Mazda RX-7 FC3S (RE 雨宮 FC2000 version)

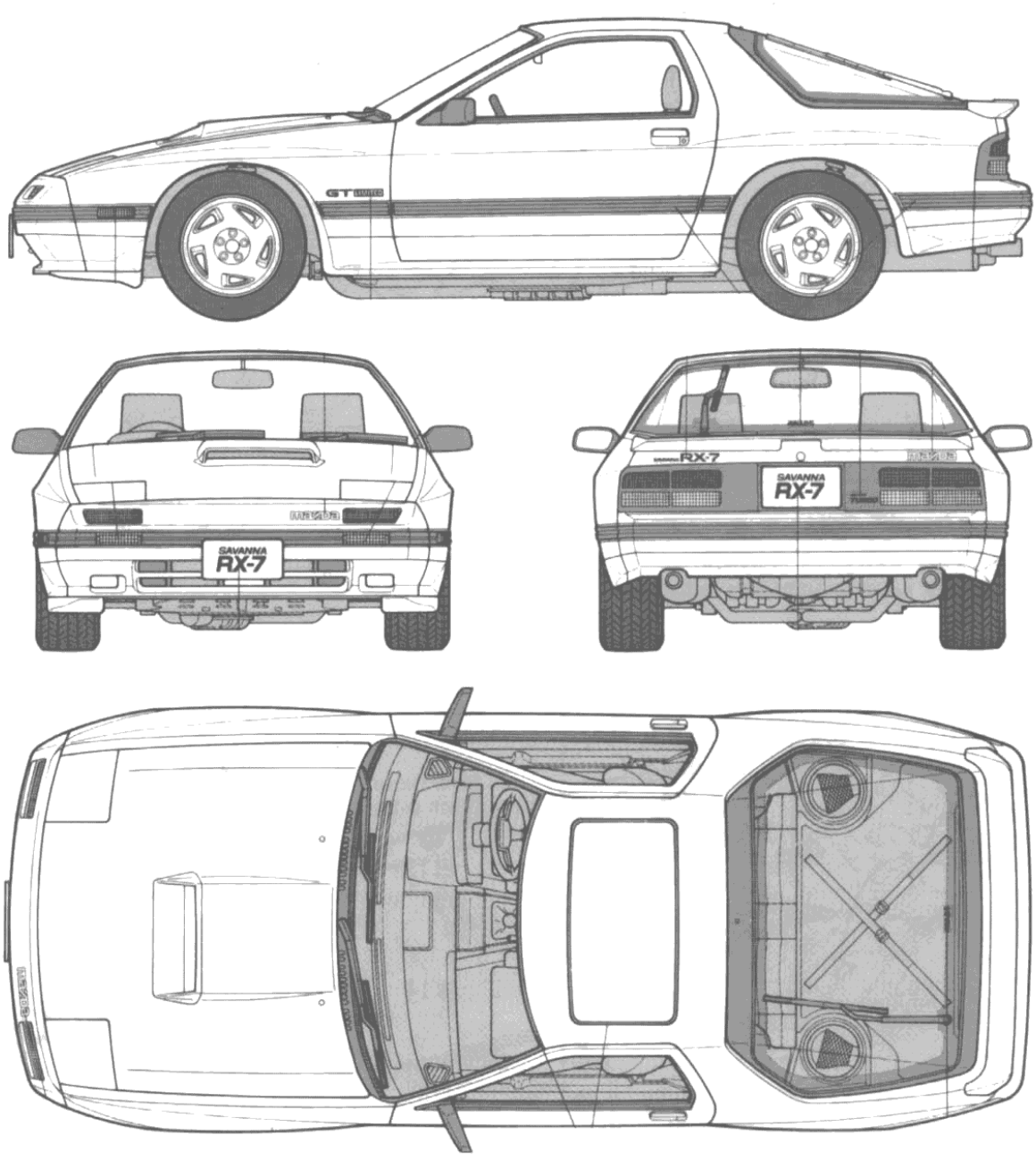
For this semestral work, I chose to model my most favorite car using blender.

I started with getting as much reference material as possible, which was no easy task, as the original car is more than 30 years old.

TASK 1

Reference materials

I used two sets of reference images, one is the base trim model from 1988 and one is the body kit upgraded version.



1988 RX-7 FC3S

The latter is not really reference images in its truest meaning because some of the photos are taken slightly under an angle. The source is https://www.japaneseclassics.com/vehicle/1990-mazda-fc3s-

rx-7/

There is also a two-part video series of the car being created and raced around Tsukuba circuit, available here:

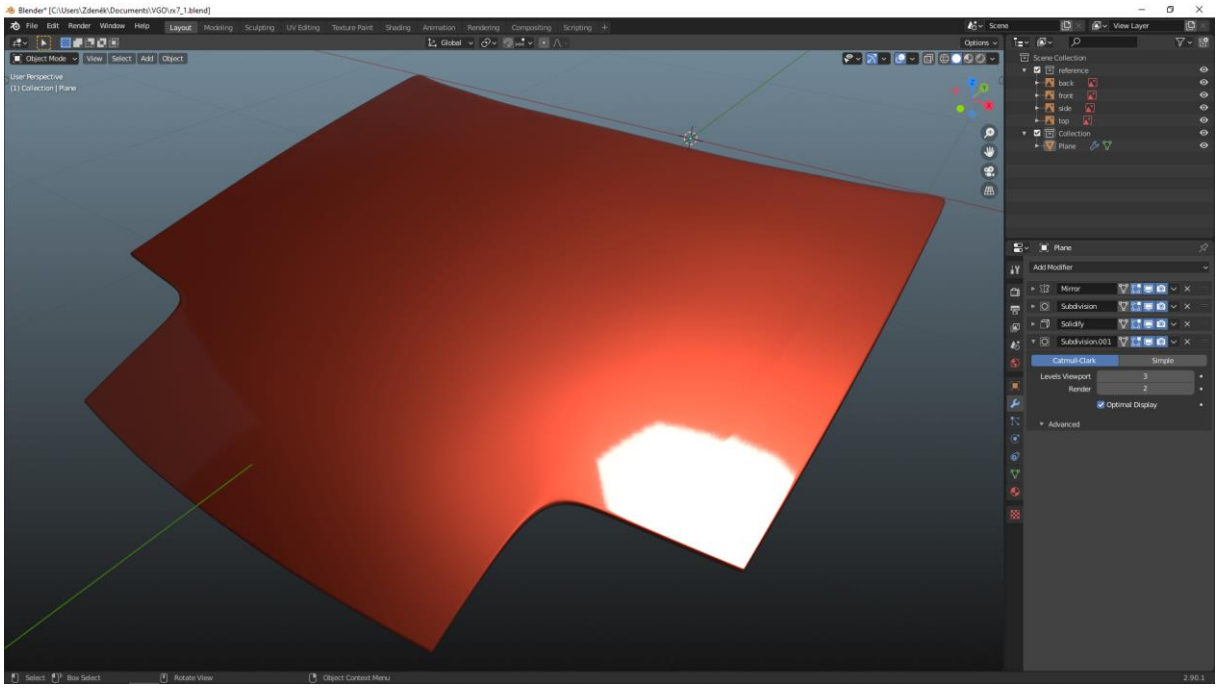
https://youtu.be/JgRLg2JqEUk

https://youtu.be/8mUvzD4LuK4

Workflow

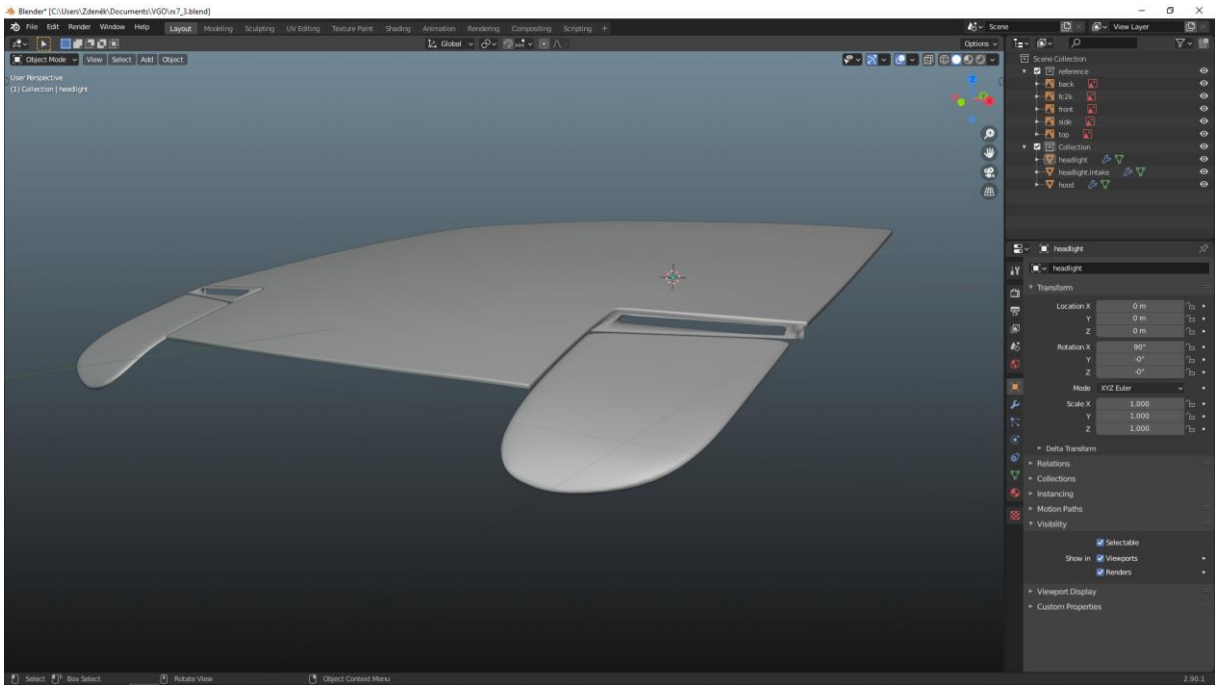
The hood

First I started modeling the hood. I started working on this just after our first seminar so naturally, I had no idea what to do and mostly followed this tutorial: https://www.youtube.com/watch?v=6-4OGtZZ3jE&list=PLzlZDwOppS3rJMotP-yle3lvRjfvmzsDU. I later did many edits, which is why this has minor changes in the final product i.e. the headlight cutout is not entirely sharp.



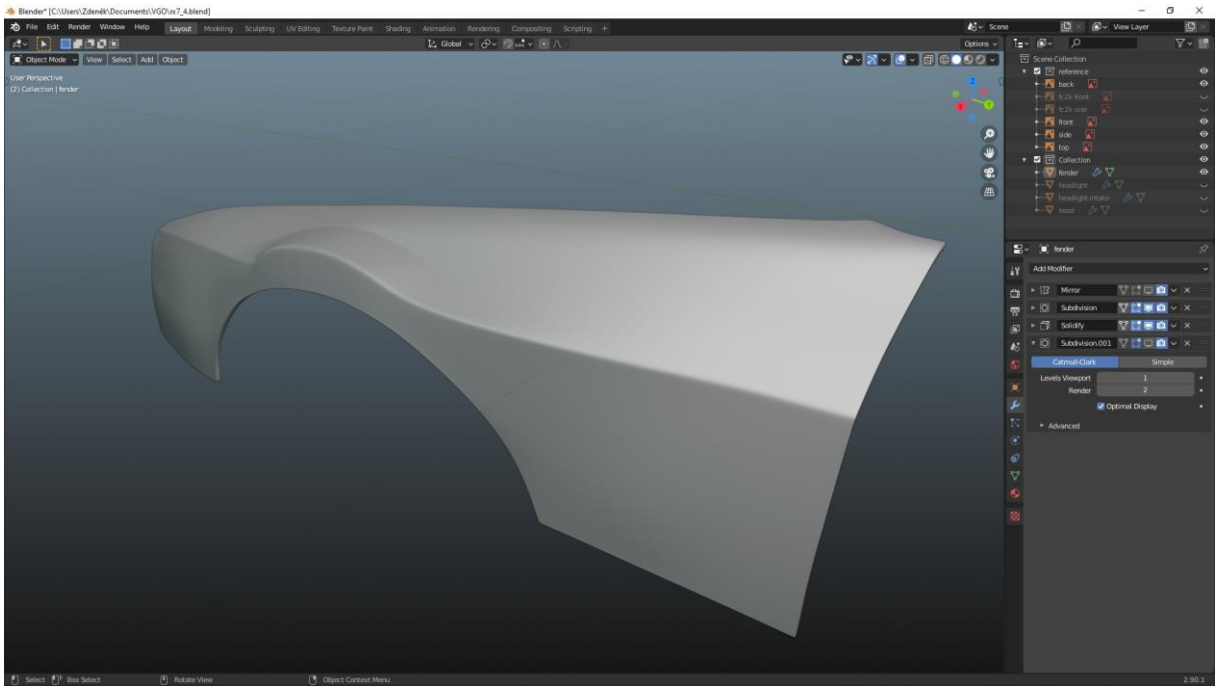
Headlights & intakes

Second on the menu were headlights and intakes just on top of them. The intakes were the biggest challenge (then), because I was using two subdivision surfaces and a solidify modifier, which due to the shape of the intake, was simply not feasible.



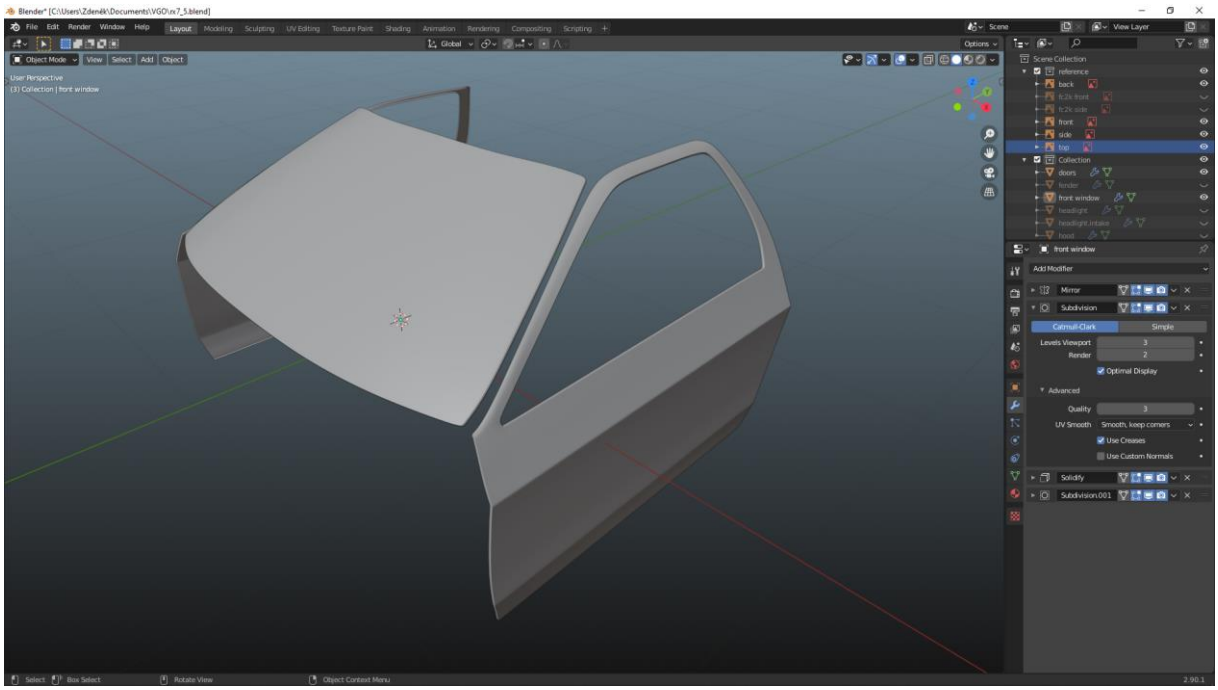
Fenders

Next were the fenders with another interesting challenge. The RE 雨宮 version has slightly different fenders, so I first modeled them using the reference images and then edited it to make it more similar to my set goal.

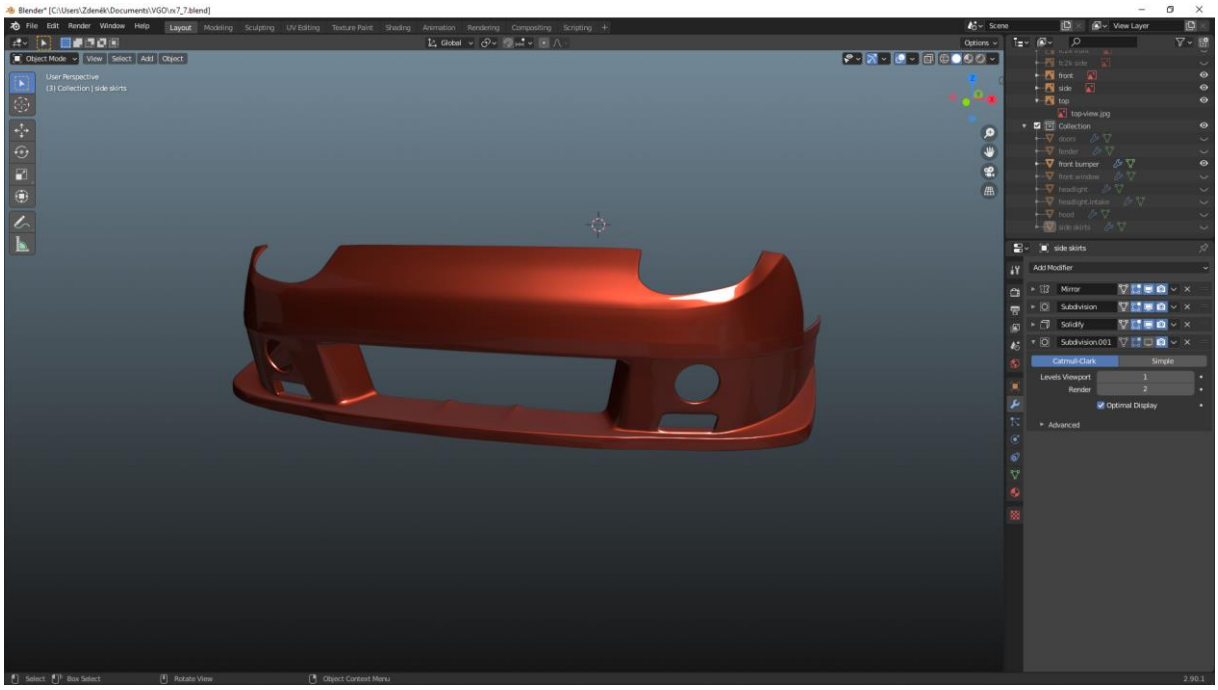


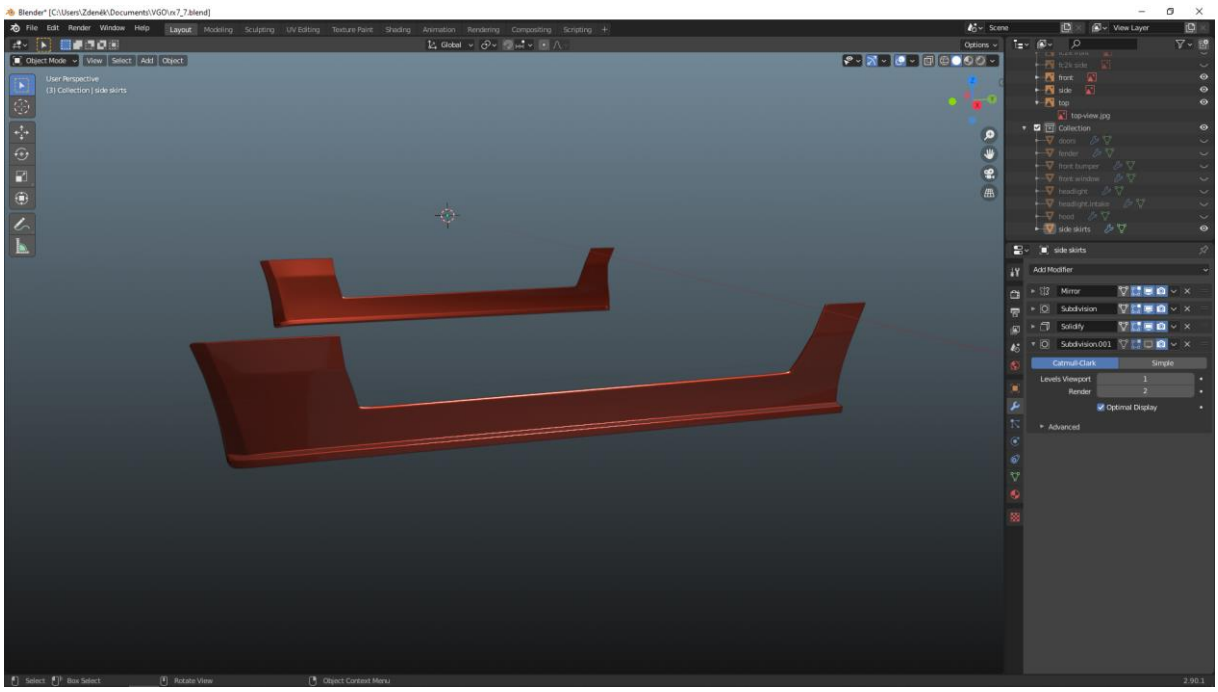
Doors & windshield

I continued with modeling doors and a windshield. Notice the bigger space between them, as window seal yet has to be added in later versions.



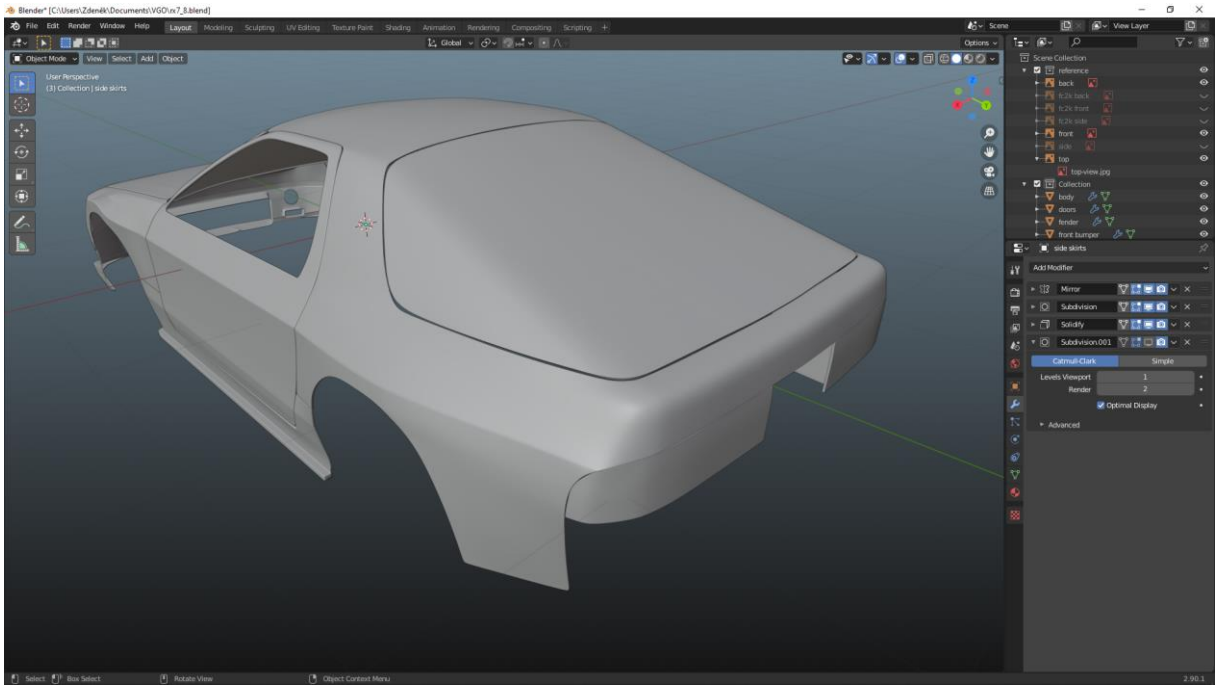
Front bumper & Side skirts





Both of these were rather difficult, as either of them isn't original trim. But I think they came out great, especially the front bumper.

Body & rear window

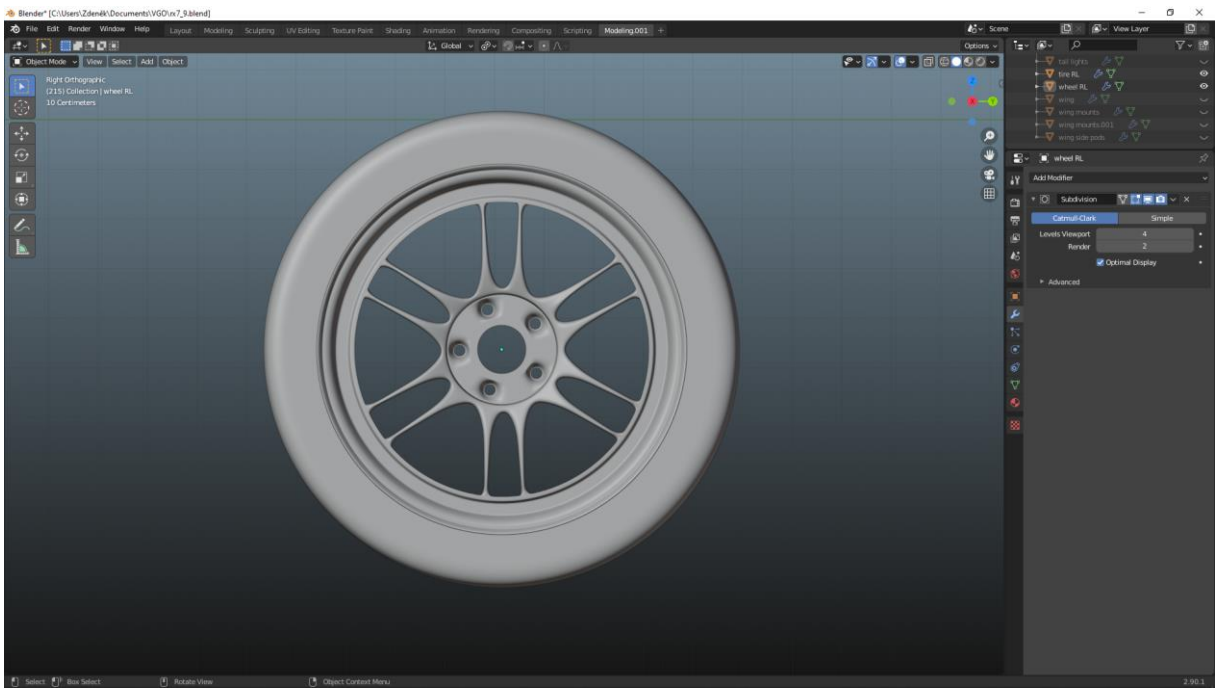


To be honest I'm quite not happy with how the body looks, but I couldn't figure out where it's wrong, but somehow looking at it, I know it doesn't look like the original. The problem here was that the original reference images don't fit each other… Looking from top it should be longer but looking from side it should be just how it is. I chose to follow the side.

Wheels

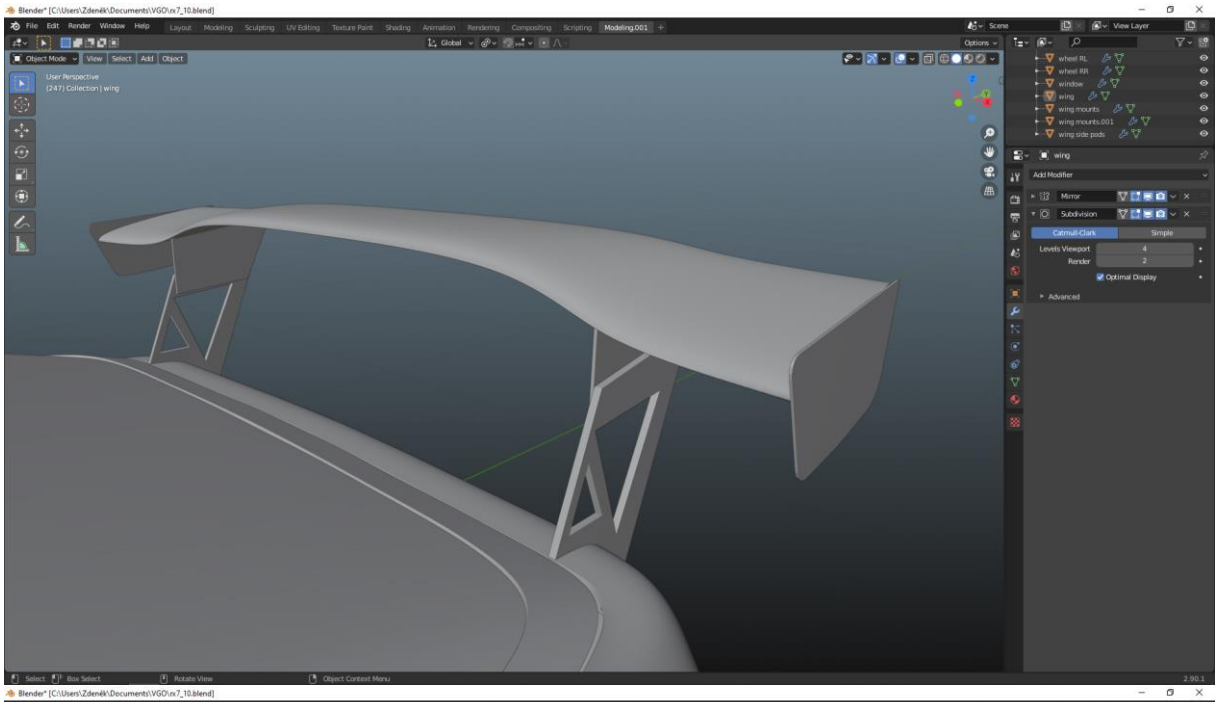
Making the wheel, I chose to follow another tutorial again. https://youtu.be/s0gzXLPqDVo

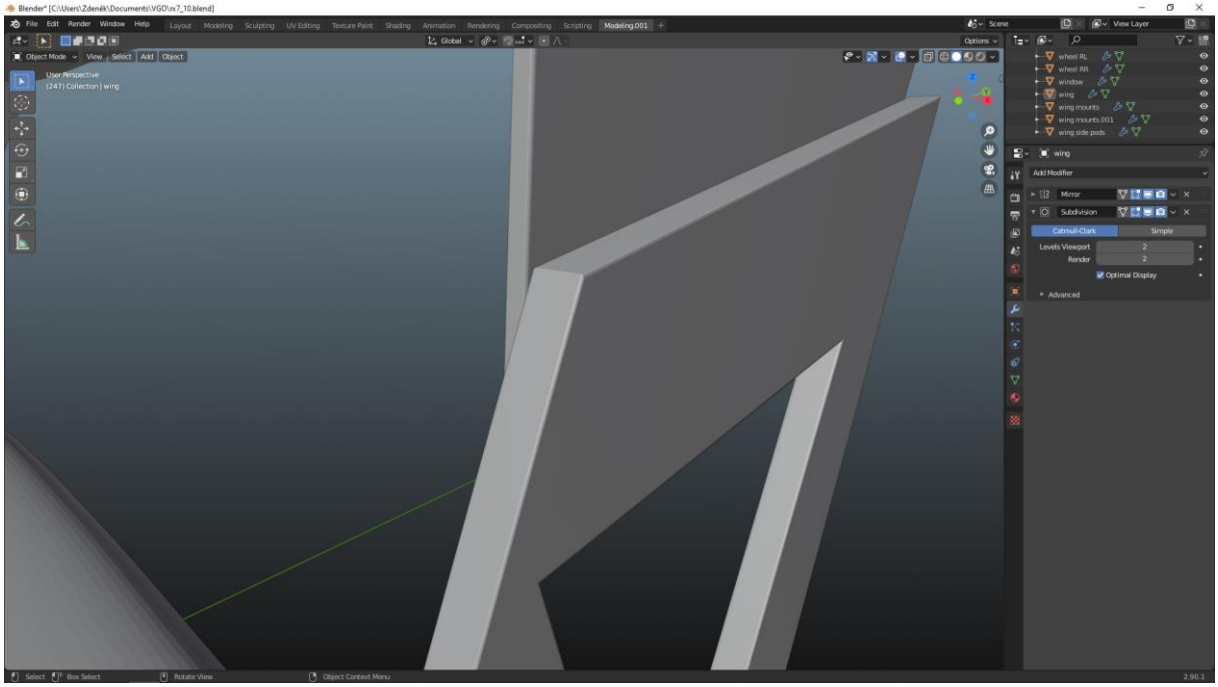
I did Enkei RPF1 wheel and chose to pair it with a slick tire, as it is very easy to do, because it has no thread.



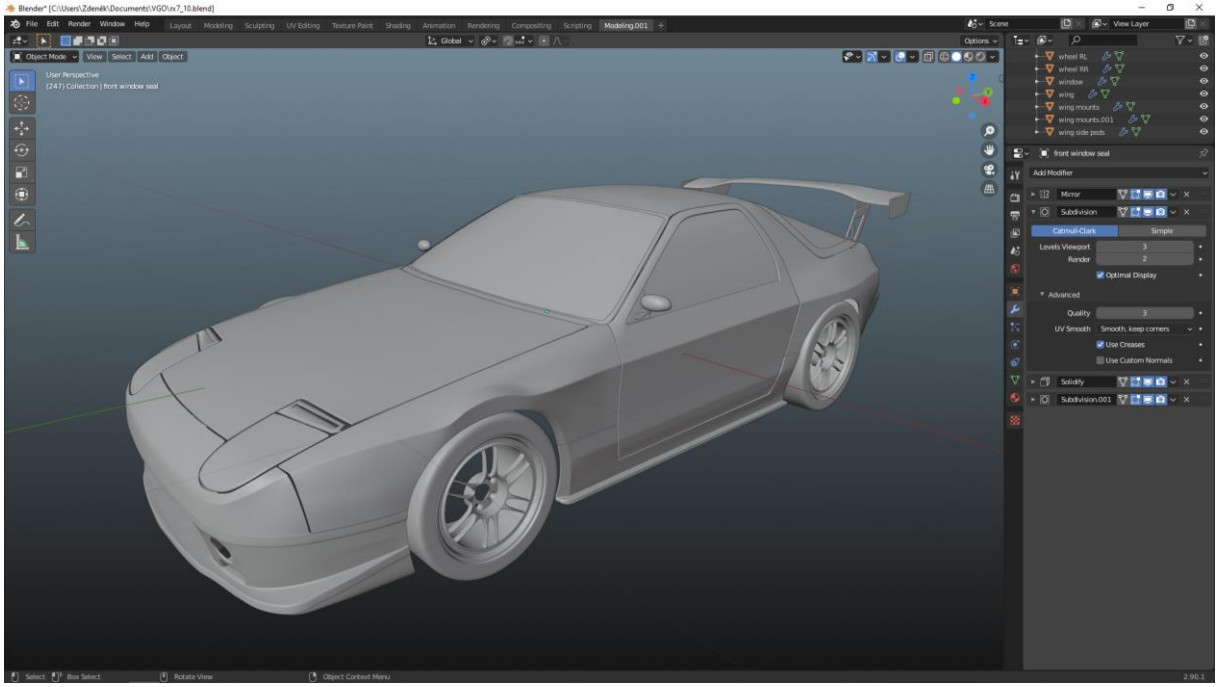
Wing

This was another tricky part, because I couldn't have used subdivision surface on the wing mounts. I have used bevel instead to make the edges a little bit less sharp.





Final touchups



I positioned the wheels all around the car and added 2% of camber to each of them. I added mirrors and rear bumper as well as exhaust.

Finished the window strip I was writing about earlier and edited rear hatch a little to better represent real life version.

And added a bunch of strips (can be seen in final version) all around the car – fenders, doors, the body and rear bumper.

Tools/modeling techniques

I started with a single point, which I then extruded multiple times to match the reference images. Most of the parts have these filters:

Mirror

To simplify my job, I only model half and then use mirror modifier.

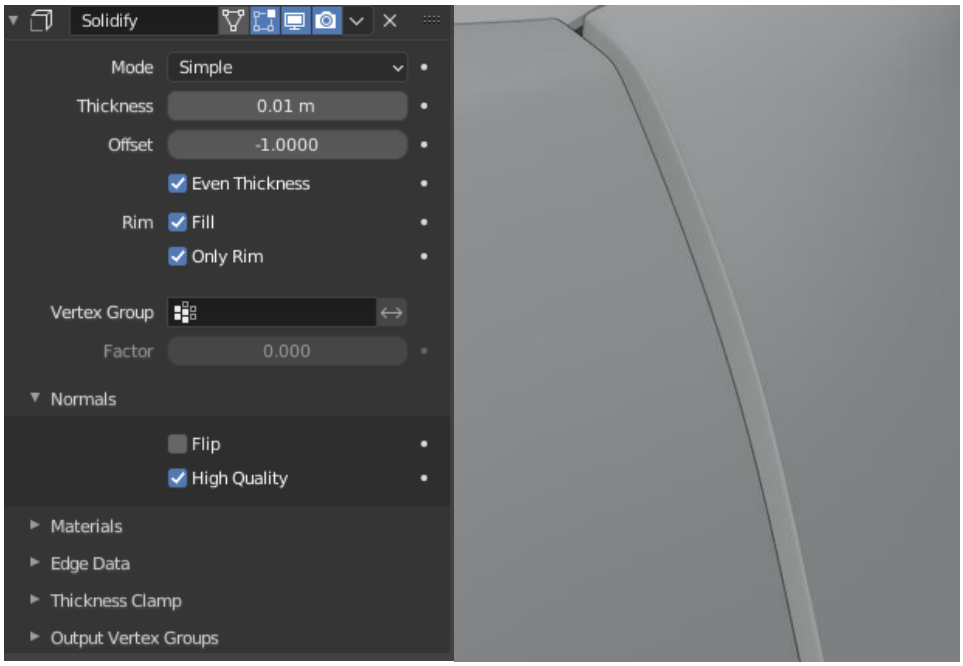
Subdivision surface

To make the objects smoother I use subdivision surface. I use this on almost every model, apart from parts of the wing and intakes on top of the headlights.

I have never used edge crease, because it created too much of a sharp edge and instead added control points via CTRL+R and knife tool.

Solidify

To make the parts on the car look more car-alike, I am using solidify modifier- with these settings:

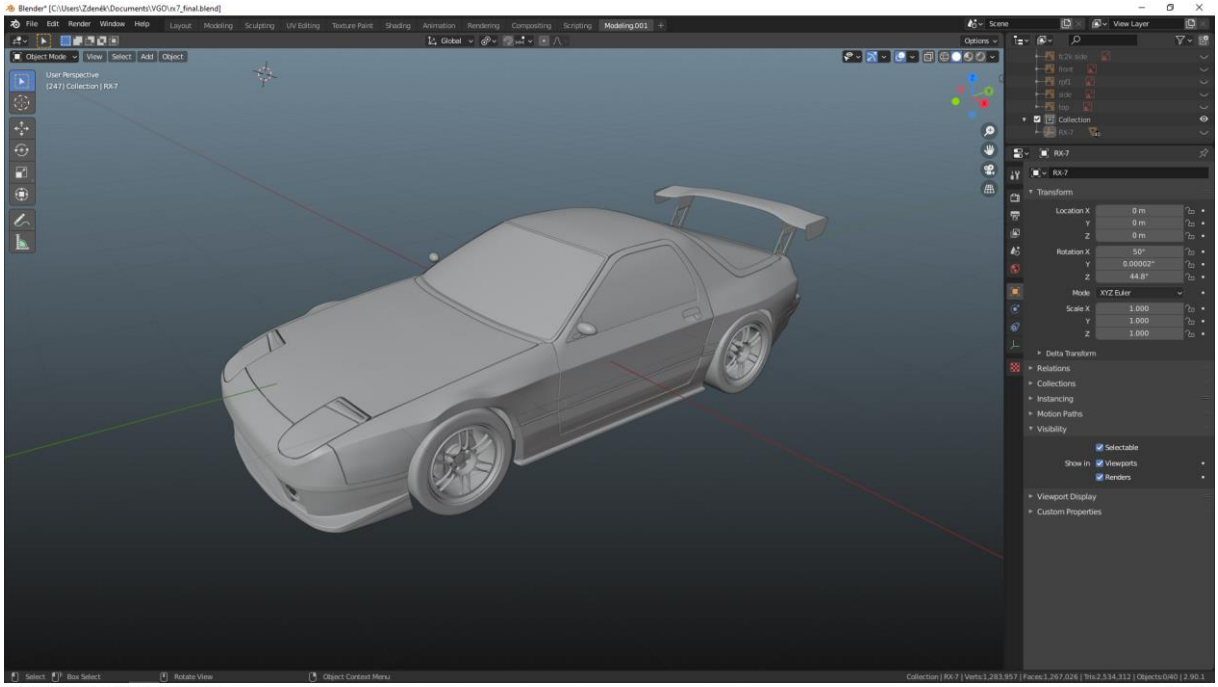


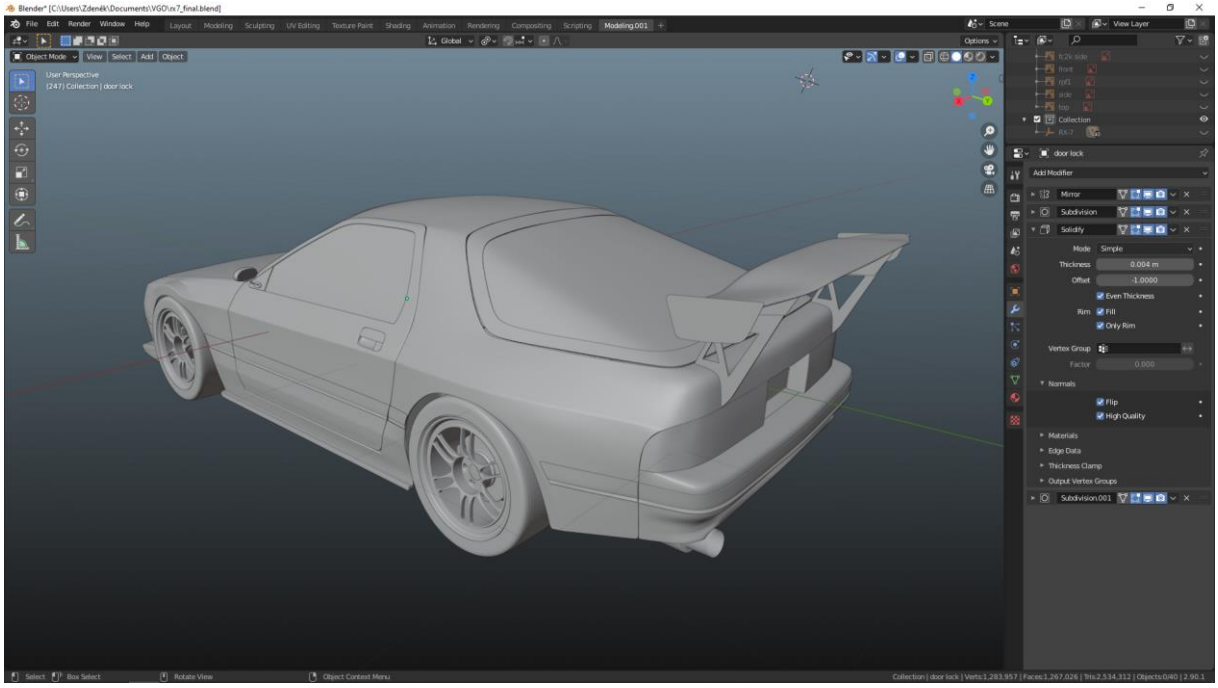
Statistics

The model consists of 40 objects, and there is an empty object to be the parent of them all.

I think I spent around 80 hours making the model, but I do not know how accurate this is as I did not track my time working on this.

Final result



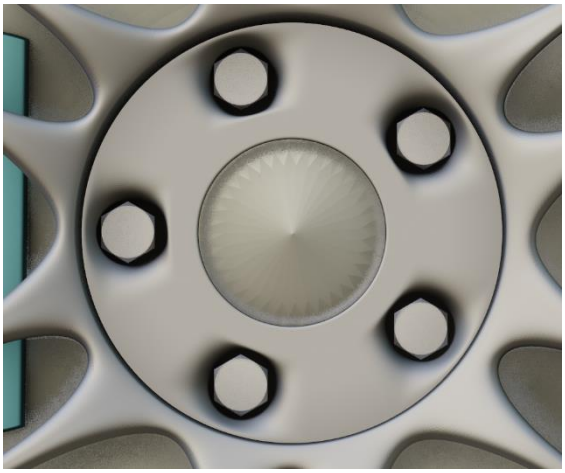


TASK 2

Additional edits

Lug nuts

I have added lug nuts, as the wheels felt empty without them. I have used blender BoltFactory add-on, then edited the bolt – filled the top.



Intercooler

Added an intercooler as well. It is a cube, but the shader does all the work, so it looks very authentic.

Stickers

I have used “Images As Planes” from “File → Import”, then used “Shrinkwrap” modifier to fit them to the mesh.

Workflow

Shaders and materials

First, I started creating shaders and materials for my meshes. “Screen Space Reflections” and its property “Refraction” are turned on to allow for transparent windows.

Paint

For the paint, I used this tutorial and tailored it to my needs. It adds a little flake to the paint.

Intercooler

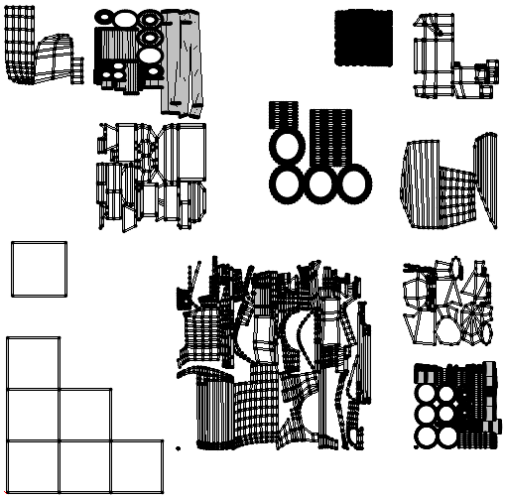
Other than the paint, the only “interesting” shader is for the intercooler. I am very proud of this one because I made the shader myself (I was not just following some tutorial).

Other

All other materials are just simple Principled BDSF with modified values.

UV mapping

Then I have proceeded to map the meshes to a UV map. I have mostly used the “Project From View” and “Smart UV Project” tools available in Blender.



The UV map created

Creating textures

This was the most challenging part of the assignment, at least for me.

I have baked the textures from Cycles as was shown in our practice, but sadly my computer did not withstand the pressure and crashed whenever I attempted to bake, even after lowering the settings. Also, from my observations, Blender only uses the processor to compute the bake, even after setting “Device” in “Render Properties” to “GPU Compute”.

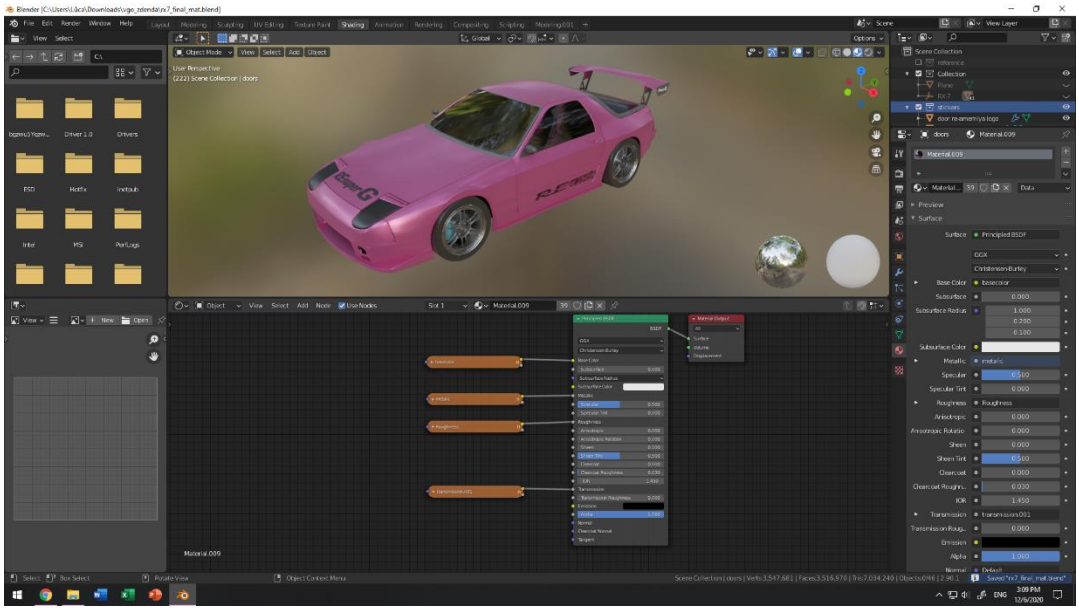
System specs: AMD FX-6300, Radeon RX 580 4GB, 8GB RAM, WIN10

My girlfriend was kind enough to let me use her PC, and I have finished the job there.

I have baked diffuse, metallic, roughness and transmission into four different images.

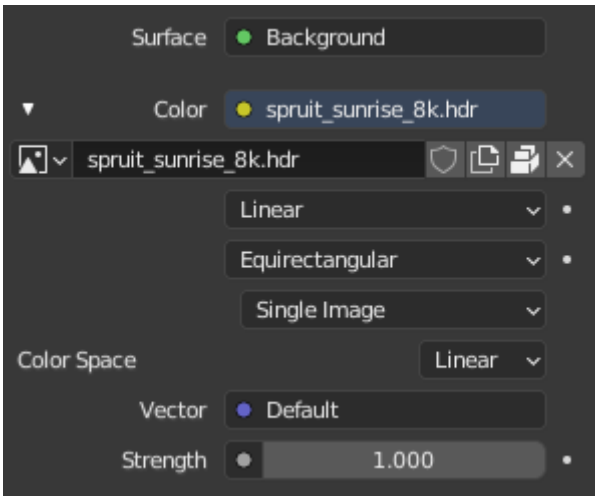
Creating material

I have connected all the baked images to a single material shared by all meshes. Sadly, it does not look perfect. The trunk mirror, headlights and rear lights seem to have baked incorrectly, and as a result, they look black (we can pretend they are carbon, as a proper race car should be). The car paint and intercooler also seem to be a little different.



Lighting

I am using a free HDR map from https://hdrihaven.com/.



Statistics

I have spent around 40 hours working on this task.

Final result