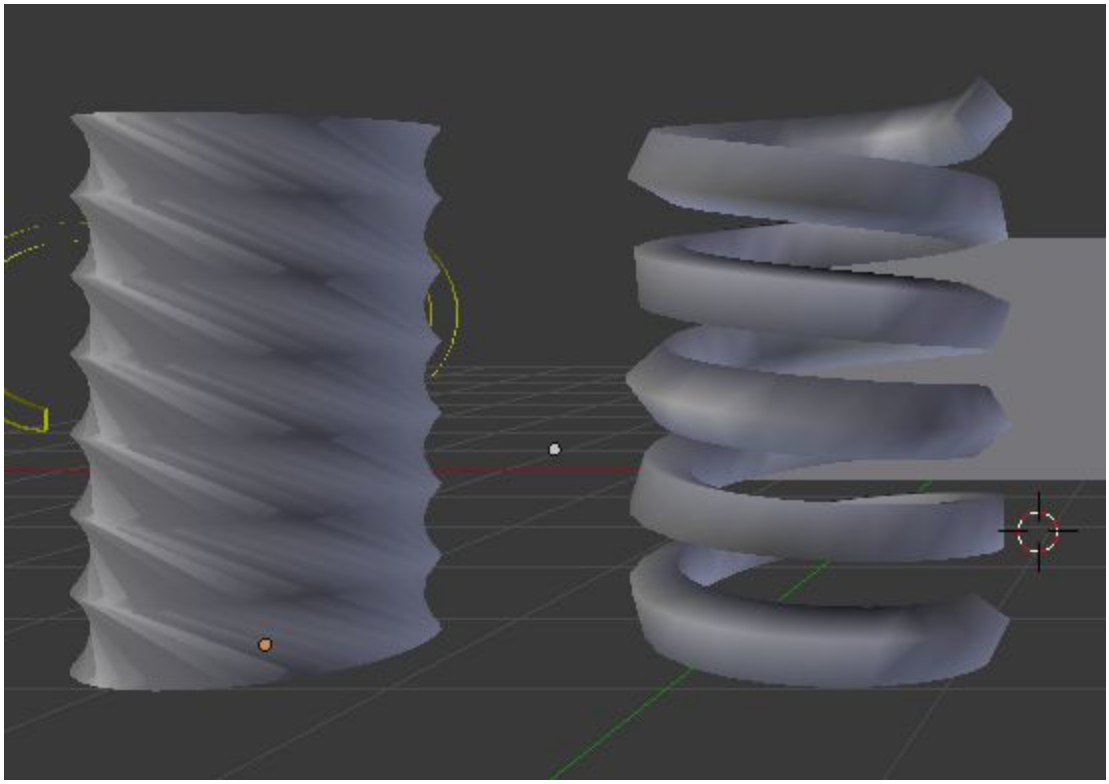


Figure 4: Difference in spirals by method of creation. On left, screw. On right, spiral.

I then duplicated the entire object and created several pegs of different colours by adjusting the diffuse. The backdrop was made by creating a flat plane of 1000 x 1000 units at Z=0. I rearranged the pegs to create a more realistic scene by adjusting the location and rotation values, and ensured that each object in the scene was in a different layer. The ground was moved to a seperate layer.

I first created the yellow plastic material by setting the diffuse to a fluro yellow and adding a little bit of reflectivity so it appeared to be plastic and the metal of the spring was made by setting the diffuse to grey and adding more reflectivity. I had some issues of the difference in the appearance of the material in solid view compared to rendered view; my material looked much less like plastic in the rendered view. Because of this I had to adjust the lighting by adding a sun and setting its energy to 0.7, as well as adding environment lighting with energy 0.3. I then added shadow and came out with a somewhat realistic scene of pegs.

I wasn't very happy with the final look of my material so instead changed the blender mode from Blender render to cyclic render. I then used nodes to create a more realistic plastic look. I added two diffuse nodes, one in a slightly lighter pink colour and one slightly darker. I then added an input layer weight and attached these three nodes to a Mix shader node. This node was then the input of another mix shader node, along with an input Fresnal node and a Glossy BSDF node with roughness set to 0.005.

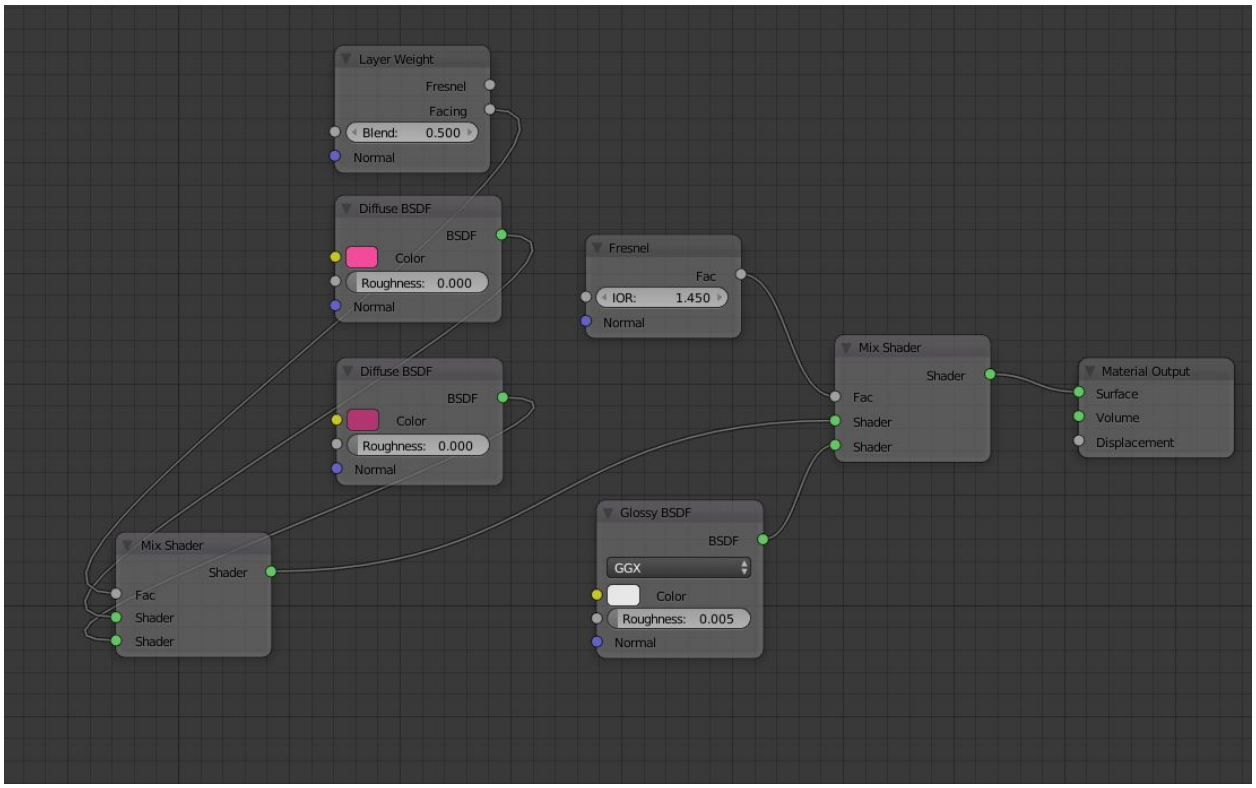


Figure 5: Nodes to create plastic look.

The metal material for the spring was created by using a voronoi texture mixed with a wave texture, adding bump, mix and mapping nodes as well as a glossy BSDF.

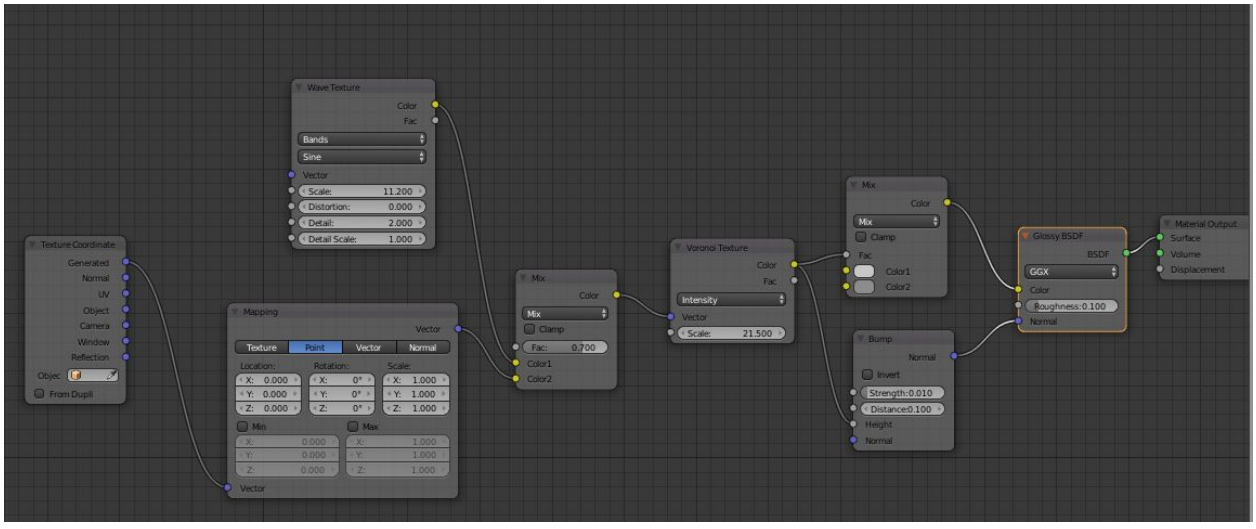


Figure 6: Nodes to create metal chrome material.

The image then looked quite grainy so I changed the render settings by increasing the sampling, disabling the reflective and refractive caustics, decreasing the number of bounces and increasing the ambient occlusion.

Overall the problems I frequently encountered were to do with the Blender interface, particularly windows disappearing to the point where I could not find the File tab to open new projects and add Add-Ons and so on. I tried doing a factory reset on all settings but this resulted in me losing my project. I resolved this by copying my objects into a new Blender file with default screens.

I ensured that I was keeping updated versions of my project in case anything went wrong (which it did plenty of times) and I had to revert to a previous version. If I had more time to work on the project, I would add etchings and leftover plastic detail to the peg to make it look more realistic and adjust the lighting of the scene to make it very slightly brighter. Overall I am happy with the proportions and level of detail of my pegs and the result of my project and have enjoyed the learning process.