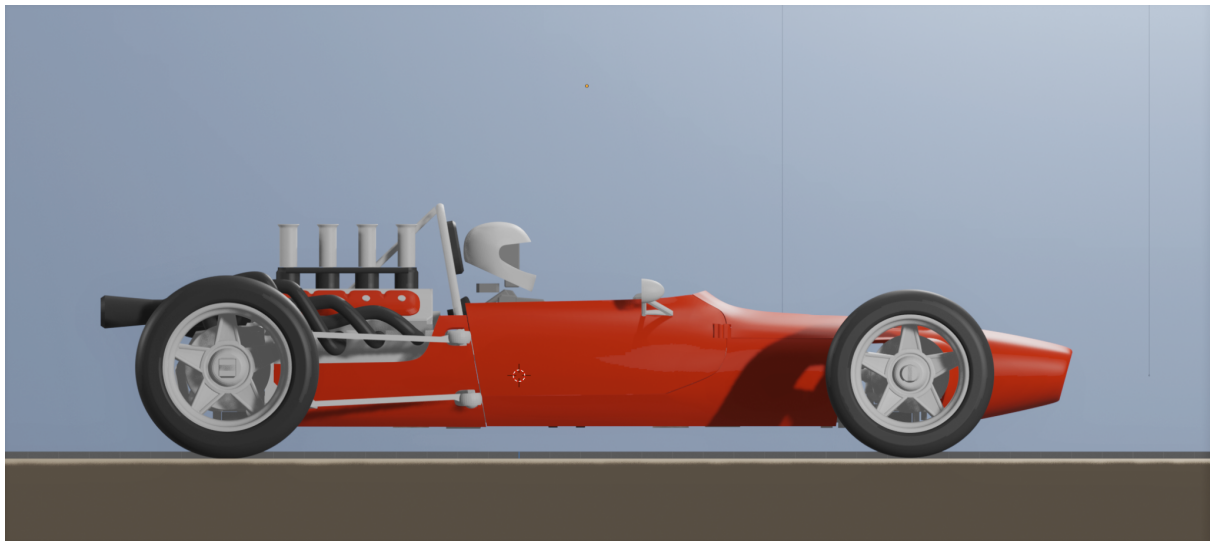




Assembly instructions for SCARBO SVF1 model

This model has functioning doors, suspension, steering, shifting and moving engine pistons. Based on [Scarbo SVF1](#) which is a modern replica of 1967 Ferrari 313 Formula One.

99% of the car is designed to be printed without supports, with the exception of exhaust pipes (I couldn't figure that one out, sorry).

Everything is designed to be simply snapped together, **no need for gluing or drilling**.

In some cases the parts might not fit perfectly, some sanding may be required.

There are also some errors in the models, but slicer should take care of them.

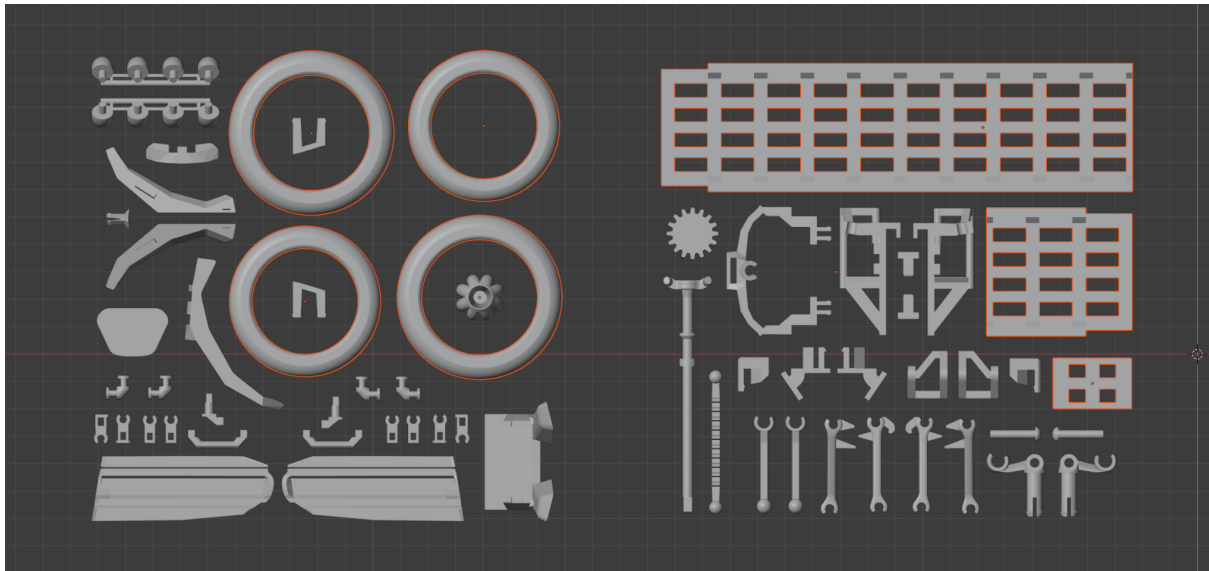
The manual is split up into **5 chapters**, which correspond to the **5 main folders**. There are two more folders called **BLACK** and **RED**, indicating colored parts used throughout all the chapters. I recommend printing the 2 colored folders first.

The parts are already grouped in the .stl (labeled - folder name_GROUP), but are also available separately. Try not to mix the ones from different chapters, there's around **150 parts**, so it can get confusing.

The exhaust pipes in the BLACK folder (labeled Exhaust_1-4L and Exhaust_1-4R) must be printed with supports. I tried to orient them in the most optimal way, if anyone comes up with a better solution, I'm open to suggestions.

The largest part is 225mm long, but **alternative files for smaller print beds** (Prusa Mini, etc.) are provided - minimum print bed size is **175mm**. The files can be found in the FRONT_AXLE and the RED folder and are labeled ALT_part name.

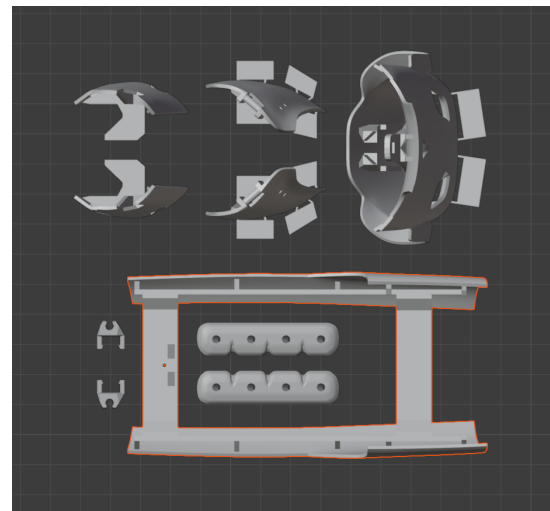
A few parts (suspension, tires) are combined with rubber bands made from bicycle inner tube. I used 29 x 1,75-2,125 (47/57-622) - going with a smaller diameter could make it difficult so I don't recommend that. You can use normal rubber bands but they usually don't last long.



As an example, here are two different folder groups (BLACK and 1_FRONT_AXLE). Highlighted parts have **alternatives**, which is why they aren't part of the grouped 3D model. For example you can choose between two types of tires, more on that in the 3rd chapter - WHEELS, and on the right is the alternative base frame. All the **grouped** parts are positioned to fit on the **small print bed**.

RED folder also has alternative parts (middle bodywork for smaller / bigger print bed). The labeling gets a little complicated towards the end. I wanted to keep the same logic in the folders, (each chapter has its folder) so there's just 4 parts in the BODYWORK folder, while the actual colored bodywork parts are in the RED folder.

I strongly recommend going through the whole manual first, especially the couple first pages and the wheels chapter, to better understand the folder sorting and alternative parts.

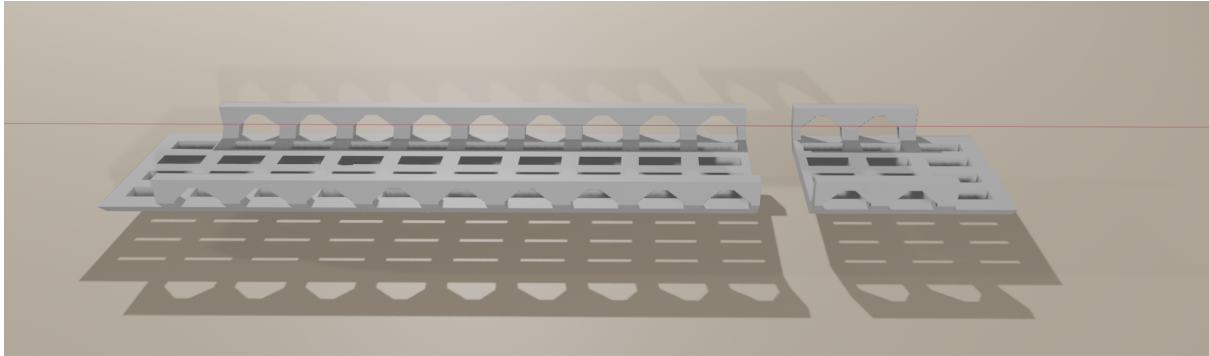


Anyway, big thanks to soozafone, his work inspired me to finally make this. And just like his [Lucky 13 figure](#) (which fits inside), I tried to make it as modular as possible. Anything can be snapped in the chassis, so I hope to see some interesting remixes, perhaps RC versions too. So, good luck and happy printing!

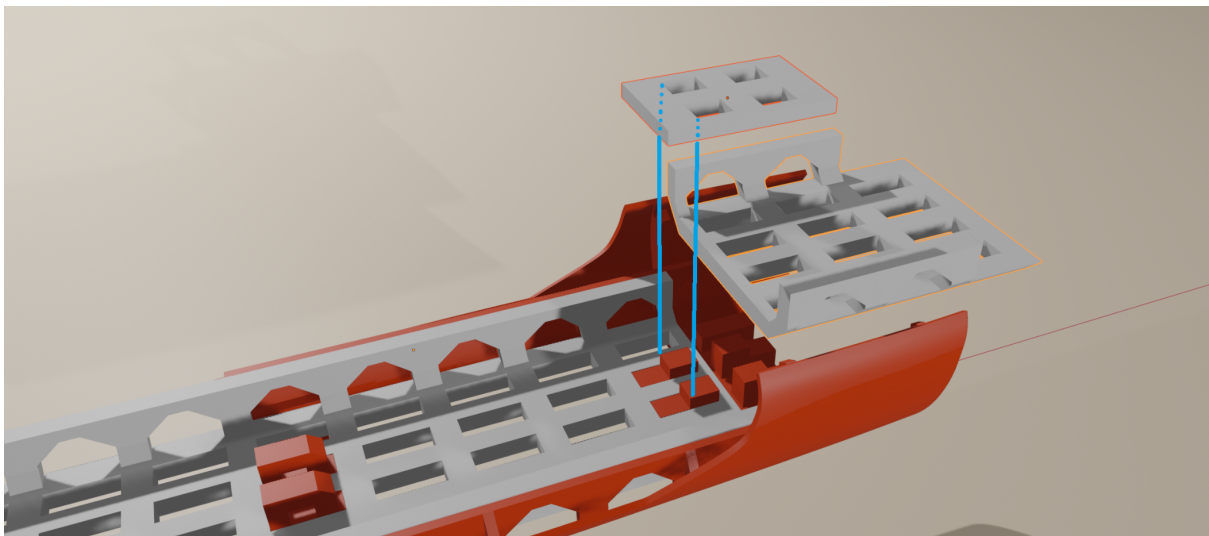
1. FRONT AXLE (SMALL PRINT BED)

In case your print bed is big enough for a 225mm long base frame, skip this page.

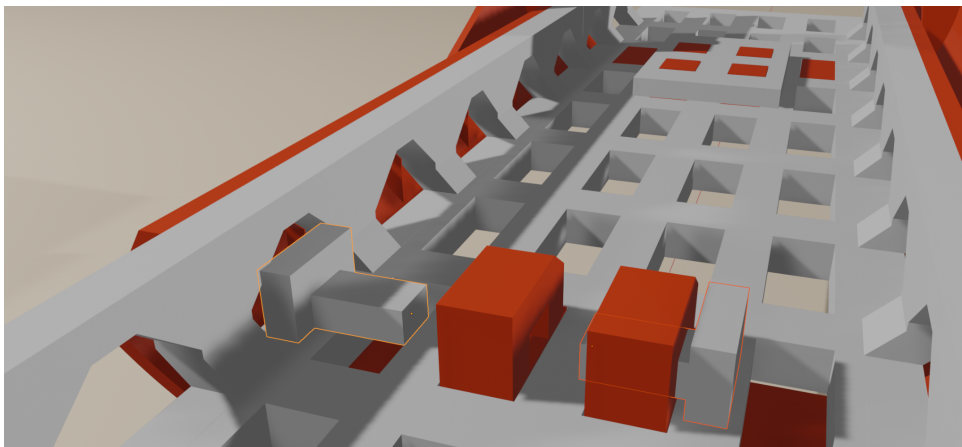
You'll still need at least 172mm, there wasn't really a good place to cut this part. I have to warn you I haven't tested this version, so some sanding may be needed. Although this print is meant to be glue free, I would make an exception for those 2 base frame parts below. This wasn't originally designed for smaller printers.



Use the ALT_middle_bodywork part (in the RED folder) to join the base frame (ALT_ files in the 1_FRONT_AXLE folder), and secure it with the part seen below.

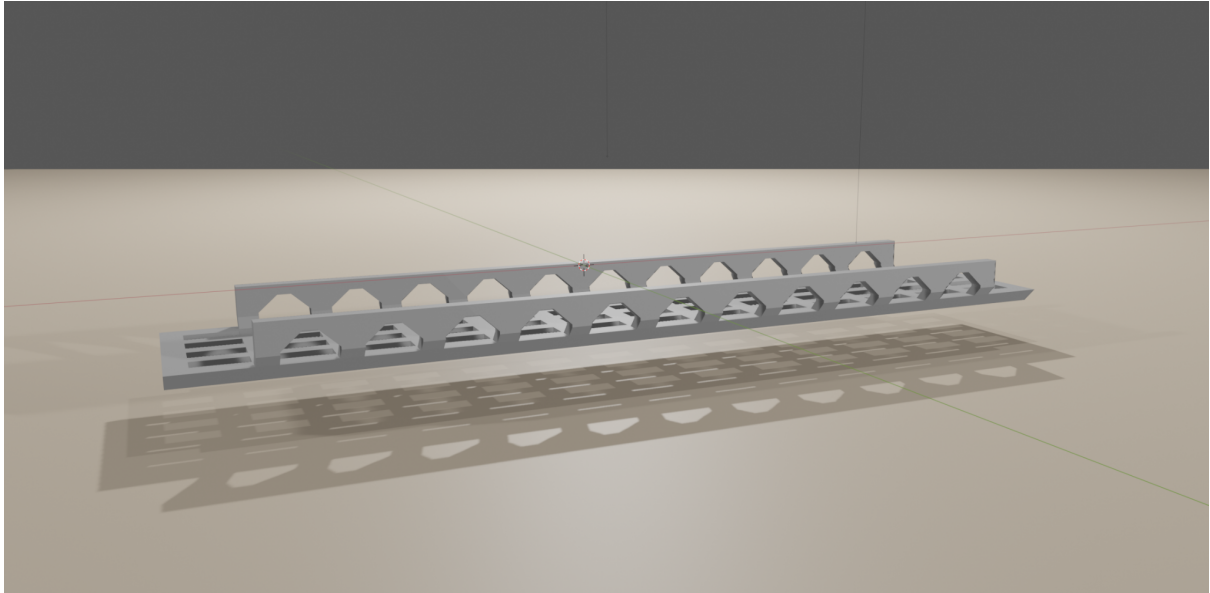


Secure the rear part with two pins. Continue on the next page, but skip the last step of this chapter (adding the middle bodywork part).

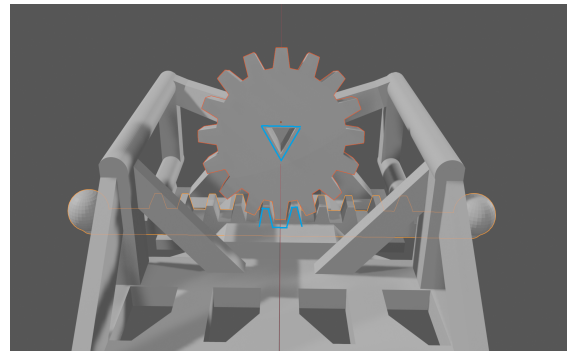
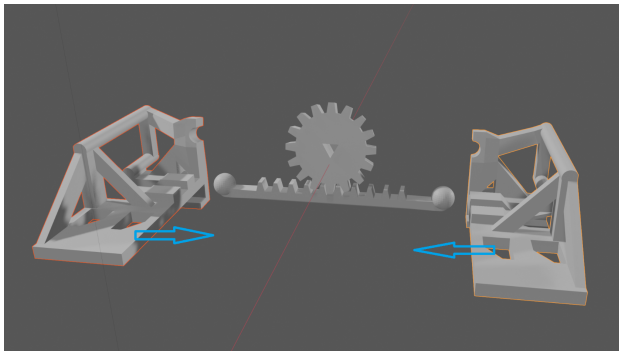


1. FRONT AXLE (BIGGER PRINT BED)

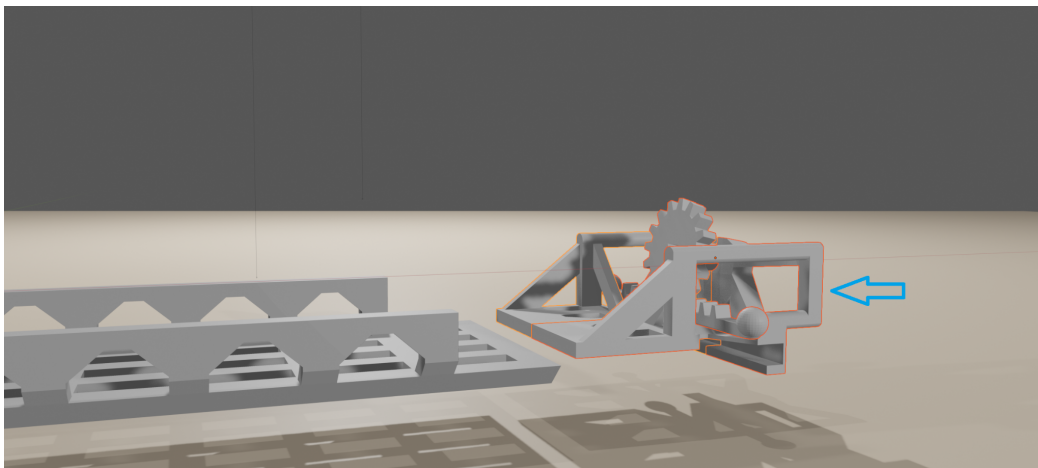
Take the base frame and choose which part of it is the front, the orientation doesn't matter in this case.



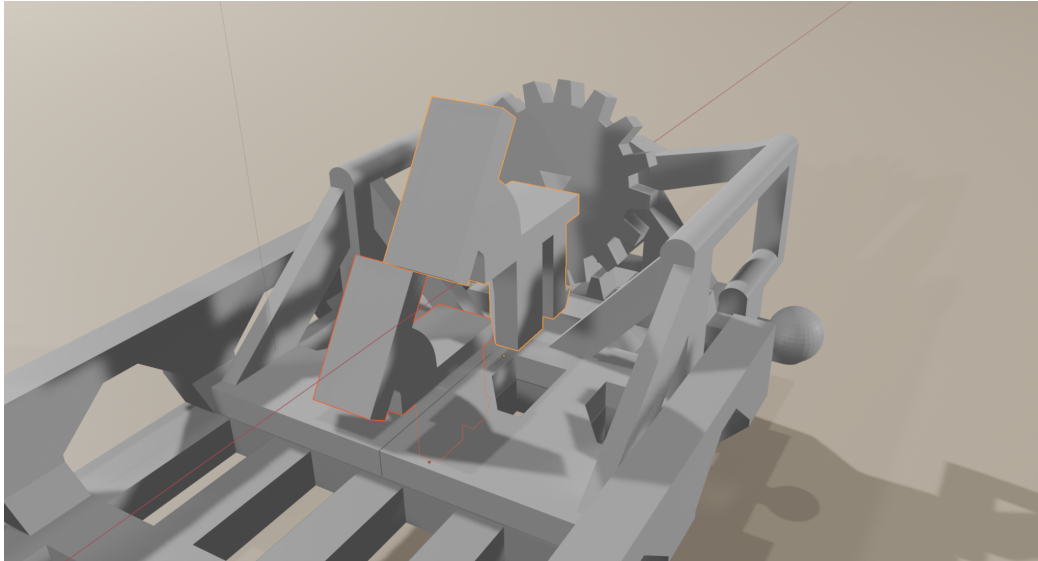
Try to hold the gear and the rod together and place them between the 2 front parts.



Note the orientation of the gear, the triangular hole **must** point downwards when centered. While holding the parts together, place them on the base frame.



And secure them with the pedals.

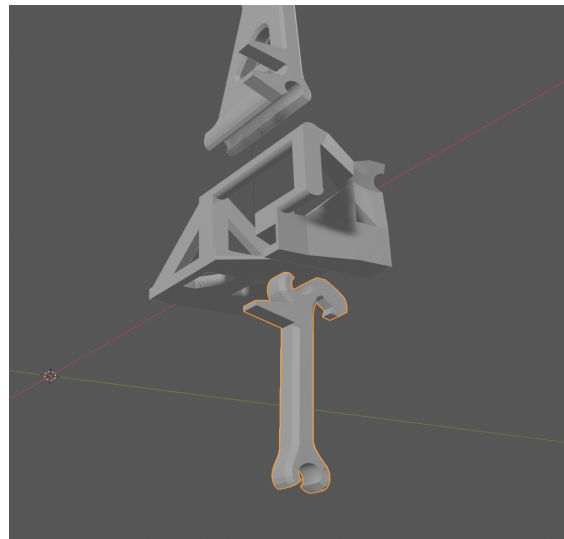


Add upper and lower control arm. For easier assembly, orient them in this way.

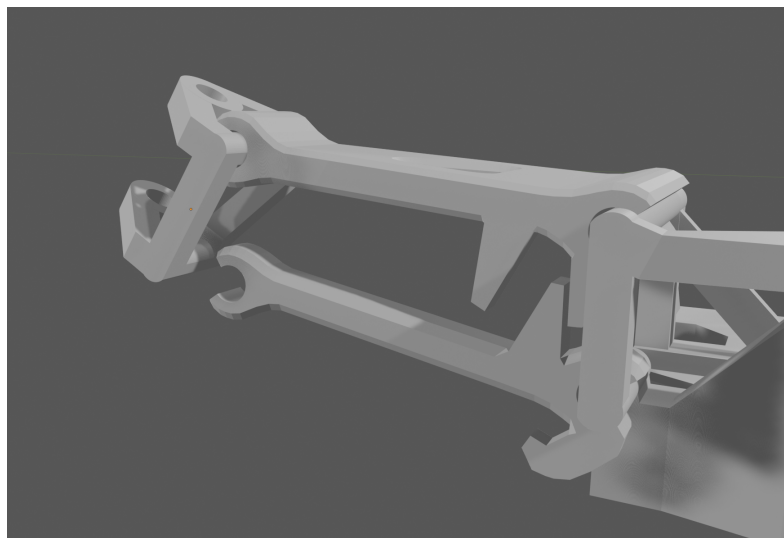
Upper



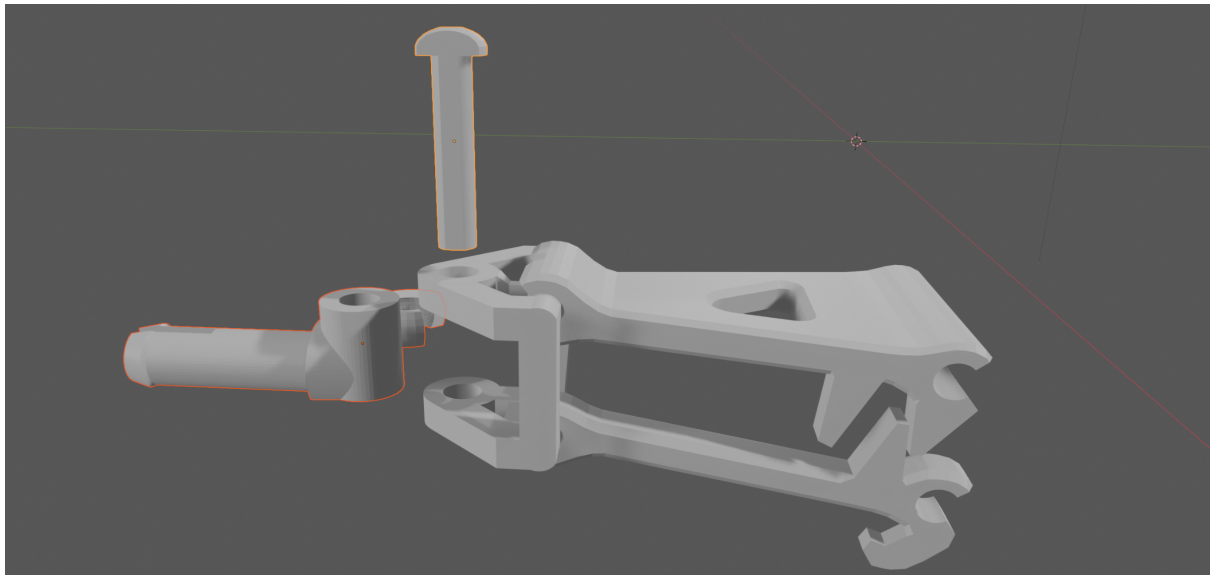
Lower



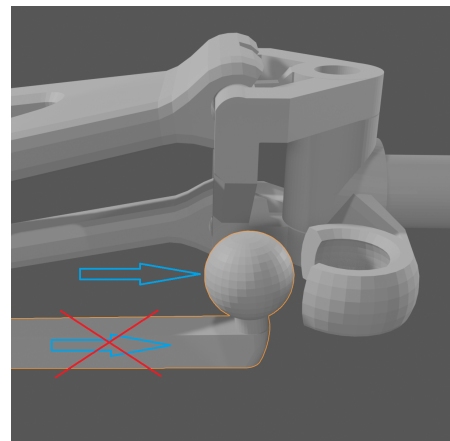
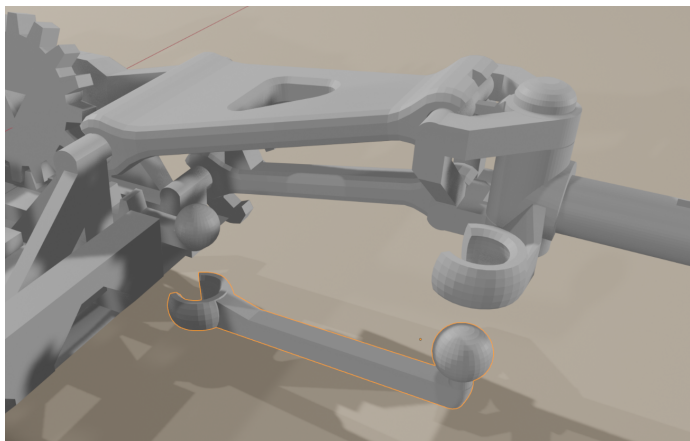
And once they snap in,
connect them like this.



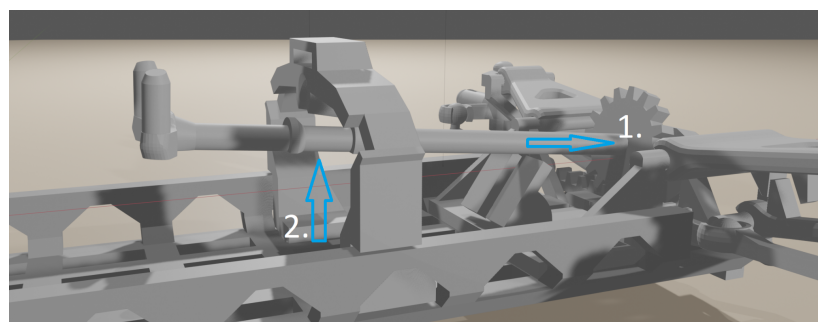
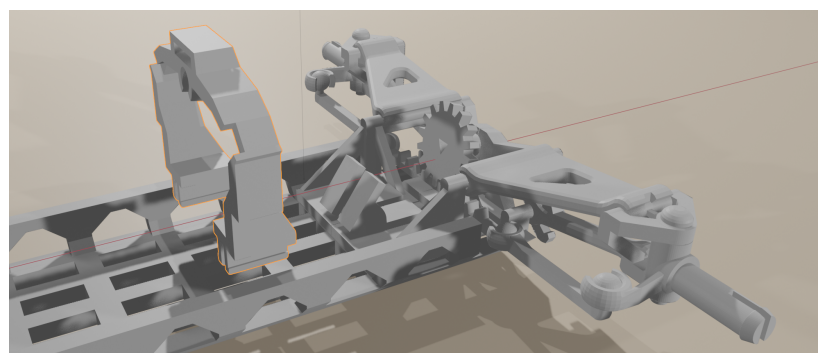
Then, add the rotating part and secure it with a small pin.



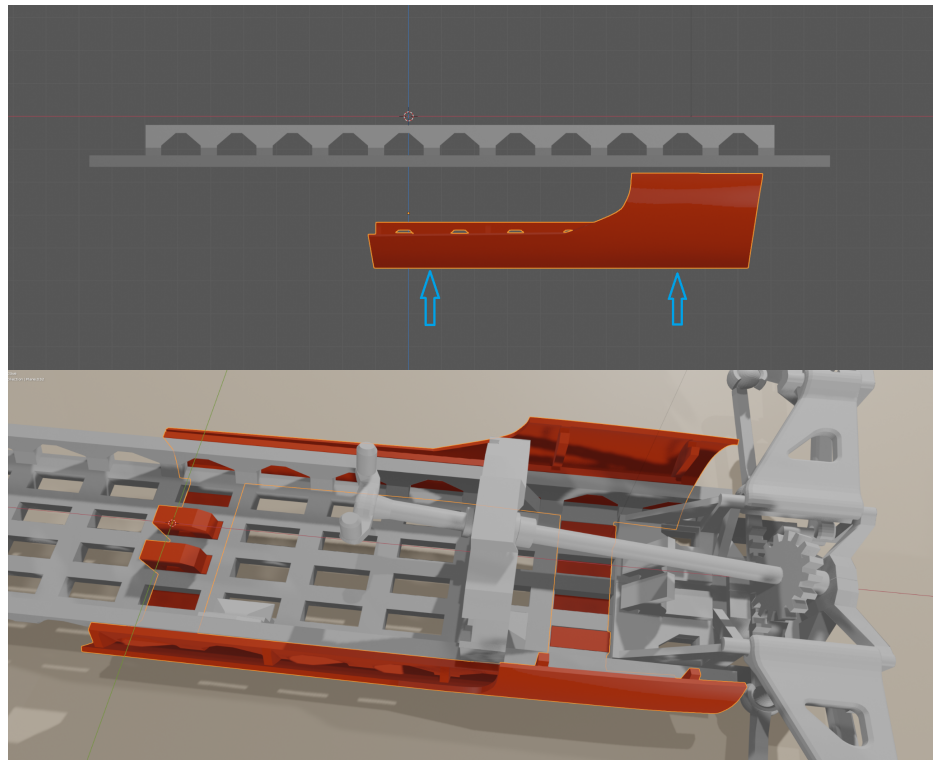
Add the steering rod, but be very careful, the ball connection to the rod is one of the weakest parts on the whole print and can break easily. **Only push on the ball** when connecting it to the joint.



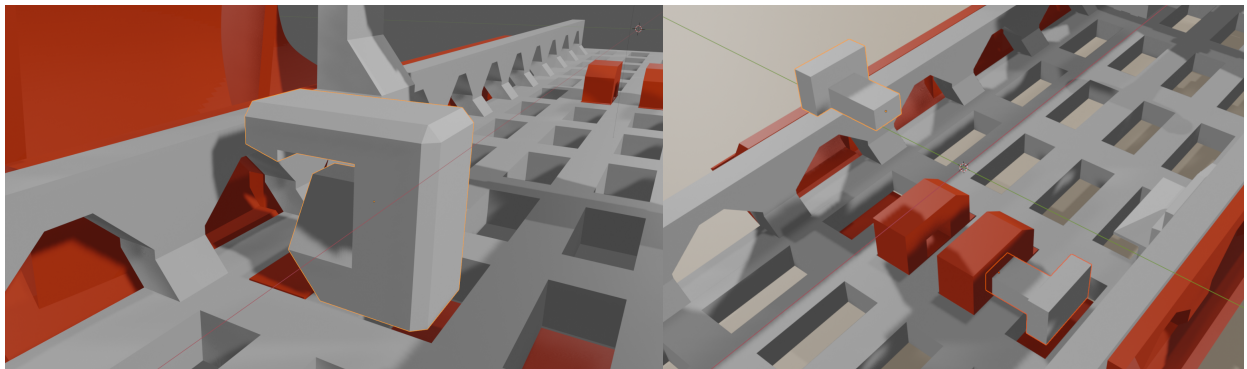
Now the steering wheel frame. Add the frame first and then push the steering wheel triangular part into the gear. **Make sure the gear is centered** before you do. There should be enough tolerance to slightly bend the steering wheel rod before you snap it in the frame.



And now the middle part of the bodywork (RED folder). It should be done at this point. Later, there could be too much difficulty securing this in the frame.



Secure the front part with clips and the back with pin

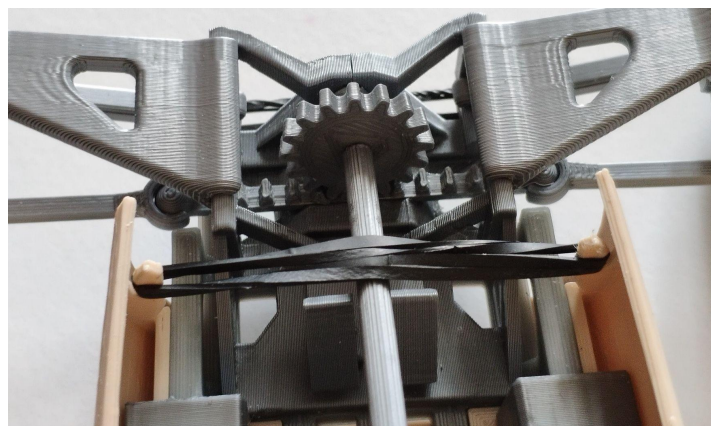


Alternatively you can use just one of the pins for the back (the top pin on the right picture above) and leave this part for the rest of the bodywork in the last chapter of the manual.

Tip:

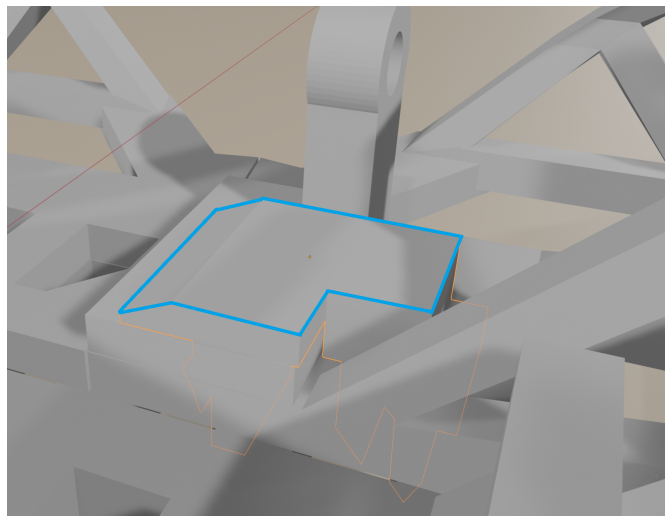
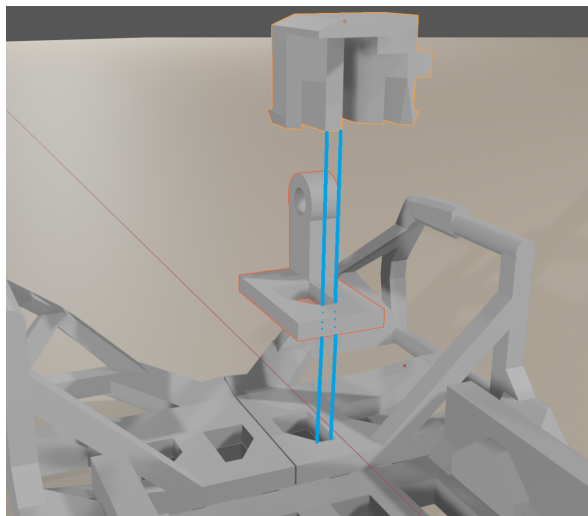
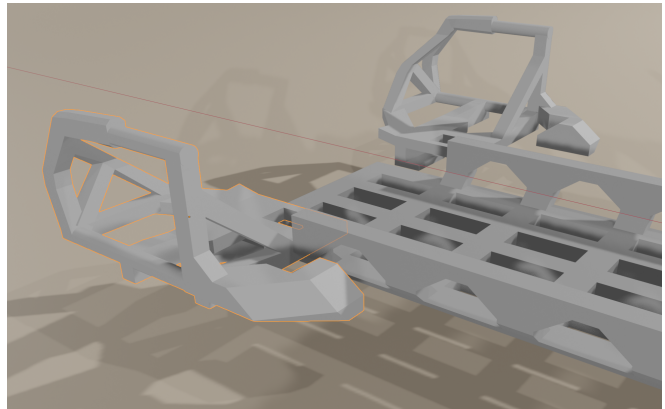
You can add a rubber band, forcing the opposite sides closer to each other. It reduces a gap between this part and the front bodywork part that's added in the last chapter. But It's completely optional.

This completes the first part - Front axle

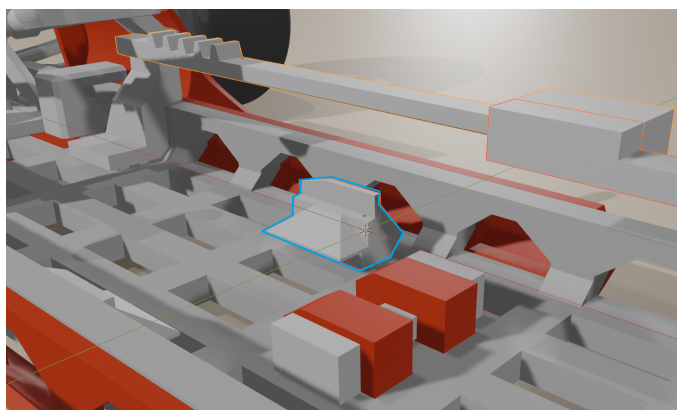
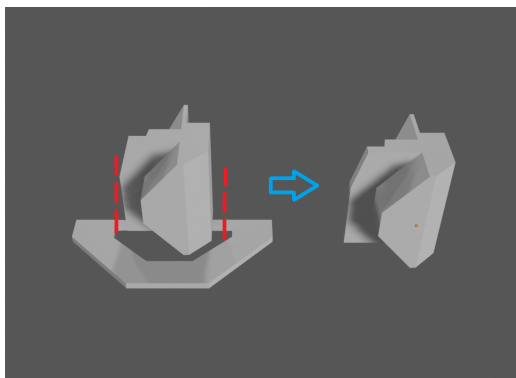
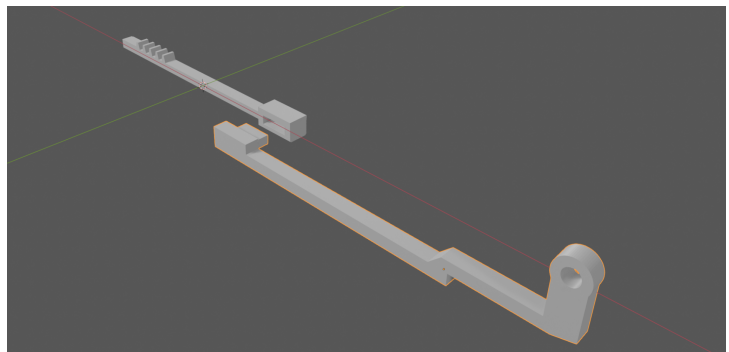


2. REAR AXLE

Add both parts to the base frame, then the left drive shaft holder and secure it with the L shaped clip - the highlighted part below.

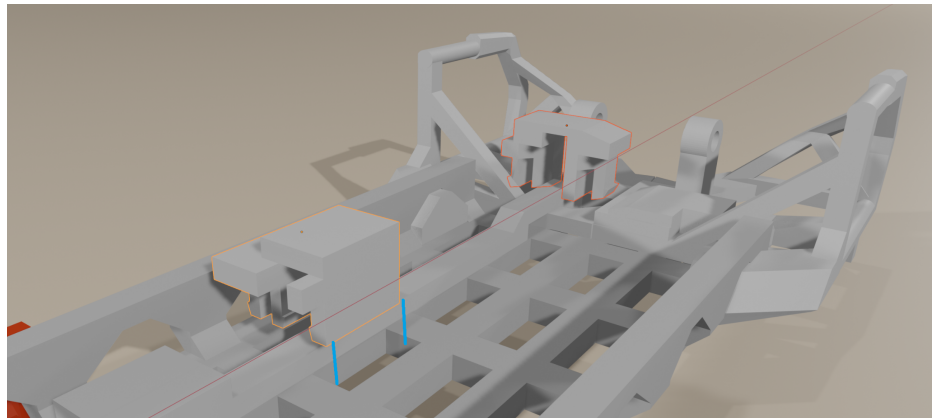
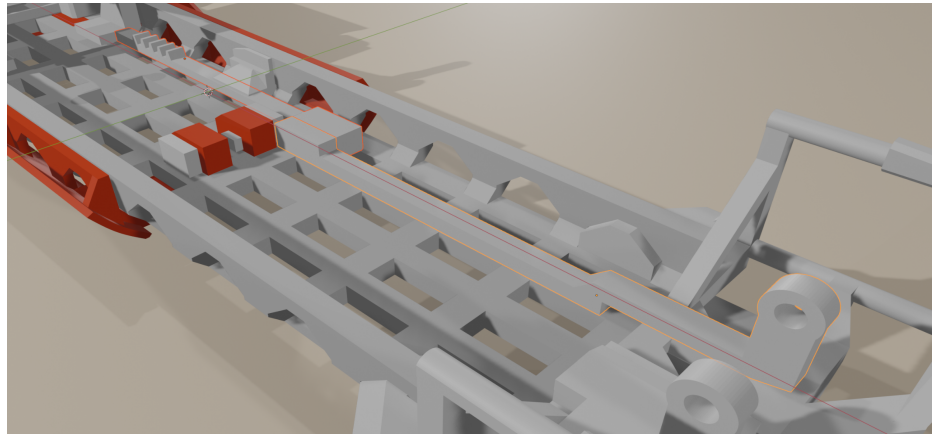


Assemble the shifting rod. **Before** you place it on the frame, insert the part highlighted below in the side of the base frame. This will keep the shifting rod in the right position. **Cut off the custom brim** (I had some problems with this part sticking to the print bed).

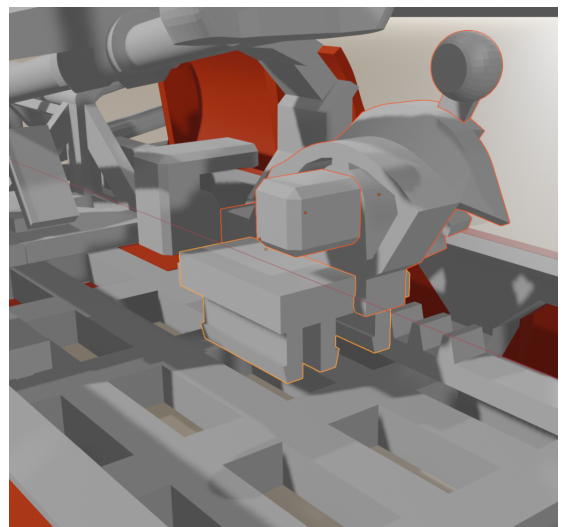
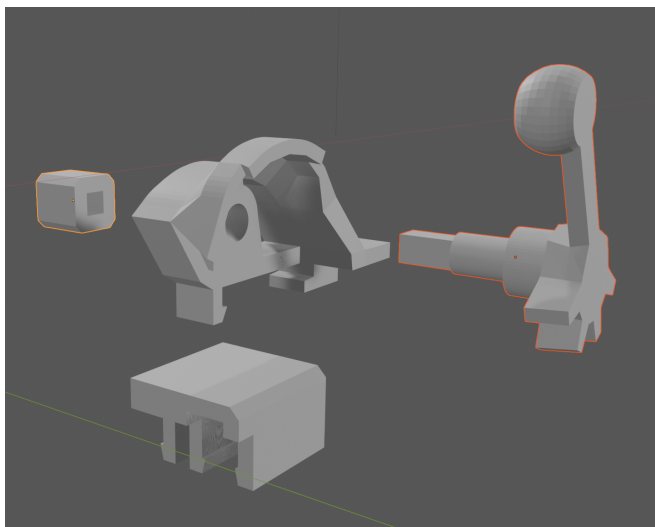


Place the rod on the frame and secure it with two different clips seen on the picture below.

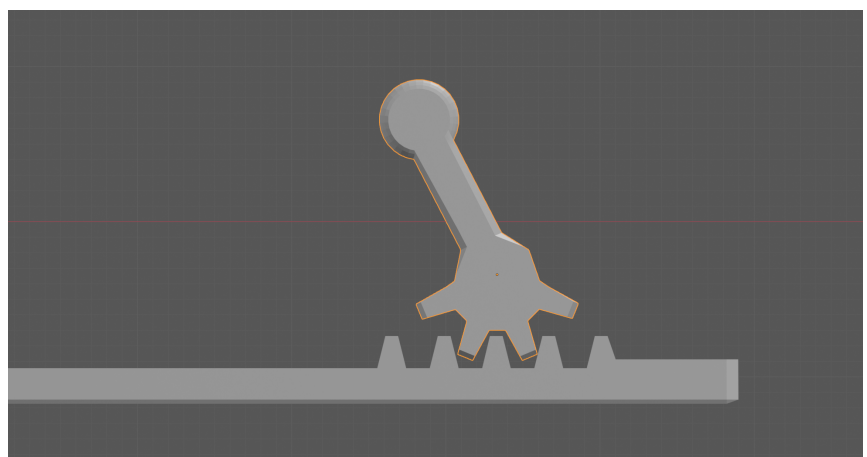
Check if there isn't too much friction, some sanding or lubrication may be needed.



Assemble the shift stick and place it in the frame.

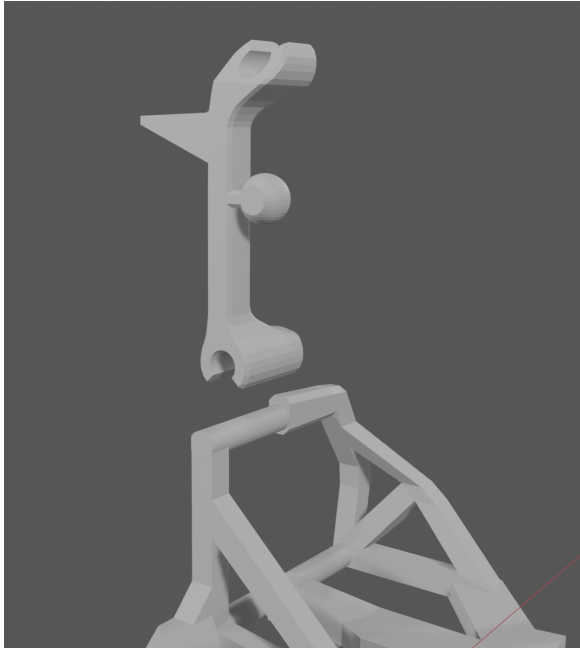


The gear part of the stick **must fit exactly** like in the picture.

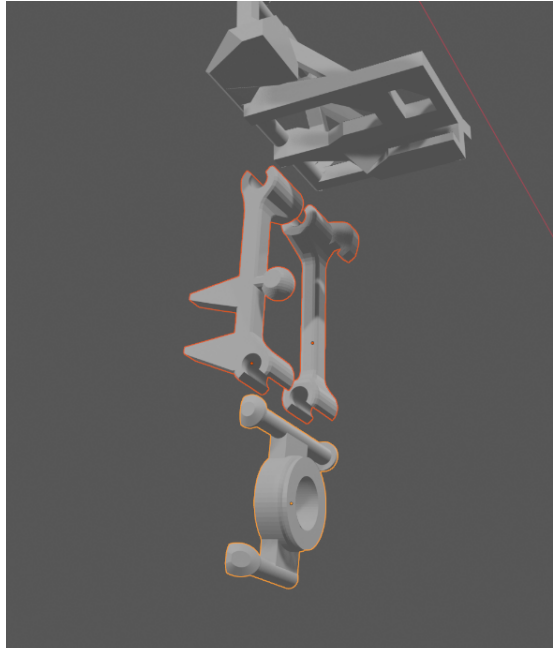


Add the rear control arms, rotate them for easier assembly just like with the front control arms.

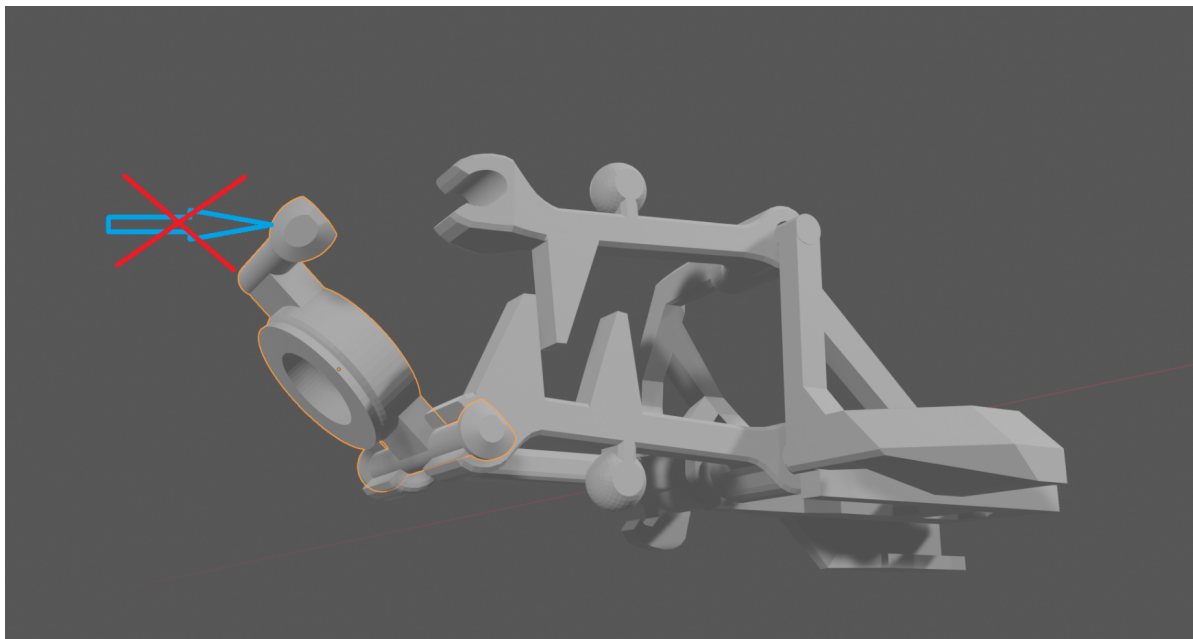
Upper



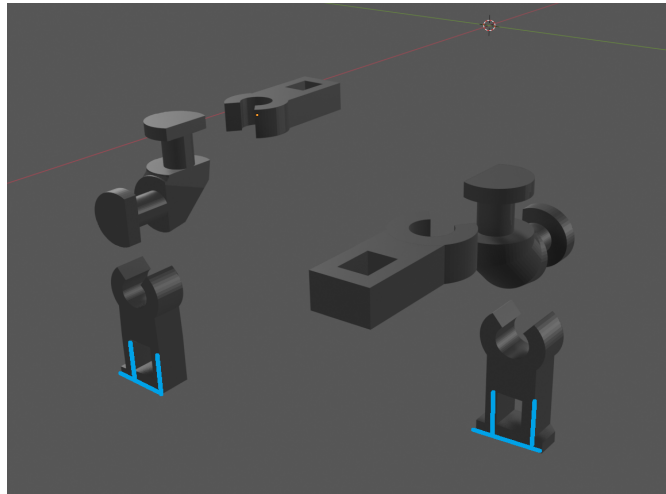
Lower



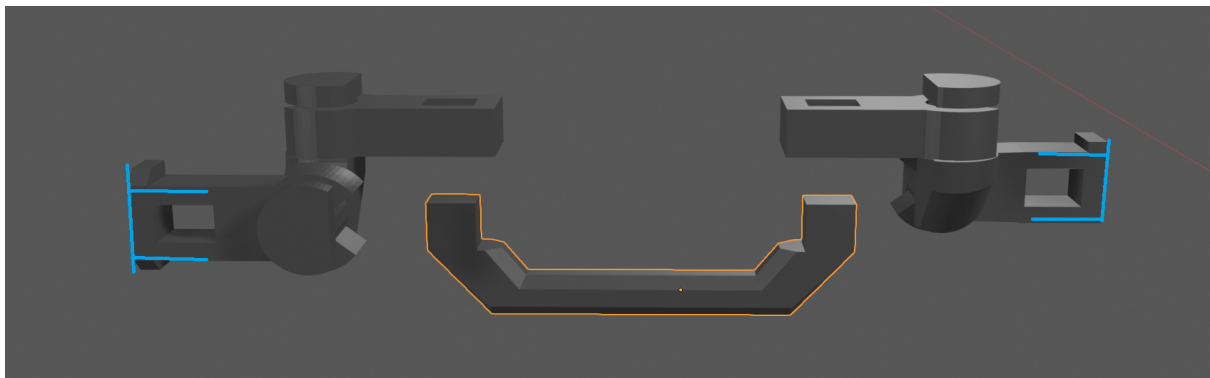
Don't connect the rear knuckle just yet.



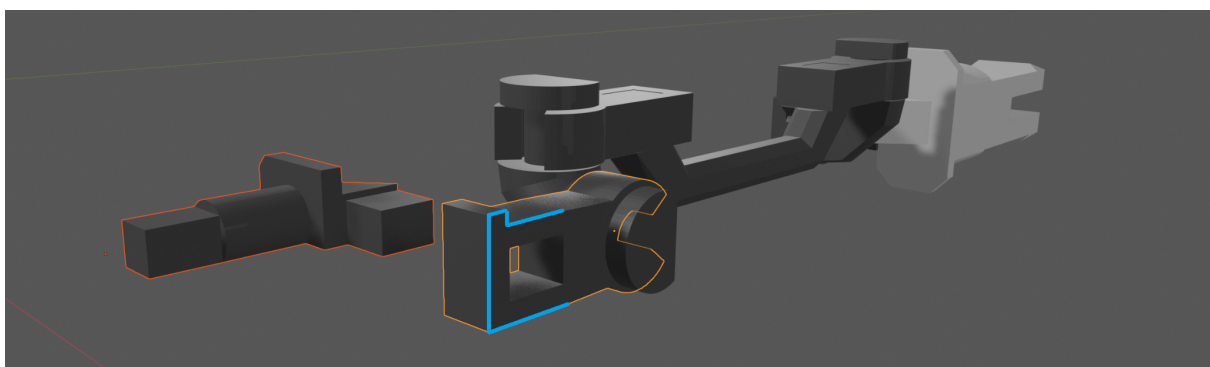
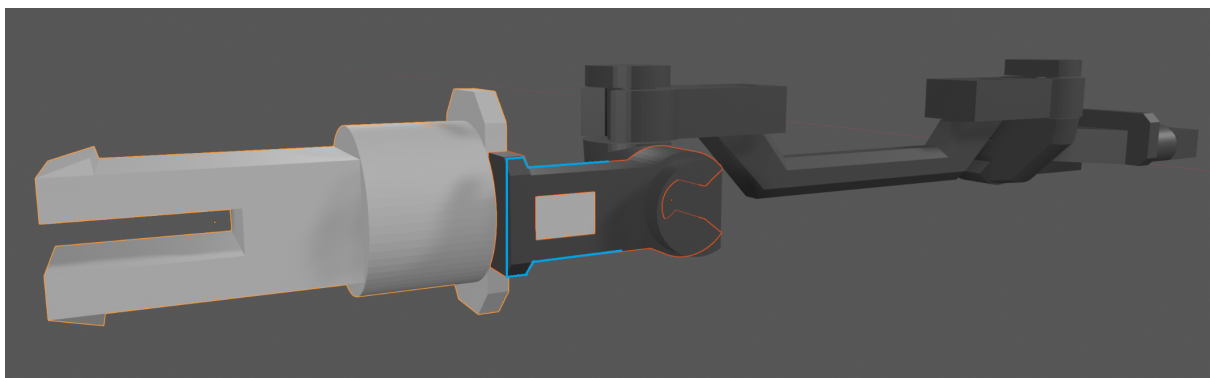
First assemble the drive shaft (16 files labeled Drive_shaft... in BLACK folder). There are 4 small parts that need to be snapped in each of the L shaped joints, two on the top are the same, bottom ones are different so check the highlighted parts in this picture.



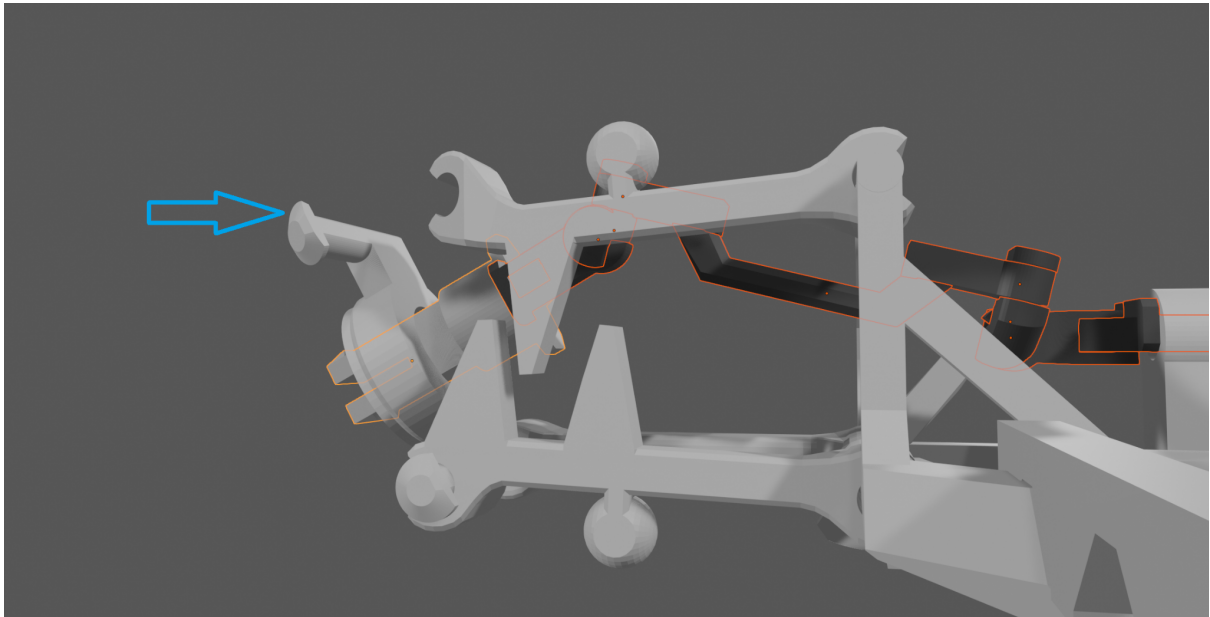
Connect the joints with the rod. Again, mind the different shaped parts.



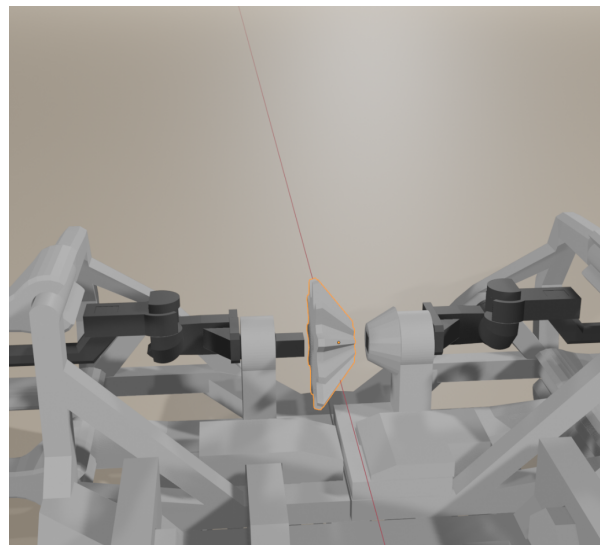
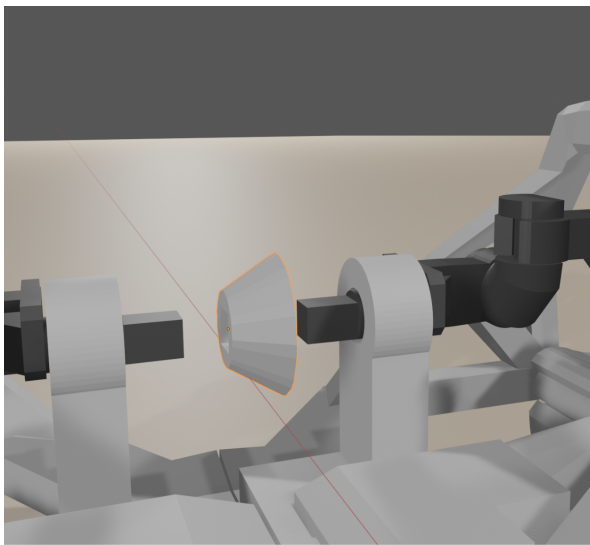
Then add the last two parts to the correct shaped ends



Assemble the drive shaft with the rest of the axle. Now you can connect the rest of the left rear knuckle.



Repeat the process with the left side of the rear axle and secure both sides of the drive shaft with the parts shown below. **Only the right** rear wheel will move the crankshaft inside the engine, so that's where the gear must go. The smooth cap goes to the left one.



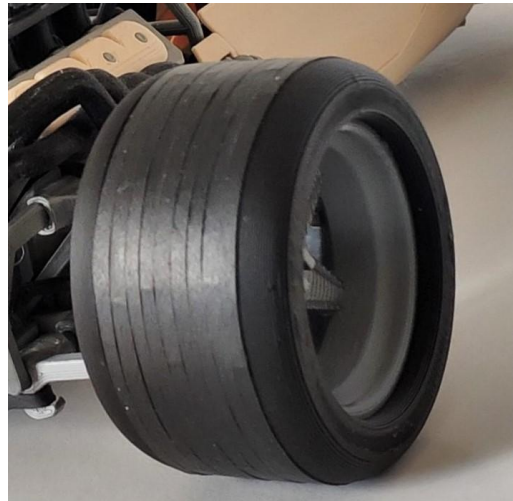
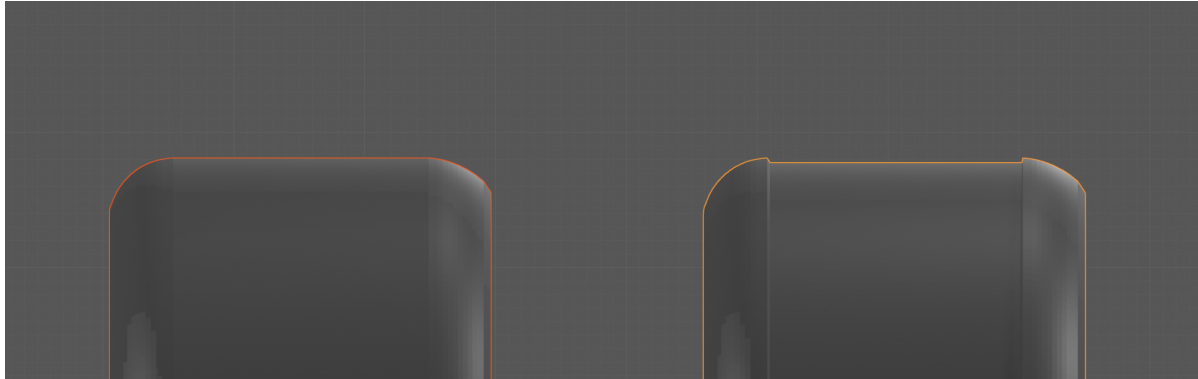
That's the rear axle completed.

3.WHEELS

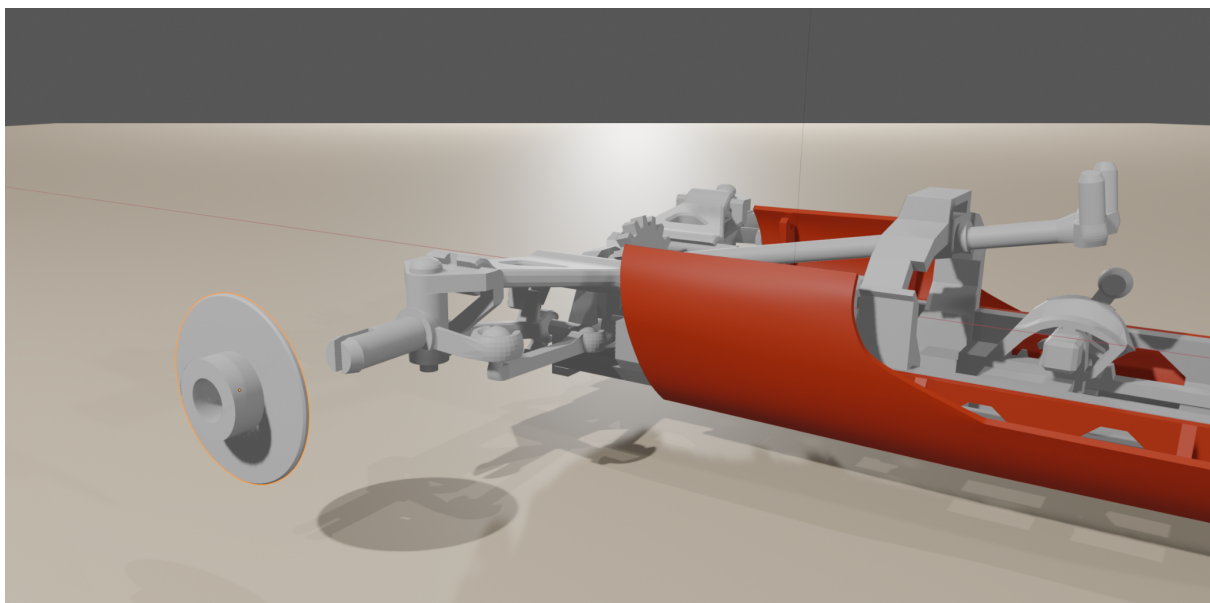
IMPORTANT NOTE:

There are two versions of the tires. The one with a groove is meant to be printed from PLA and combined with rubber bands cut from the bicycle inner tube (see the picture below). The other version is meant for flexible filament, although I don't have one so it wasn't properly tested. It will probably need size adjustment for tight fit.

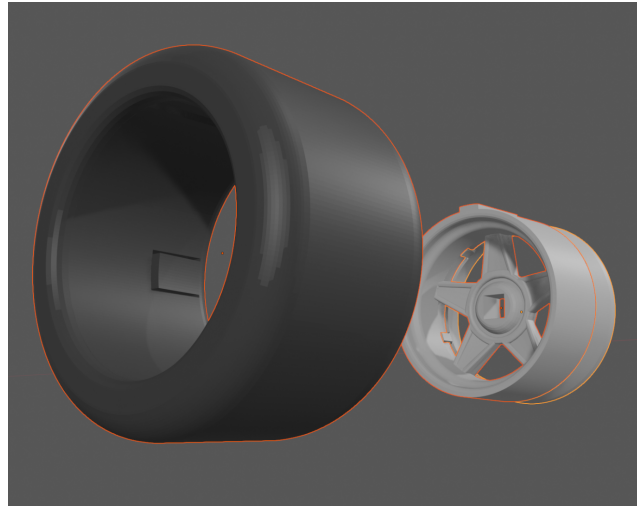
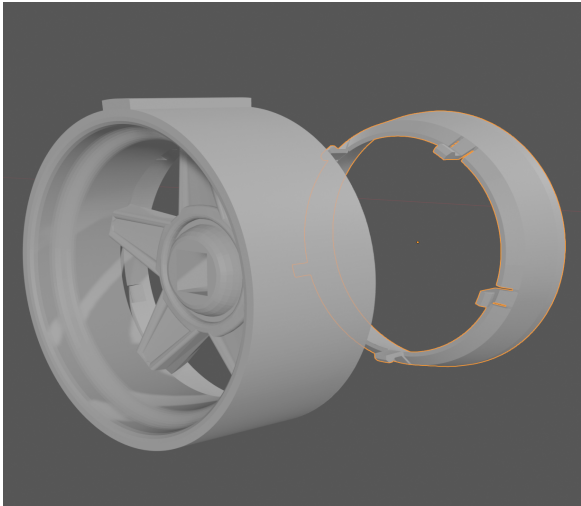
The different types are in the BLACK folder labeled SMOOTH_ / GROOVED_.



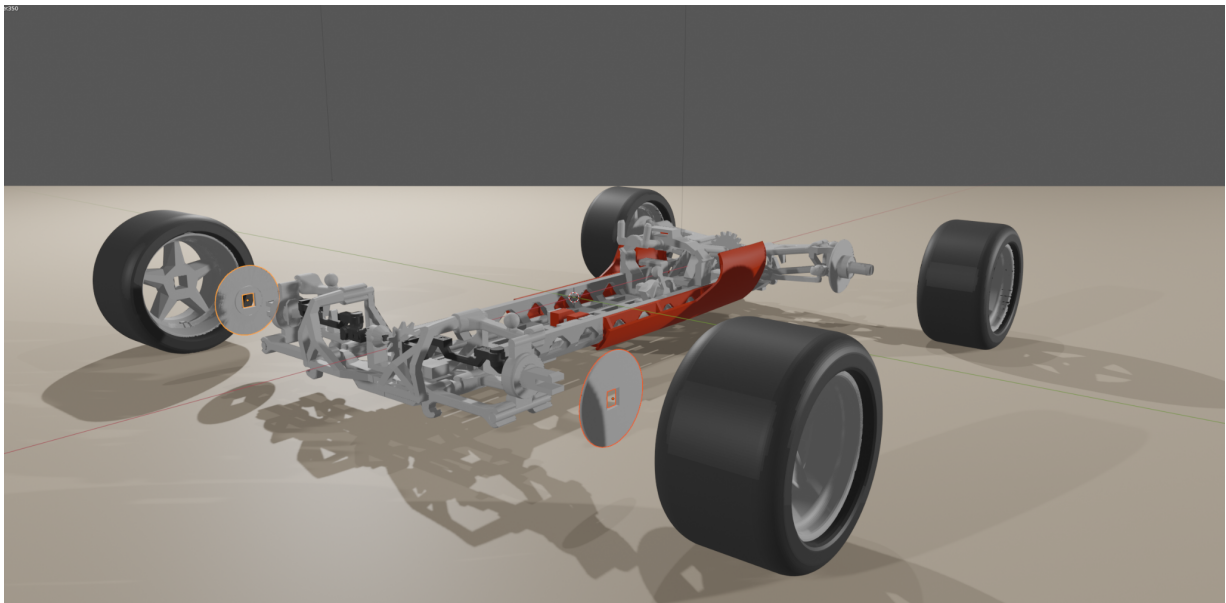
First add the brake discs to the front and back



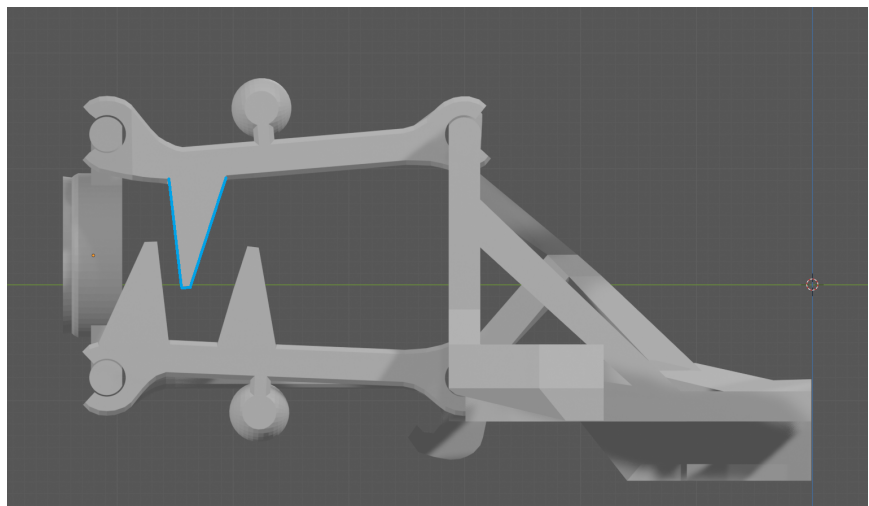
Assemble the wheels - the front ones have round holes and back ones have square. Then add the tires (BLACK folder).



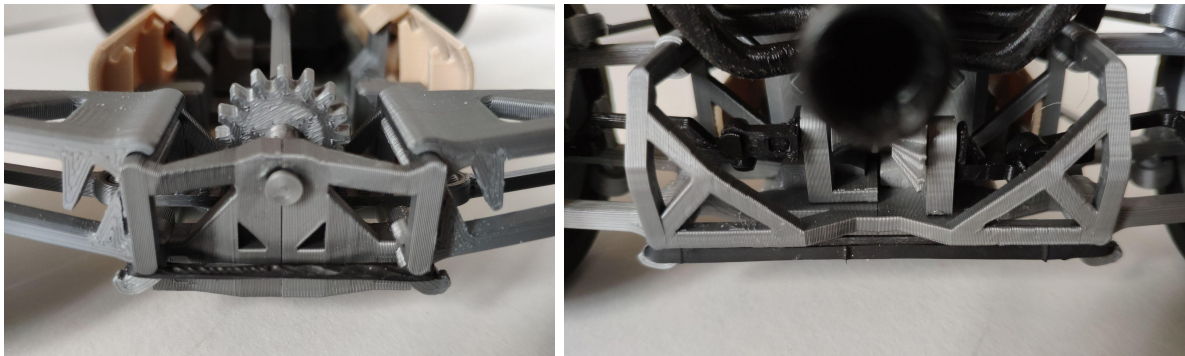
Finally, snap wheels to the corresponding rods.



You can fine tune the **suspension limits** by editing the highlighted part on the right picture. Either by editing the 3d model itself, or by sanding the part for example. Both the front and rear suspension works this way.



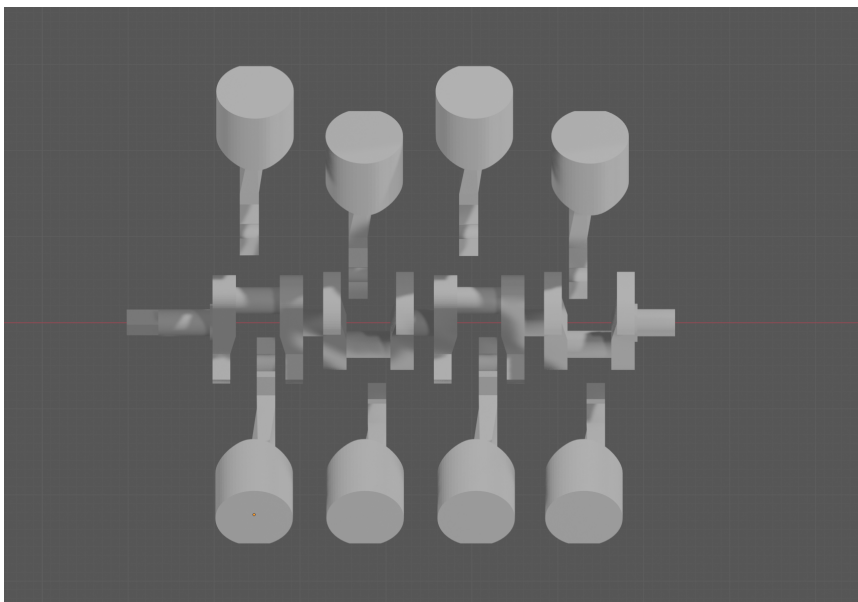
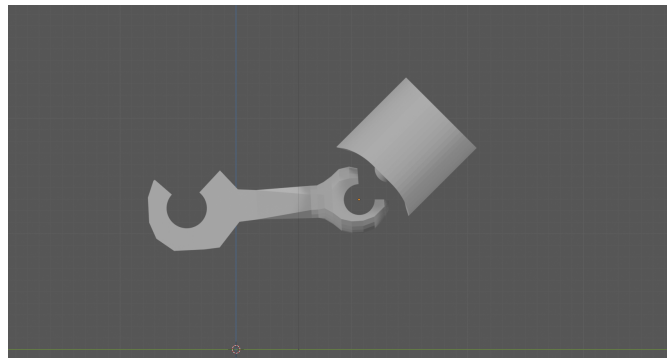
There are small “hooks” on both the front and the back axle. You may use rubber bands again or small springs to make the suspension work. But it’s much easier to regulate the suspension resistance with rubber bands, depending how thick you cut them of course.



That’s the wheels done.

4. ENGINE

Start with the pistons. Snap in the connecting rod, there should be no resistance when moving the engine parts. I recommend sanding the flat part of the connecting rods (where two of the opposite rods meet).

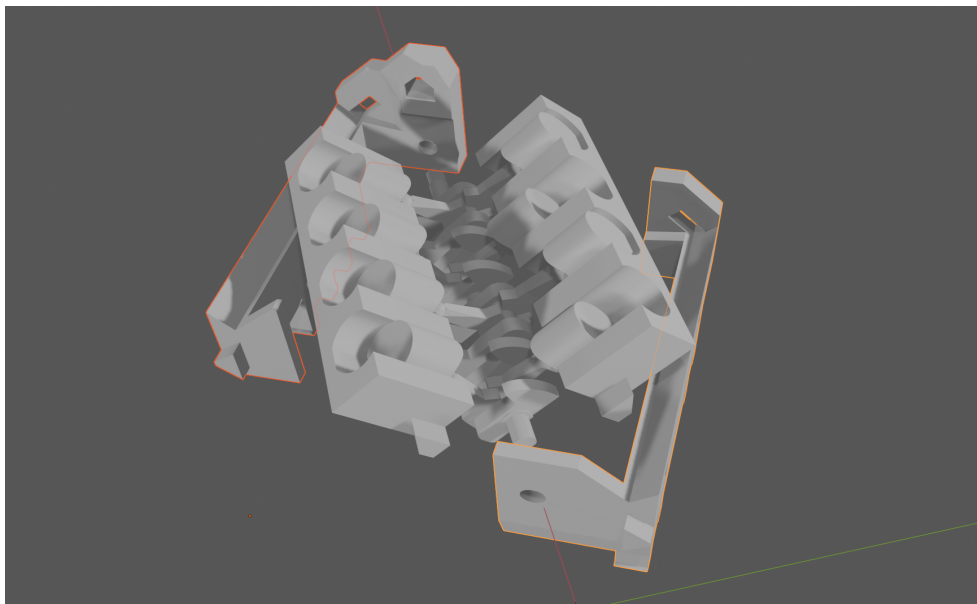
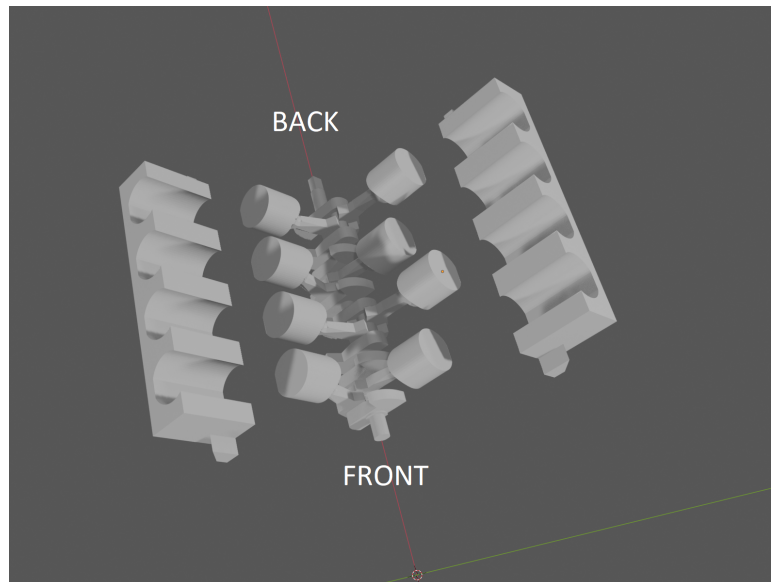


Assemble the pistons - see the picture to the left. You can lubricate the crankshaft for less friction, **It’s important everything is as smooth as possible.**

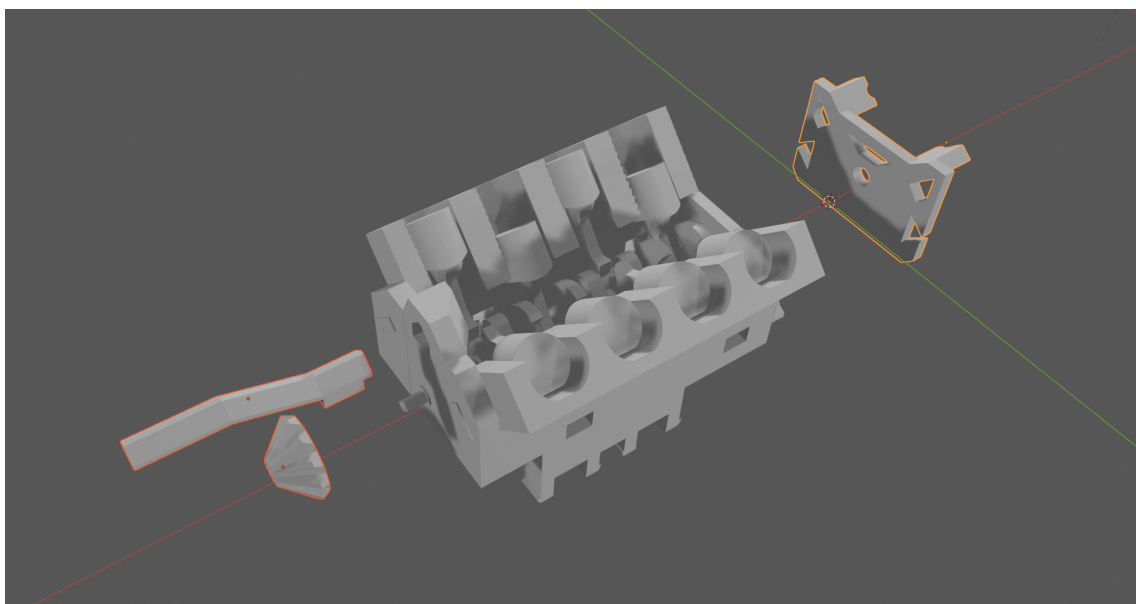
These next steps may be a little more complicated.

First add the cylinder blocks, mind the correct orientation - square shape protrusion on the cylinder block and square end of the crankshaft to the rear.

Hold the parts together and join the lower part of the engine block. Just like in the picture below, slightly rotate the lower parts and put the crankshaft ends through them. Snap the cylinder block into the lower engine block.

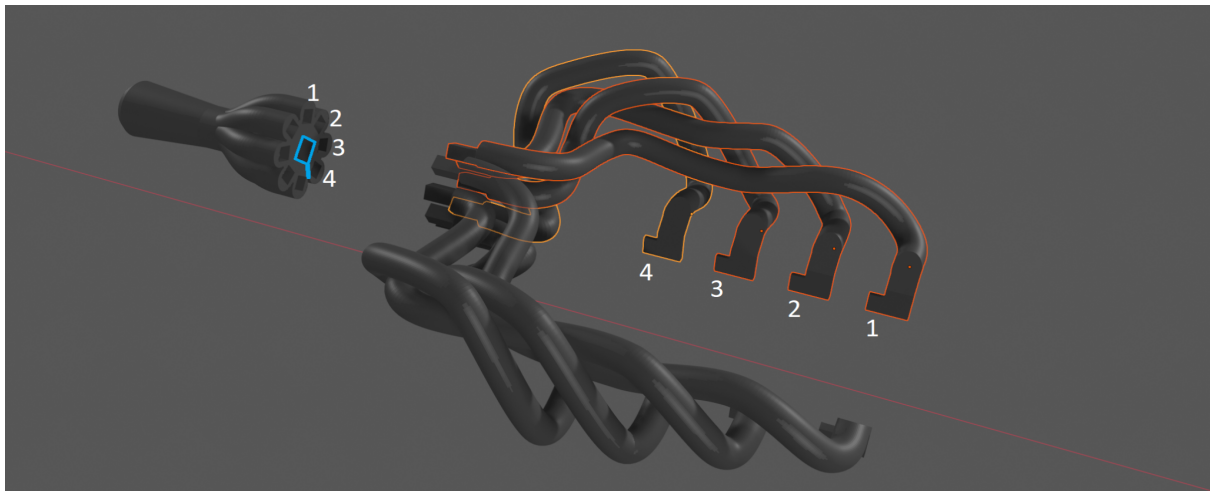


Add the front cover, exhaust holder and engine gear. There is nothing joining the part at the rear for now so be careful not to break anything

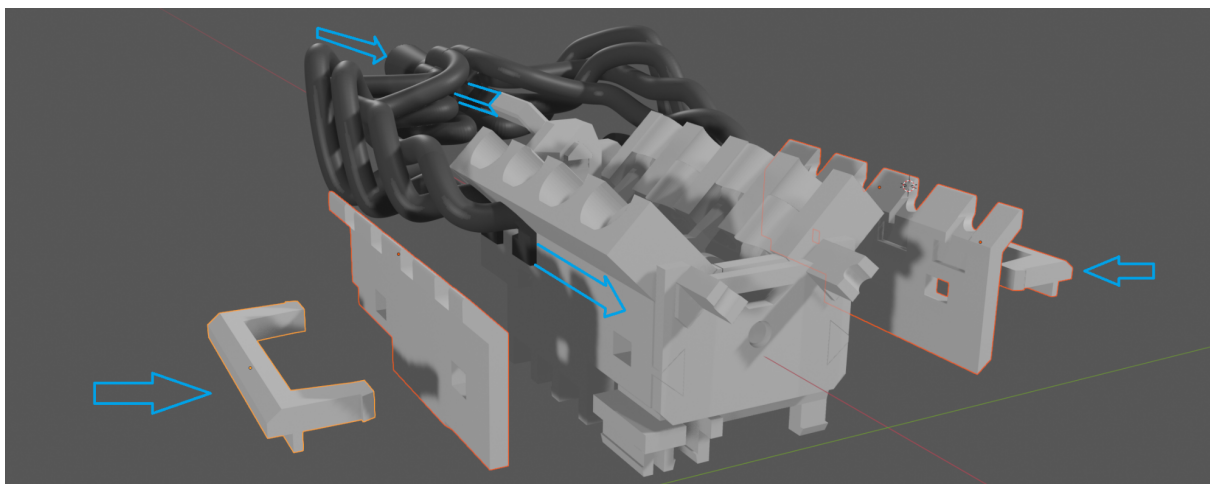


Assemble the exhaust pipes (BLACK folder), check the orientation of each exhaust in the picture below.

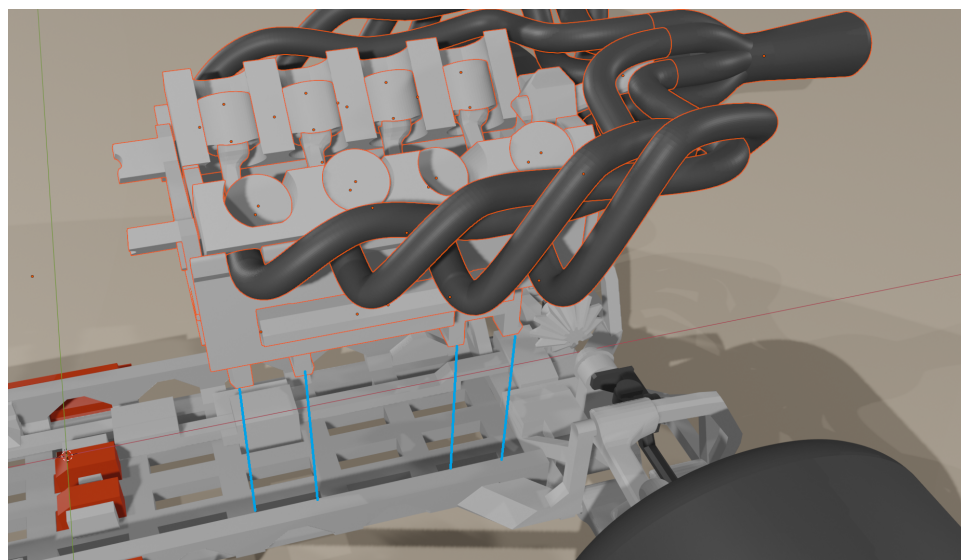
Number 1 and 2 first, simply insert them in the rear exhaust part. Then, lead number 3 between no. 1 and 2, and finally, add no. 4. The rear part connecting all the exhaust pipes should have a small line (highlighted below) pointing downwards.



Carefully slide the exhaust assembly forward along the lower engine part and secure it with side covers and clips.

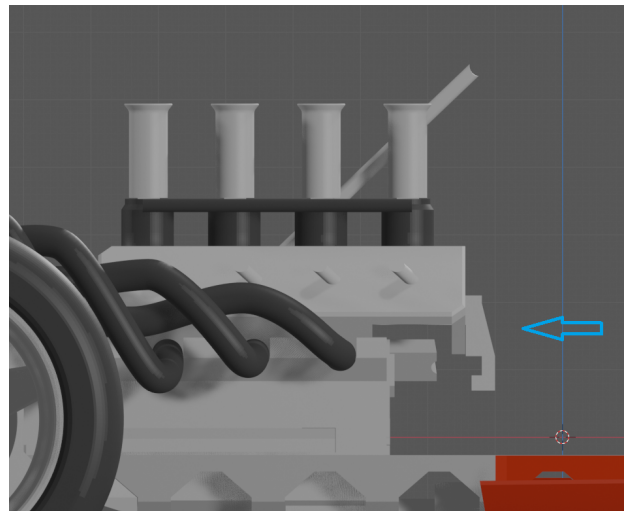
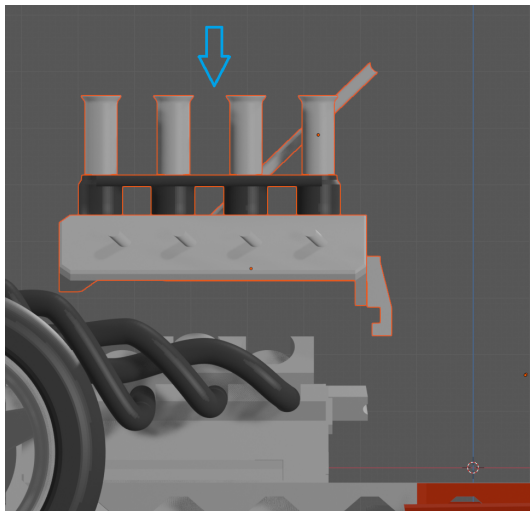
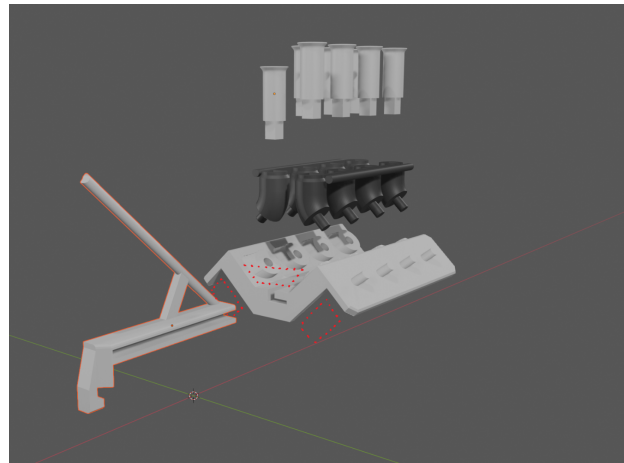


Align the engine with the base frame and snap it in. It might need a bit more force so be careful.

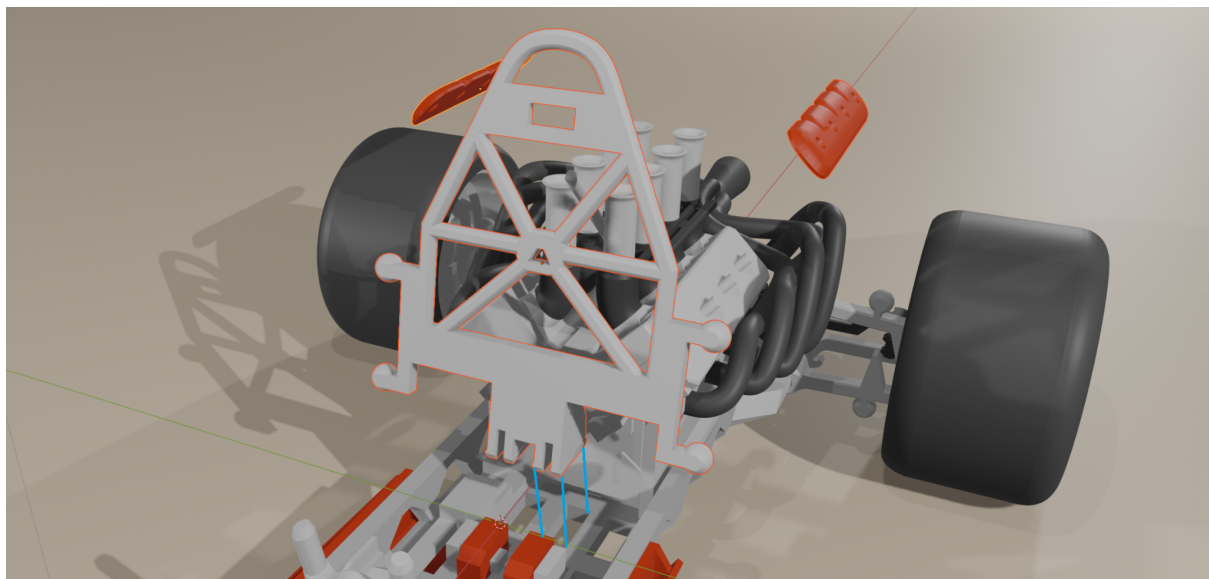


Assemble the top engine cover. **Cut off the custom brim.** Start with the part on the left (diagonal rod), then the air intake on the top.

The cover assembly is supposed to be removable, just place it on the top and move back - it should stay in place when you add the back frame.



Add the back frame and cylinder head covers (RED folder). The frame will secure the engine a bit more, plus it will keep the top cover in place. When you want to remove the cover, just slightly bend the diagonal rod in the picture above and move the top forward.

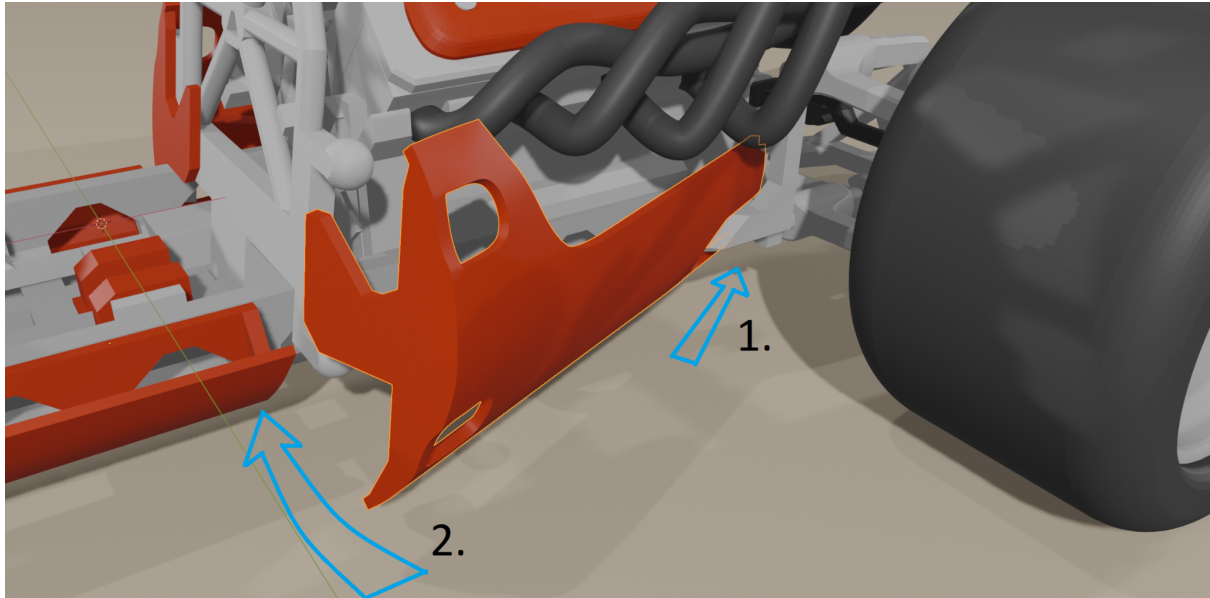


The engine is now completed.

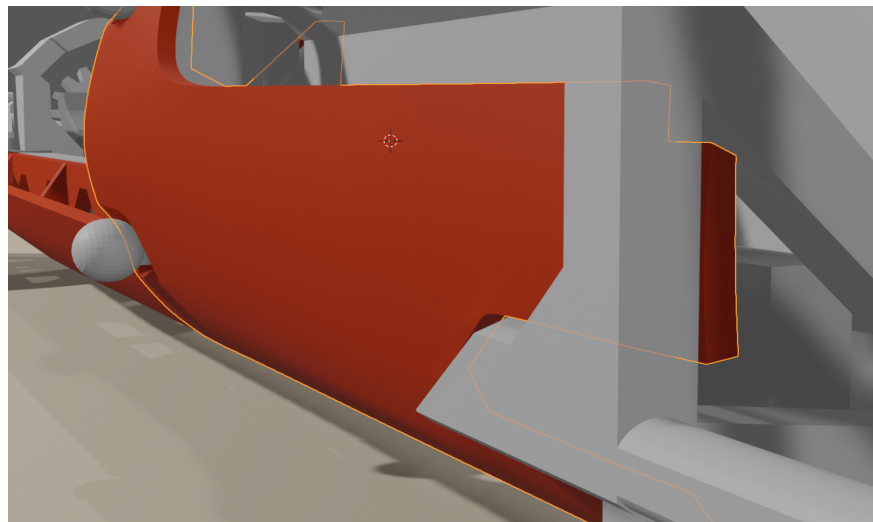
5. BODYWORK

NOTE 1: *If you haven't added the middle part of the bodywork in the first chapter, do it now. It will not be possible after the next step.*

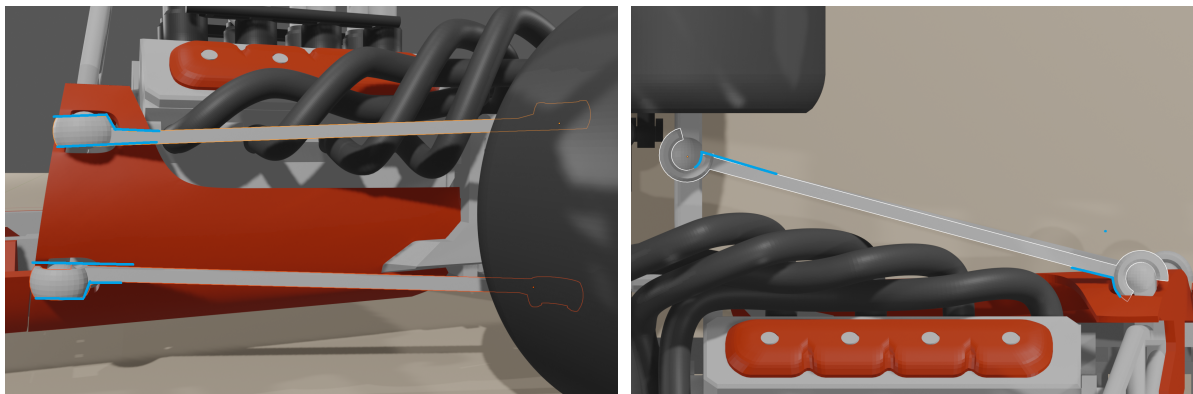
First, slightly rotate the rear bodywork part (RED folder) and insert the end of it in the rear axle part.



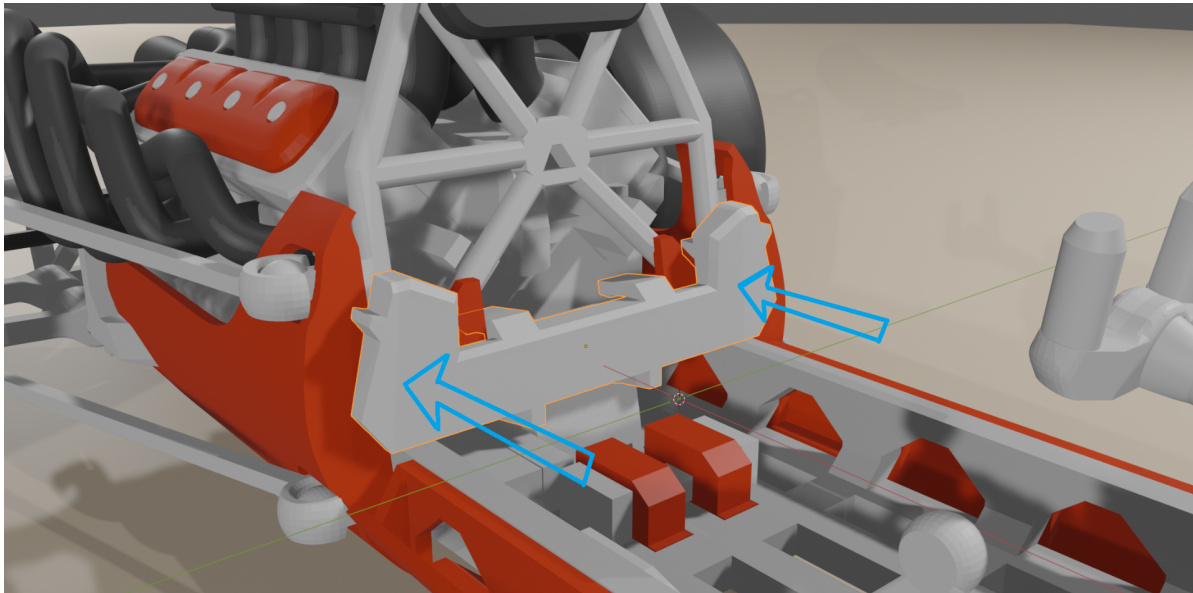
Then, rotate it back (between the back frame and middle part of the bodywork). It's a tight fit but It shouldn't be too difficult.



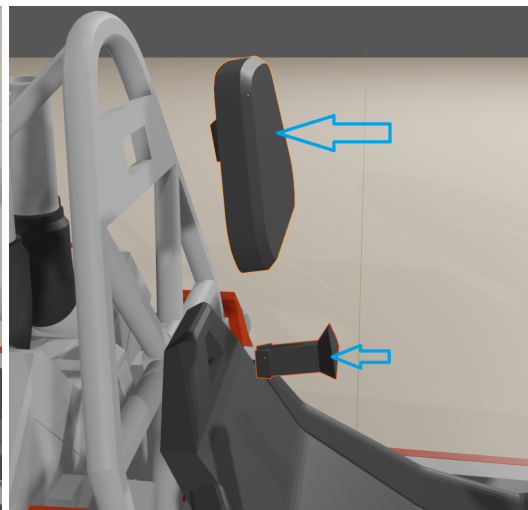
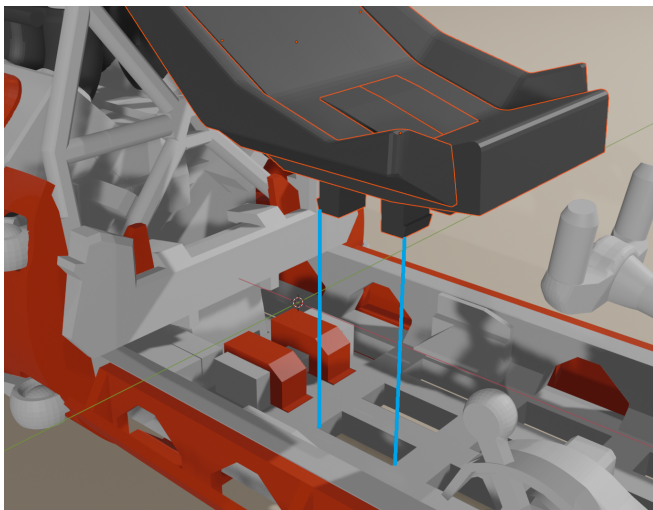
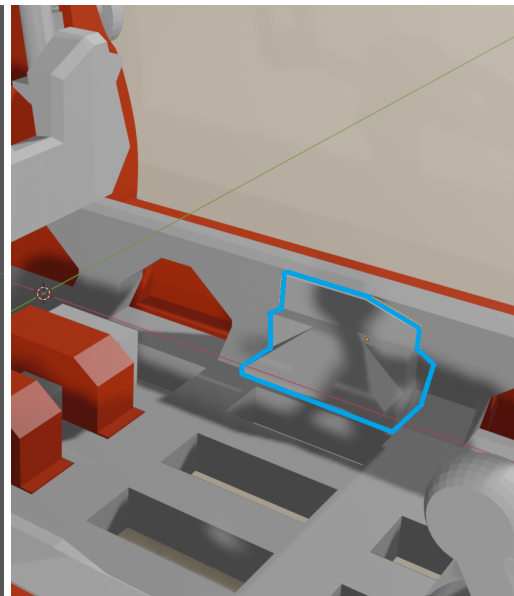
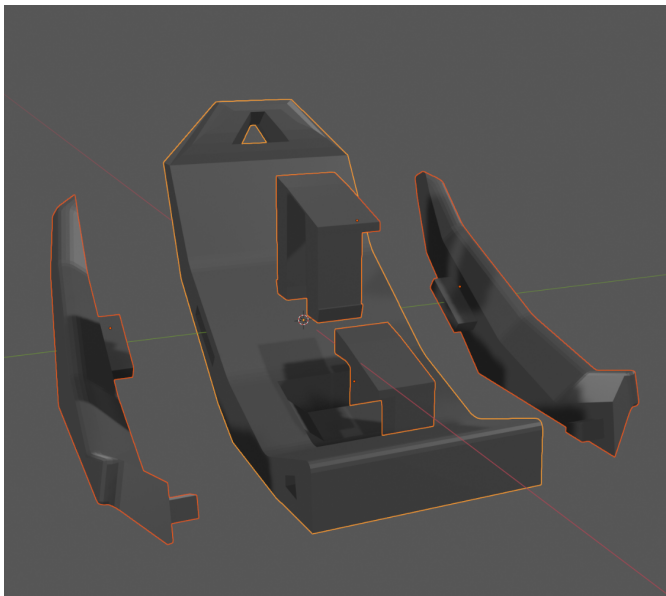
Snap in these side rods, mind the orientation highlighted below.



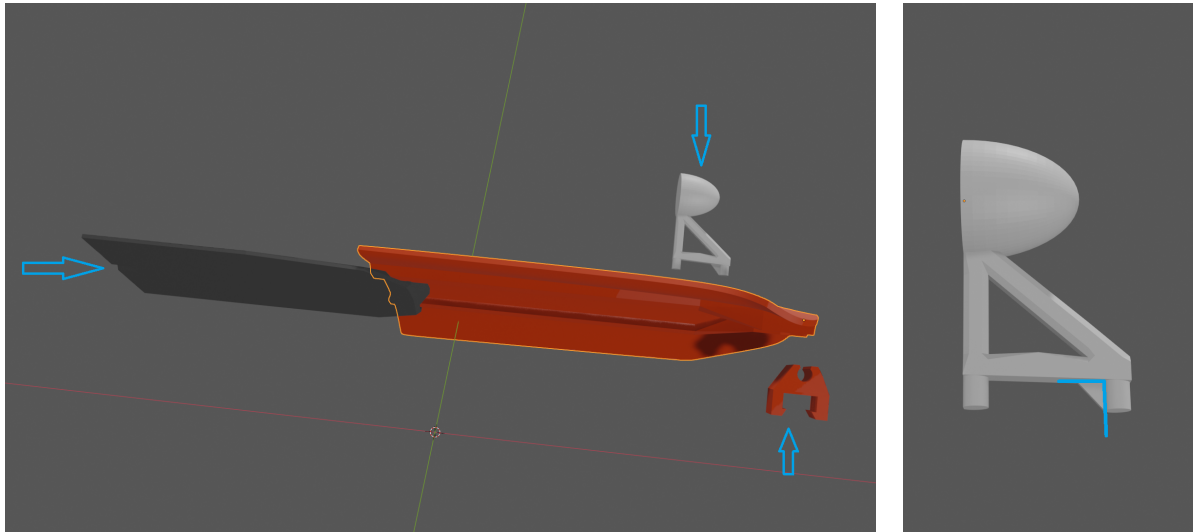
Secure the rear bodywork with this part.



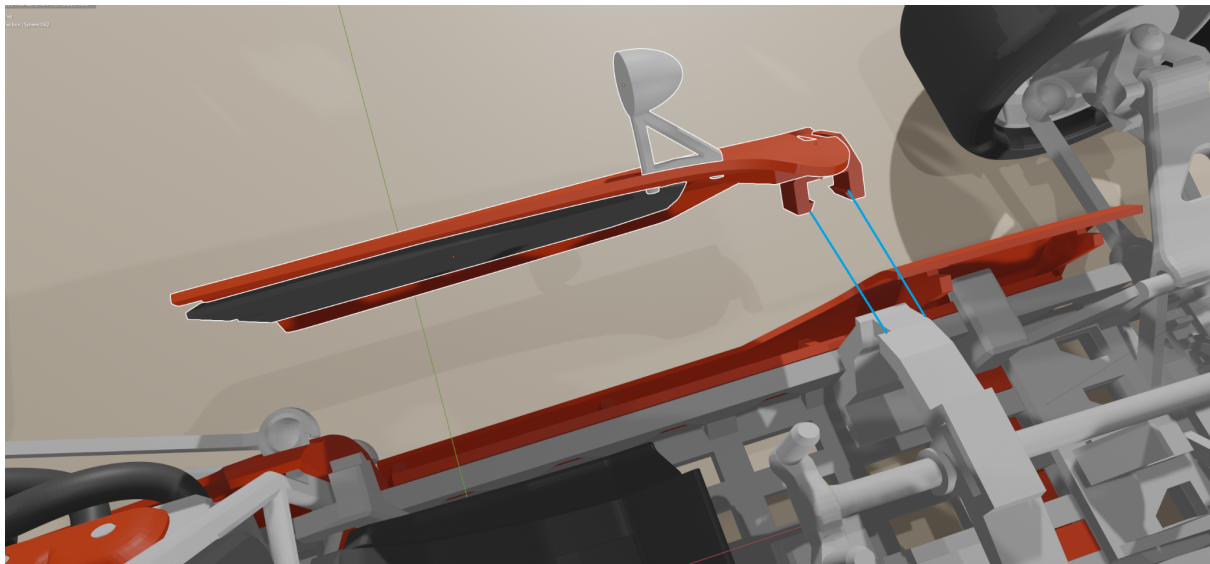
Assemble the seat, and place the highlighted part in the frame - **remove the custom brim** just like you did on the opposite side (beginning of the chapter 2). Snap the seat in the frame and secure it with the small pin. Add the head rest.



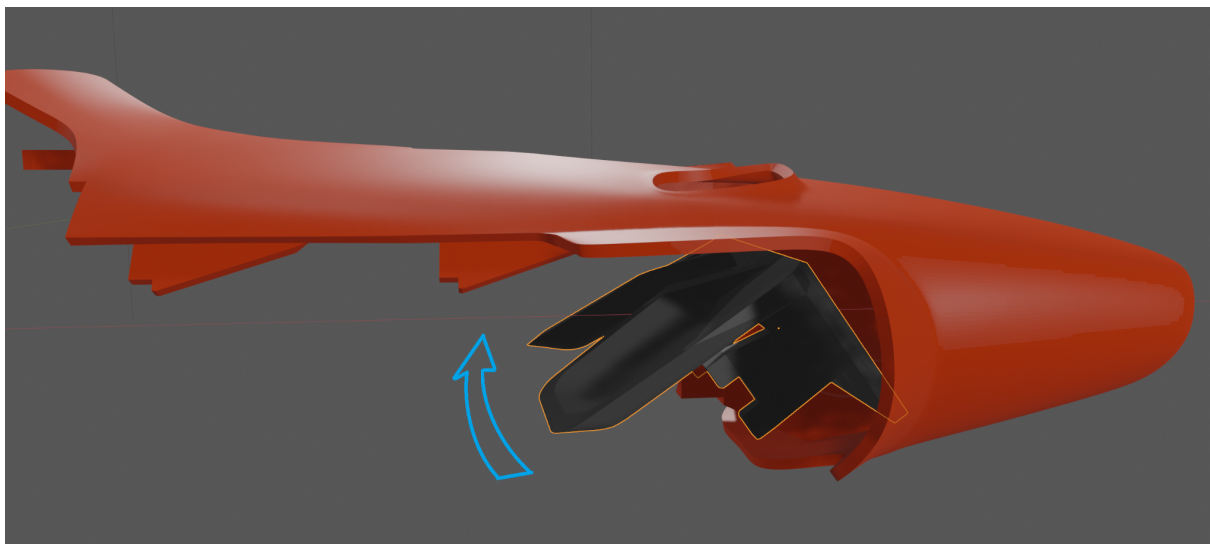
Assemble the doors. **Remove the custom brim** from the doors. Also you have to cut off the highlighted part of the mirror (right picture) before inserting it in the door, it only acts as printing support.



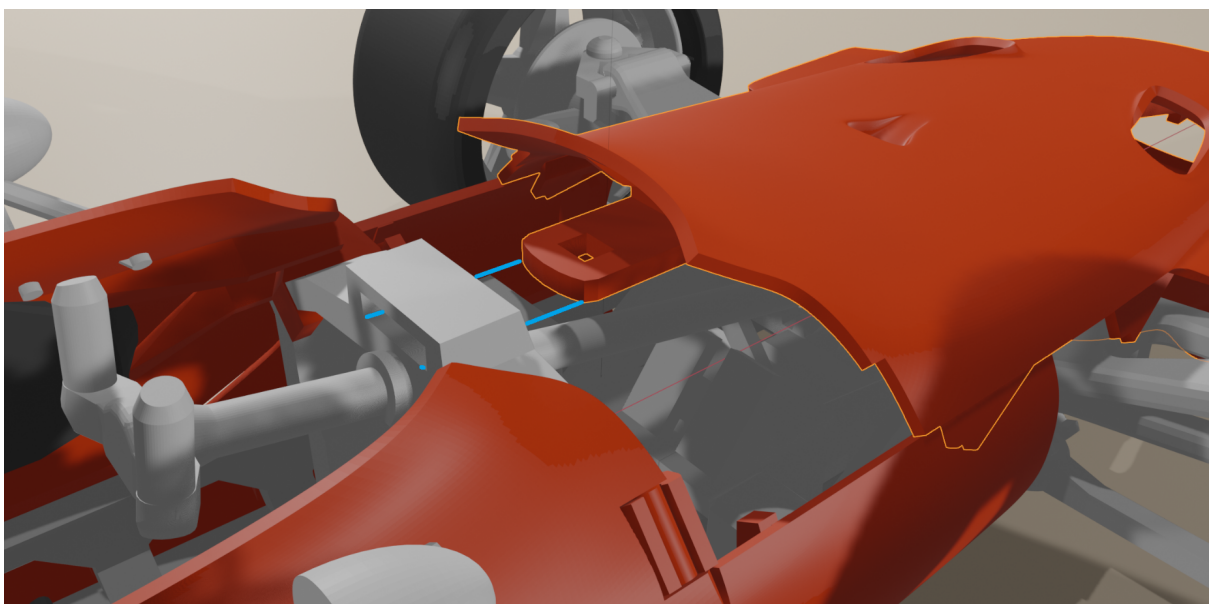
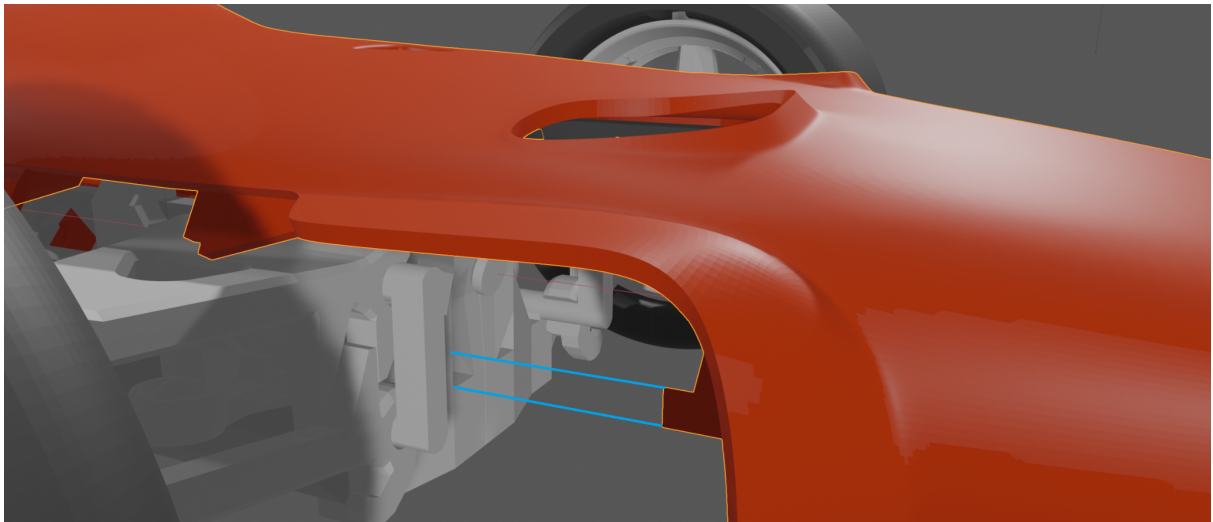
Snap the door in the frame.



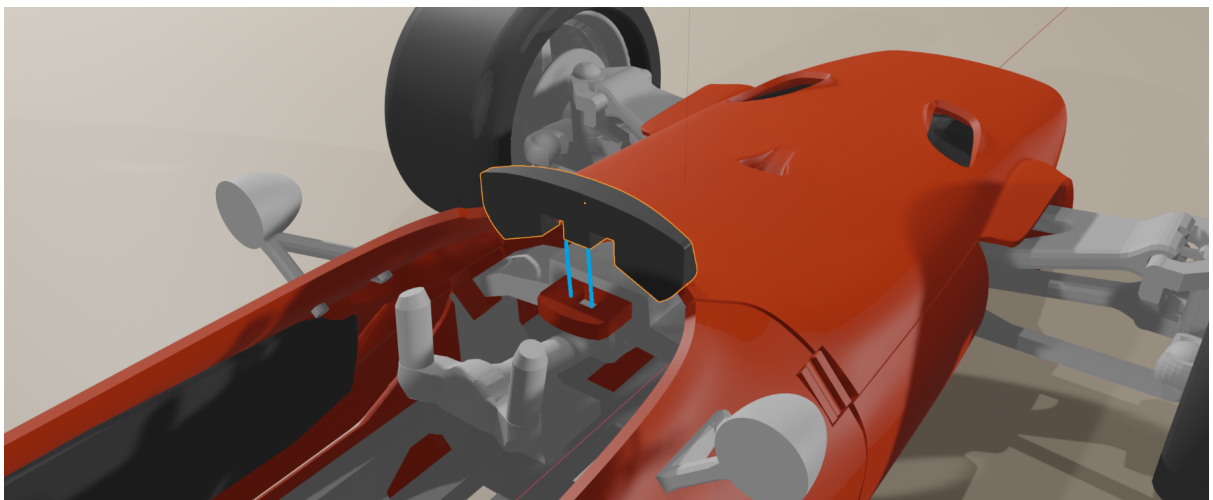
Remove the brim from the front bodywork part and add the radiator.



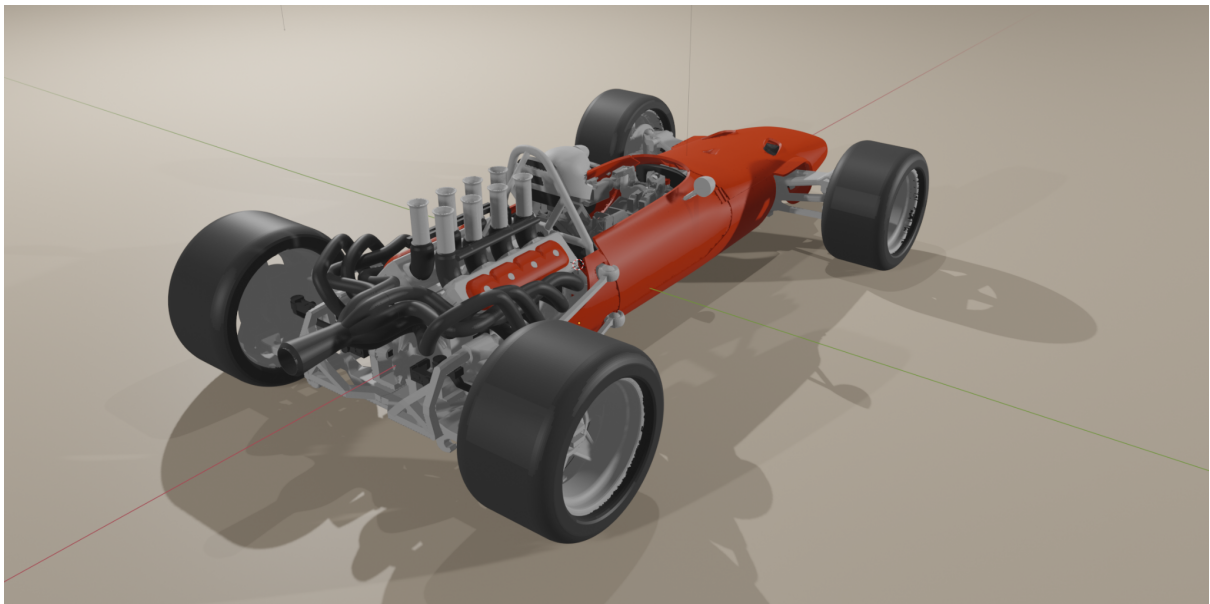
Insert it in the frame.



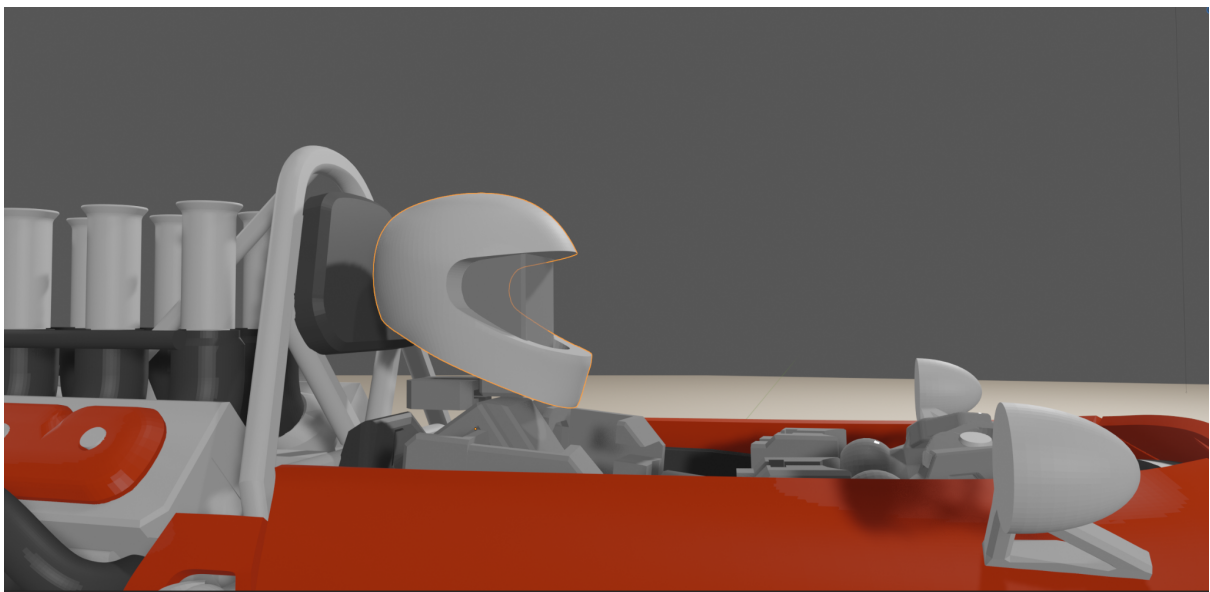
And secure it with the dashboard (flat part towards the driver).



That's it. The SVF1 is completed!



I have also made a small addition for soozafone's Lucky 13 figure. A Helmet that fits on the smaller version of the figure's head. The files can be found in my Lucky 13 remix [here](#).



If you want to **support more ideas like this**, please consider donating, any amount is appreciated. [Paypal link](#)

I worked on this every day for almost two months and it was the most complicated thing I've done on the 3D printer so far. I hope you'll enjoy it. Let me know in the comments if there were any problems needing to be fixed. Thank you.