Donut Kingdom

Animation Project by Adrian Binu

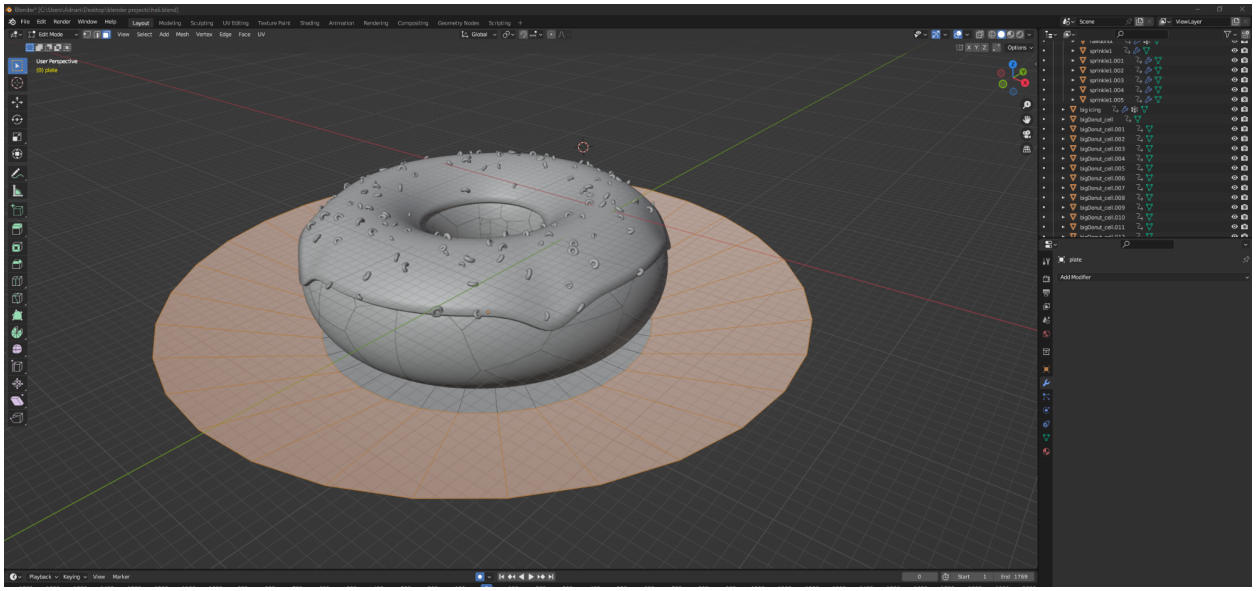
COSC 3P98 Term Project

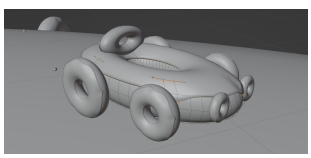
Youtube link here:https://www.youtube.com/watch?v=anNn_HvjBJs

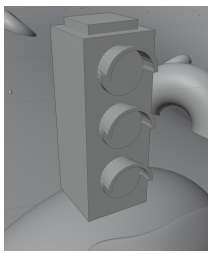
Overview

“Donut Kingdom” is an animation made in blender inspired by Mario kart, space, f1 cars and crafted with a love for donuts. The lighting is the main part of the animation that makes this animation amazing and the music playing is “Cats” by the living tombstone. Everything was done in Blender including the modelling of objects, animation and video editing, this is the first time I have modelled and animated in Blender however I had experience with video editing before. If you are tempted to eat a donut right now that is entirely normal.

Models



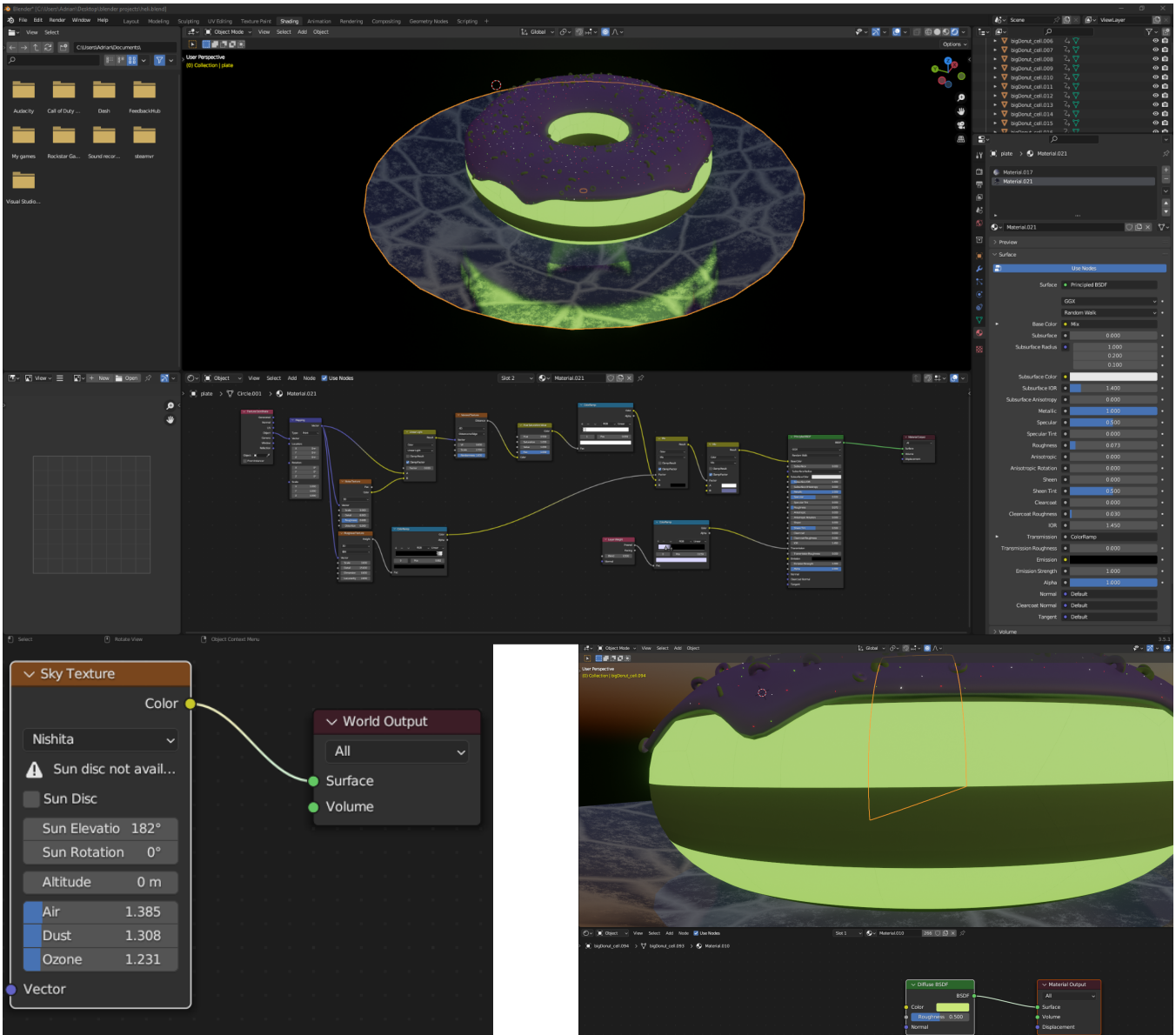




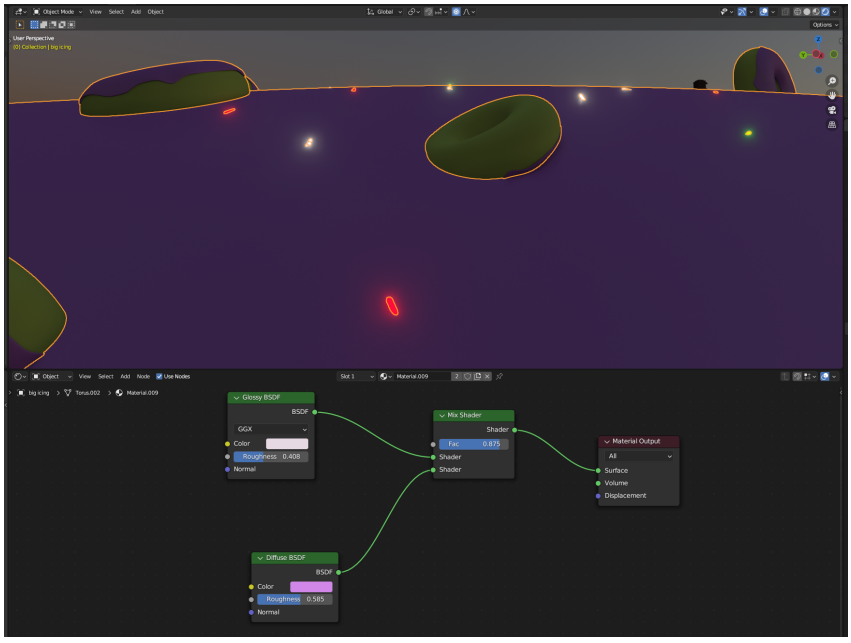
The models were entirely made in Blender by myself and watching lots of tutorials helped. There were lots of ways to model the donut but I simply shaped a torus and for the icing, I simply copied the top part of the donut and pasted it on top and then used a

solidify modifier in Blender to thicken the icing. After making drips of icing by dragging parts of the mesh I then modelled a sprinkle using a cylinder and then instantiated it many times on the icing using Blender's particle system. You can use anything as a particle so I made a collection of objects including the donut itself and put it on the icing. I then made a plate out of a circle and extruded it and rotated it slightly. The car is also made of donuts but scaled in different ways to match the features of a classic racing car. The ring at the end is also modelled with a low poly torus because I had not applied a smooth shader or subdivision modifier on it as I had done on all the others. The traffic light is made with cubes and I simply extruded some regions to match the look of a traffic light. Finally I then scaled up the donut and plate to a massive size and then placed the other objects on top as I desired.

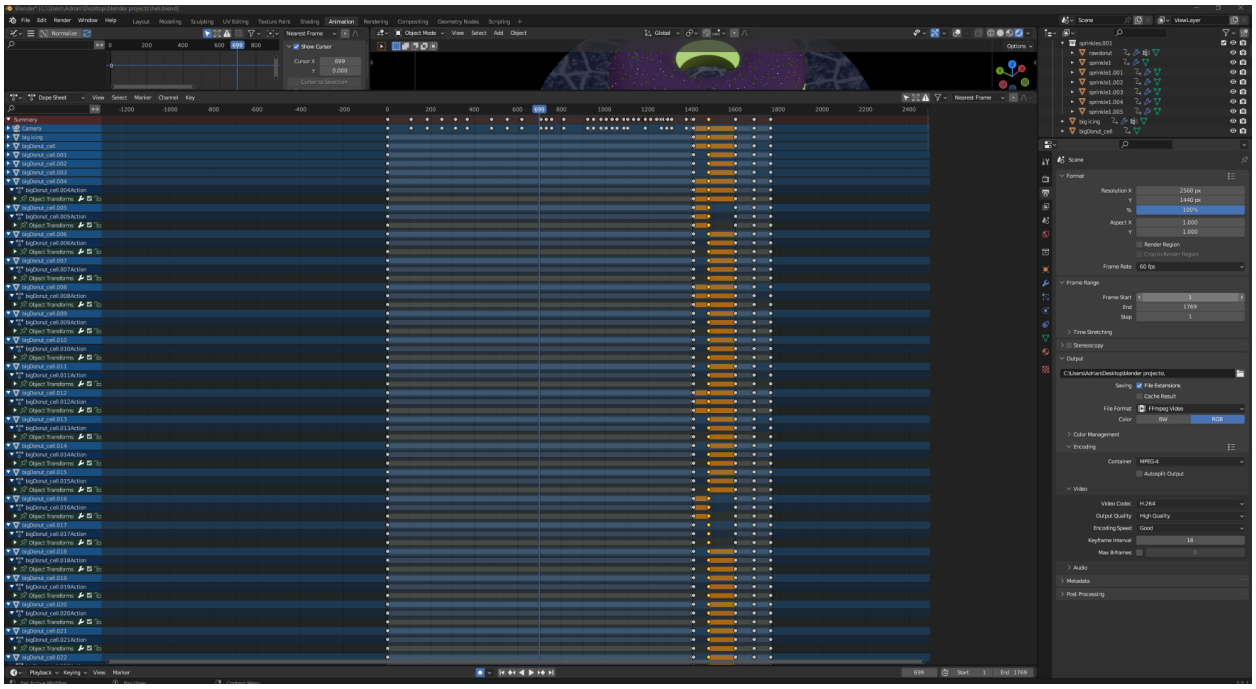
Lighting,Shaders,Textures



The lighting is something I wanted to get right so I made the sprinkles glow to make them look radioactive using an emission shader. To get sprinkles with more than just one colour I had to also make other sprinkles with different colours and shapes and add that to the collection to be instantiated on the icing. They almost look like glow sticks which I thought was a cool way to light up the donut more. This was not enough light however so I had parts of the donut mesh to also emit a yellow light, forgive me if it's not yellow because I simply picked whatever colour looked nice and my eyes are not exactly the best with colours so yeah. This still was not enough light for me so I used Blender's included HDRI background and applied it to the world and gave it almost this sunrise lighting effect in the background. The shaders I used for most objects were just a mix of two nodes, glossy and diffuse nodes. The glossy node helped to reflect some light and the diffuse gave the objects good colour I tweaked this until I was happy with each model. The plate shader nodes, however, were taken by a Youtuber (refer to Citations) then tweaked after and I don't understand how it works but from what I learned it uses a Voronoi texture to get cracks and then you add a lot of noise shaders for more realism and then add a slight reflection to it to give it a cracked ice looking texture which I thought was cool and appropriate for a plate. The light reflected off the plate from the donut is simply mouth-watering to look at in 1440p 60 fps and I was really happy with how it turned out. Overall I wanted the donut to look as delicious as possible and the rest of it to look childish and look like every kid's dream.



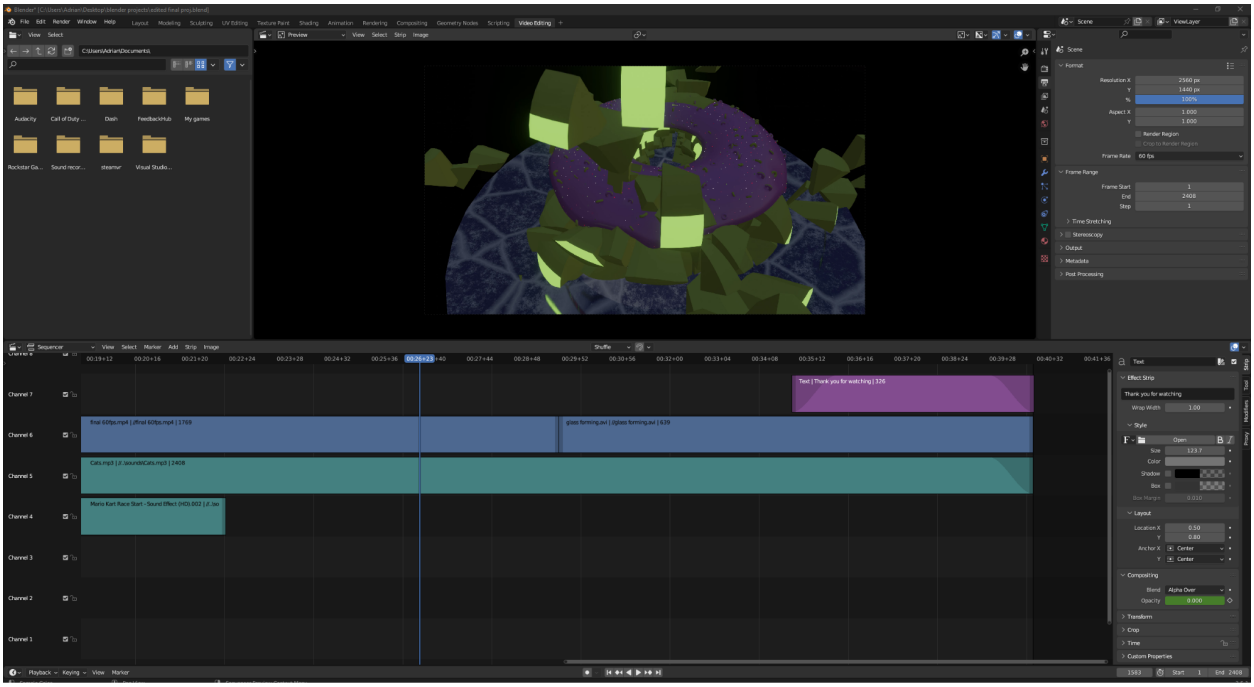
Animation



Animation is where I had a lot of trouble with because I wanted it to look realistic but it took a lot of effort to do that. The camera movements were nice and I simply used Blender's auto keyframe tool to simply keyframe whenever and wherever I wanted the camera to move to. The Bezier curves did most of the work between keyframes and I did not need to tweak it a lot for this animation, however there were some cases I did. If you wanted to animate an object hitting something really fast and coming to a full stop immediately then you would need to tweak the end of the Bezier curve to make it look exponential so that it does not come to a slow stop, and I did this in some cases for the car. You could also tweak it the opposite way and I did this for the ring, but most cases I did not have to. To slow down the animation of the ring coming together I simply put the keyframes farther apart so that more time elapses therefore slowing down the animation, I did this a lot for cameras. The donut and ring fracturing is actually an add-on in Blender where you specify how many parts to break it into and also how many times you also want to recursively break those parts too. You do have to however let the fracturing bake for a while first and then you start manipulating them. I then simply dragged some broken pieces and then keyframed it to look like the donut was breaking

apart and did the opposite for the ring forming. I love breaking and shattering things so I made it look like the donut kingdom was breaking apart from how fast the car went. You might have noticed it but the car is not always on the ground but this is because of the donut shape and its not completely flat and I wanted to animate it on the ground but it would have taken a lot more adjustments like rotating the car to better fit on the ground, maybe the car went so fast that it defied the laws of physics. The animation for the camera was something I focused heavily on because I wanted to showcase the donut and all of its glory so I made the camera pan, rotate and zoom in all kinds of ways to show how big this thing really was.

Sound



The sound editing was done in Blender's video editing tool and fairly quickly too. I wanted music that fit the animation and its childish theme so I used "cats" by the living

tombstone to enhance that experience so others could enjoy some cute cats meowing over and over again. The traffic light also has a sound and I borrowed it from the mario kart traffic light sound, I was trying to find the old version but I could not find it so I simply spliced the audio for only 3 beeps instead of 4 beeps to match my traffic light design and then sped it up to match the light timing. Yup I realized that my traffic light was missing one more red light but going back after I did all the animation and modeling I just decided splitting the audio was a less time consuming idea to solve my problem. To not have the music suddenly stop at the end of the animation because that would be bad, I applied a fade out effect at the end for the comfort of your ears. And since I wanted to thank the viewer for taking the time to watch my animation I put a thank you text at the end with a fade in effect.

Rendering

Yup this is where I lost my mind many times due to my pc crashing and turning off multiple times for whatever reason. I had to render this around 5 times but mostly it's because I did not like some renders and I wanted to get the highest quality possible and thanks to my rtx 3060 it rendered my final animation in around 30 min. The animation was in MP4 format 2560p by 1440p in 60fps however it is not lossless because the file would have been too large if it were lossless and many social media platforms would have compressed it anyway. Rendering this animation however I did notice some problems like clipping when faces overlap each other and this is noticeable where the donut breaks apart and overlaps with the icing. To solve this problem the icing would also need to be fractured however when I applied this add on to the icing the particles were also not fractured with the icing and fracturing the donut already was crowding the animation timeline with too many keyframes because of the many smaller polygons the donut breaks into so I did not do it for the icing. However this is something I would have done with more time but the donut and the glass ring fractures were already pretty pleasing to my eyes. This animation has really taught me a lot of cool features and how

to use them and I now respect animators a lot more for all the hard work they put in to make shorts and movies. I hope you enjoyed my silly little animation and thank you.

Works Cited

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