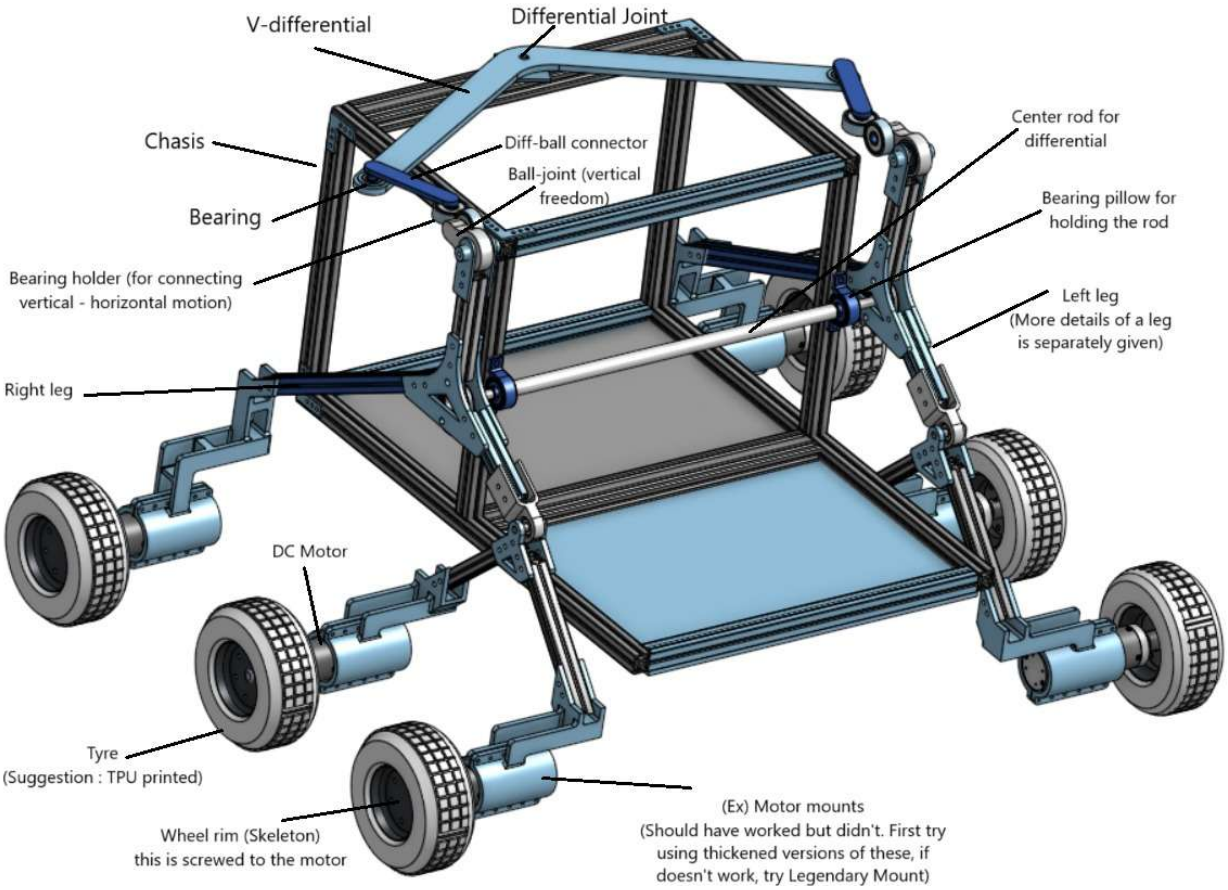
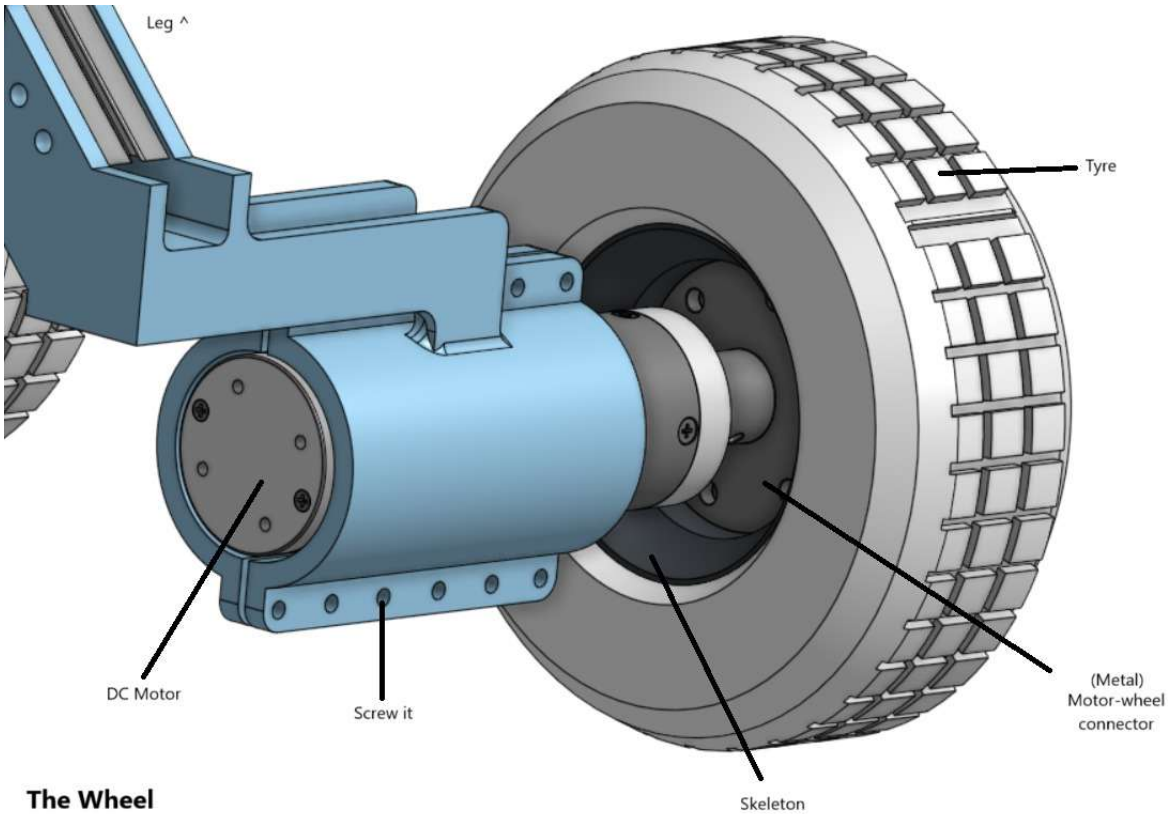
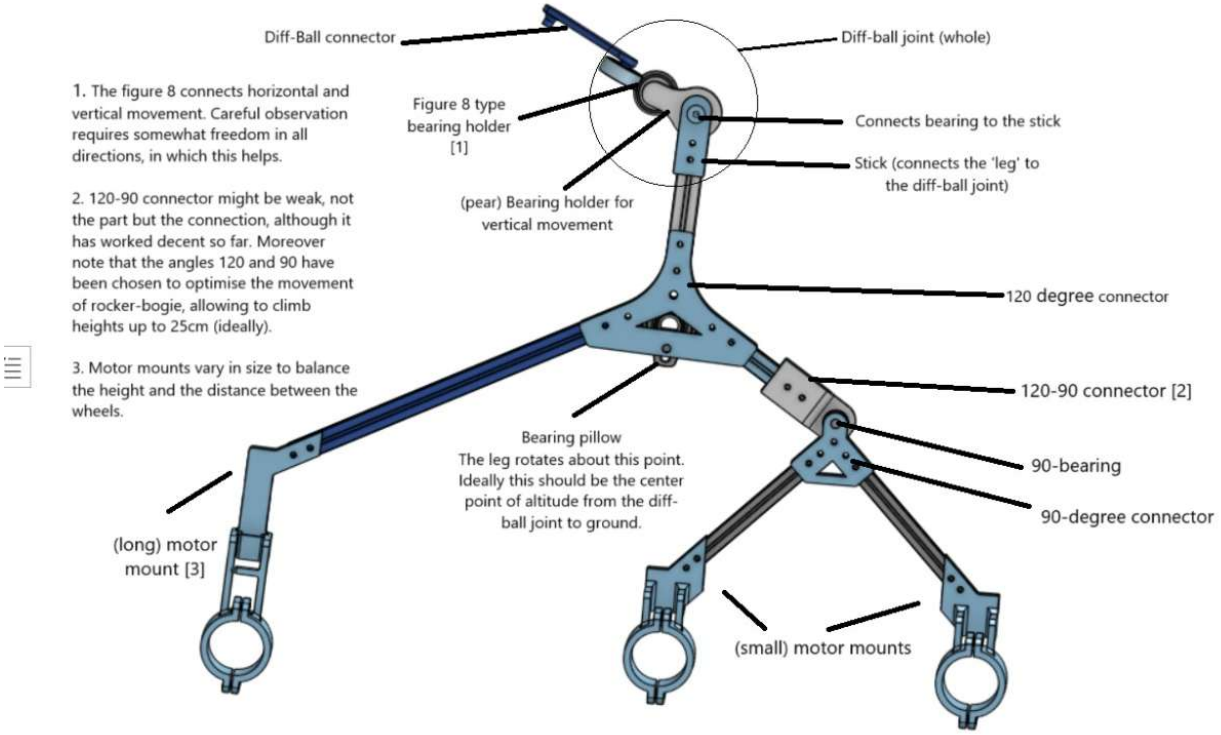
ROVER DESIGN





The Wheel



Some important info

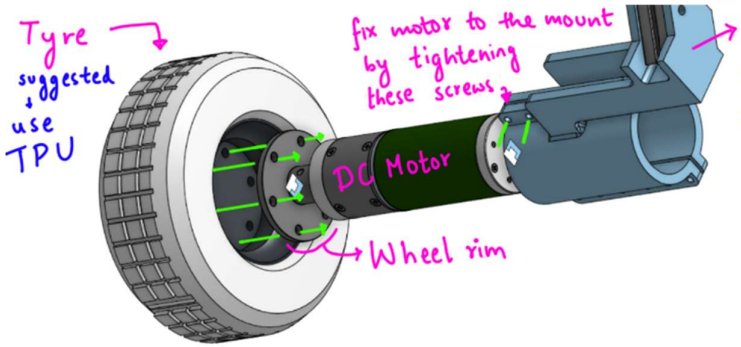
By the end the trouble was to get a proper 3D printed wheels of TPU (we don't know what type of filling, i.e. hexagonal, linear, etc. to be used and what should be the density and a good balance of number of shells suitable for the tyre).

Apart from that a setback was that all the 3D printed motor mounts broke, because the D.C. Motors are very heavy. We realized that maybe our mounts are thin and there are some stress points, so we thickened the existing mounts (in the model) and hopefully this would work. Although if unfortunately, it fails, for that we had designed a Legendary Mount (model is in insight-3). The good thing (only good thing) about it is that it is completely made up of metal, but doesn't require CNC cutting (which was another issue, one can imagine a lot of things but 3D printing might be weak and getting everything we imagine into metallic parts isn't possible for us, because we're not engineering students and our workshop takes a GREAT load of time for small things).

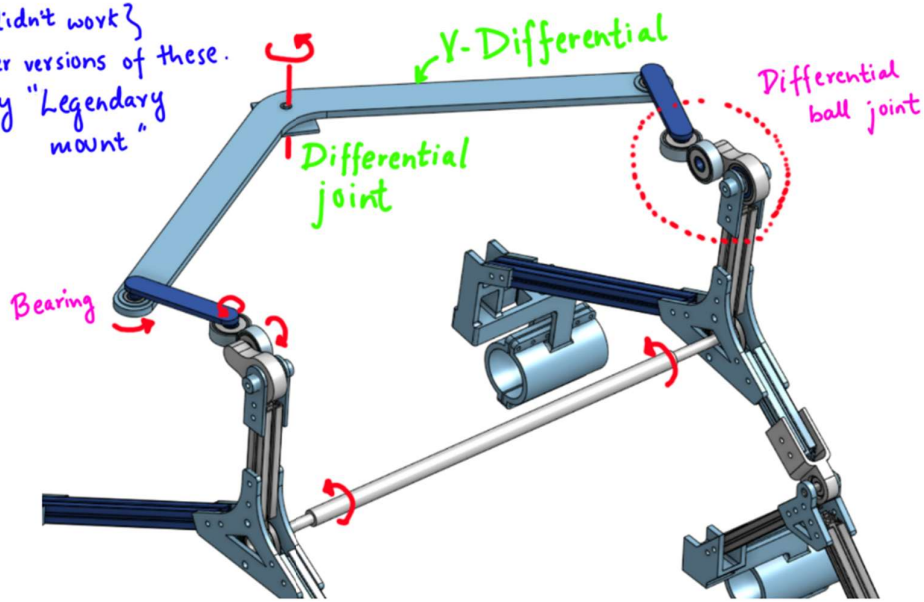
Navigating the model: About the naming of the documents, i.e. insight 1,2,3. It might seem like a mess at first but it was necessary. Onshape is a website where if you make changes in an assembly which is used in some bigger assembly, then the changes are implemented everywhere. It was obvious but without experience when we were making subtle changes in the smaller assemblies which were use in the main complete assembly, the main assembly became a complete mess somehow.

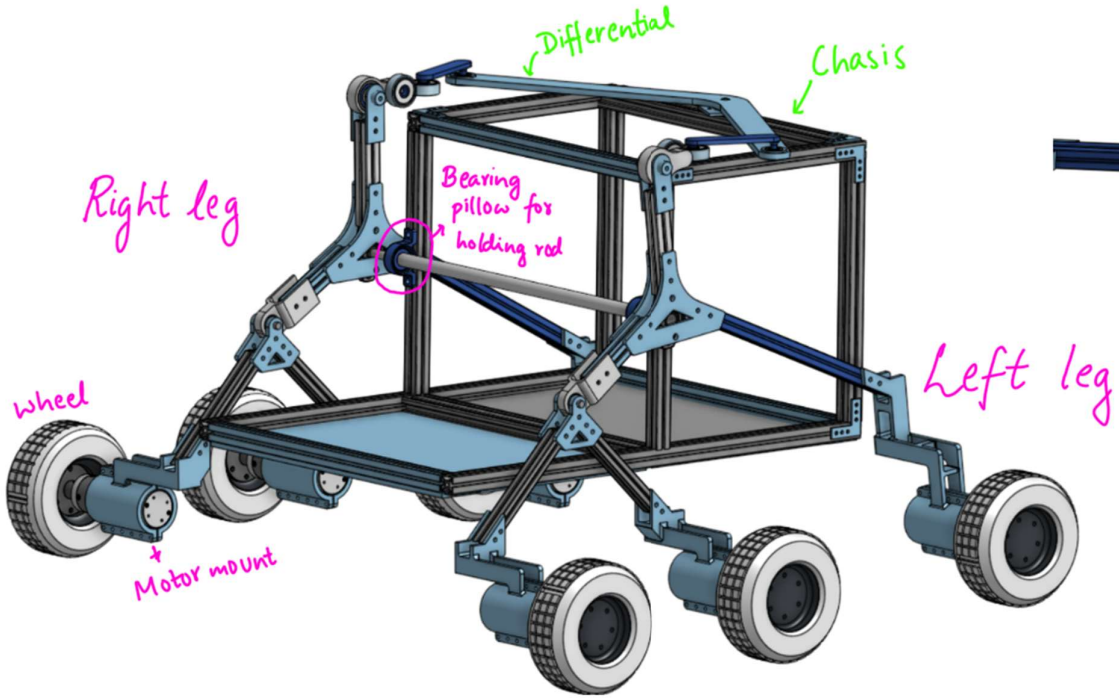
Moreover, the whole document needed cleaning and it was not possible to do without insight 2. At present, insight 2 is the most meaningful thing I believe because it doesn't have a lot of extra stuff. After the motor mounts broke, I made insight 3 to design new mounts but it was important to not do anything to insight 2. We didn't delete the first insight because it's like a trashcan where you might find gold (once we found a gold in rtc shelf which was supposed to have random trash, now it is the arm's base). In summary, Insight 2 is main, insight 3 is one with legendary mounts and Insight 1 is trashcan. There are respective folders and files prepared as per how we found it suitable. To navigate to a part or subassembly, right click on it in the bigger assembly and search for the option which you want.

PS: Everything is before your eyes. All you need to do is find it. If can't, then google it, because there's quite a good number of ways to get your work done quickly in Onshape.



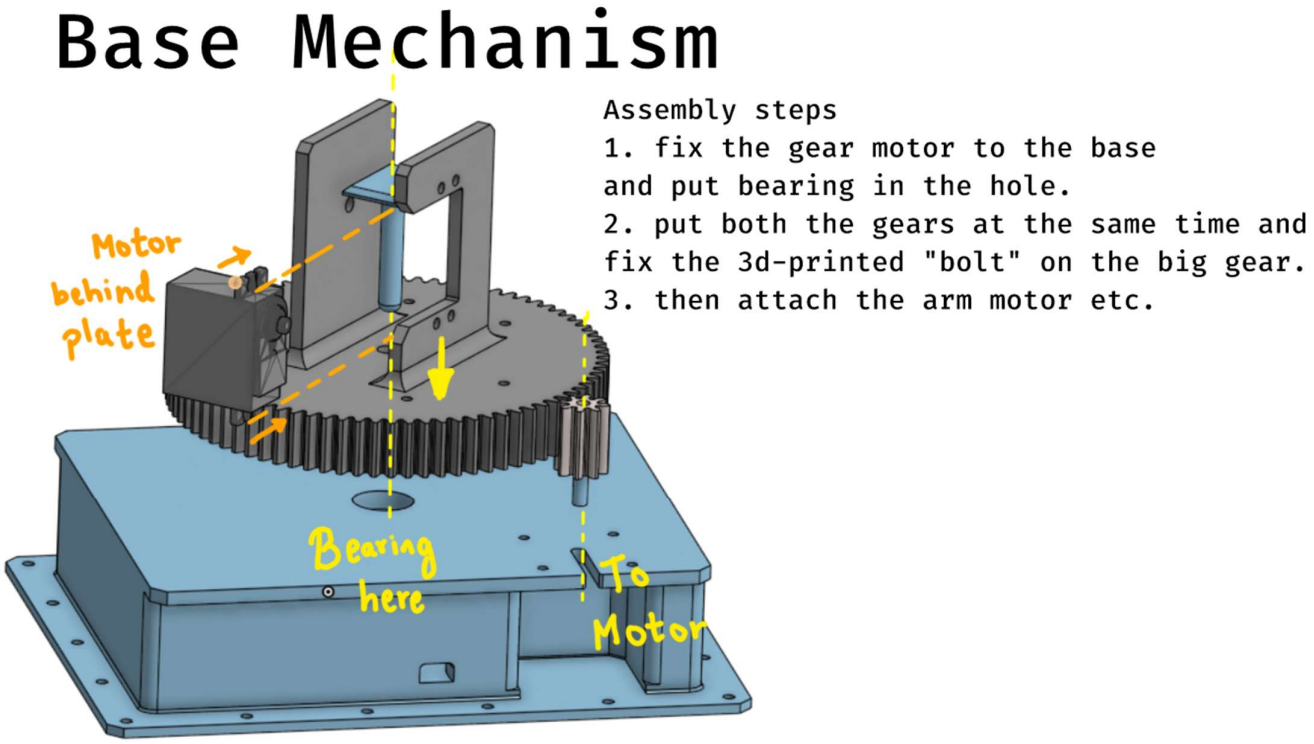
(Ex) Motor mount {didn't work}
- first try using thicker versions of these.
- if it doesn't work, try "Legendary mount"





Rover Body

ARM DESIGN



The Arm itself, despite some flaws is in working conditions.

If you are planning to make changes, or design something completely new, I suggest first rectify the motor-bearing axis issue on the second arm (you will need to print another, just make sure they are coaxial {motors axis is a little tricky}).

After that device some new Gripper Mechanism. The current model is not that bad, but it feels a little bulky and brittle. Come up with a smaller design (keep in mind the pickup objective).

The gear ratio used generates sufficient torque to move the arm. Don’t bother designing new (too much calculations and constraints now that the rest of the rover is made). In case the gear wears down print the one from OnShape.

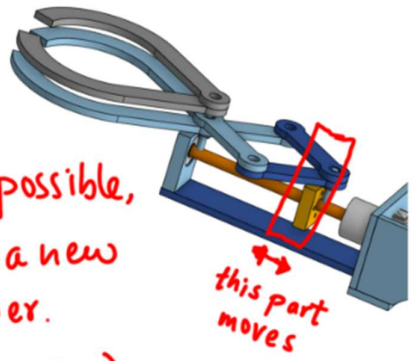
in the actual model,

assembled like this

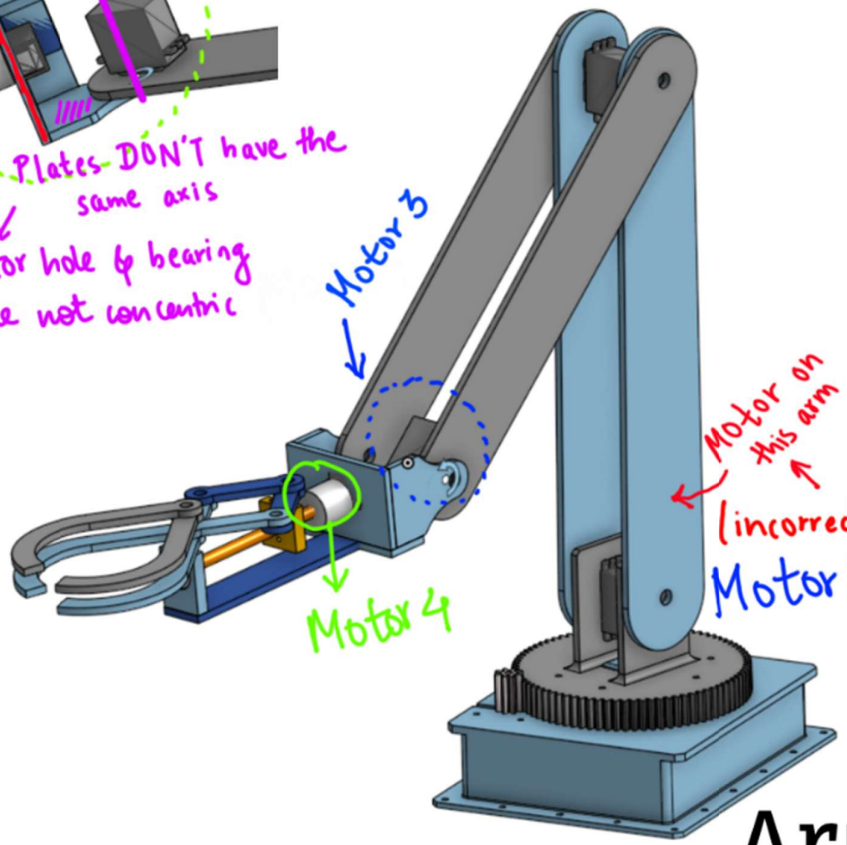
not coaxial

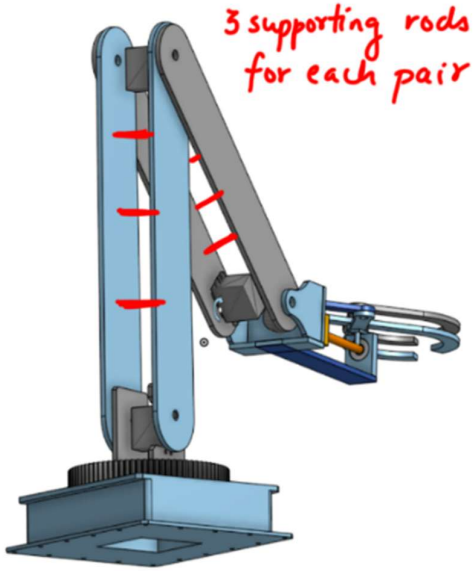
Plates DON'T have the same axis

the motor hole & bearing hole are not concentric



* If possible, make a new gripper. (less bulky)





• All motors are in alternate order

Arm Assembly