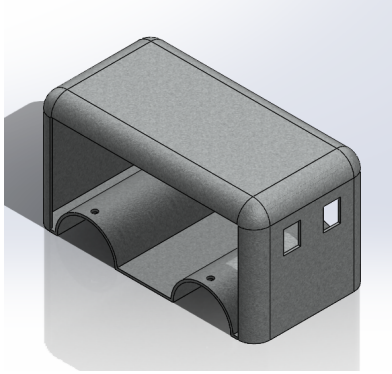
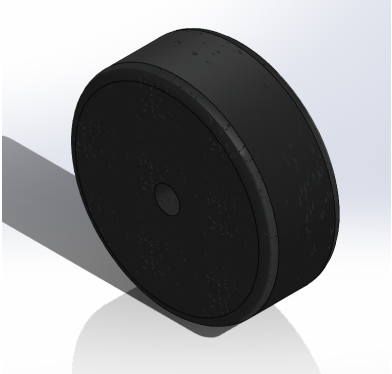
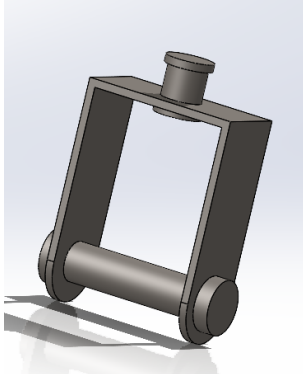


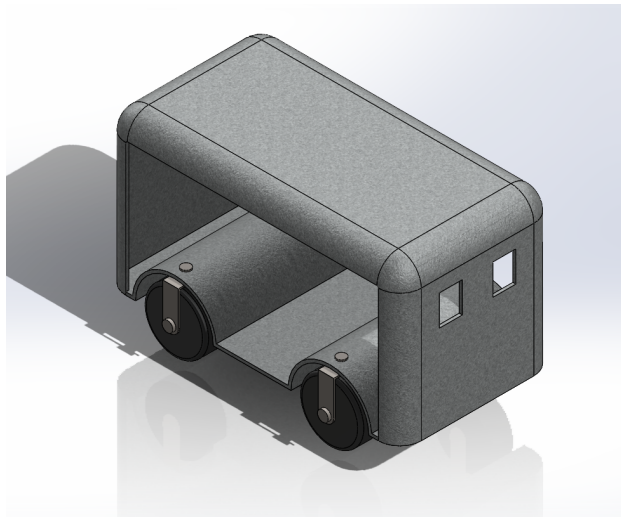
Project 1 Report
ENPM 662 - Introduction to Robot Modelling
Kshitij Karnawat - UID: 119188651

CAD Modelling

Parts

Car Body	Wheels	Axle Sub-Assembly
		
The car body was inspired from that of an autorickshaw and was made using the extrude and extruded cut tools	The wheels are driven in the rear and the front wheels provide the steering	A C type hub was designed so that the front wheels are free to rotate and are not obstructed. The tyre pin makes sure that the wheel is in place

Assembly

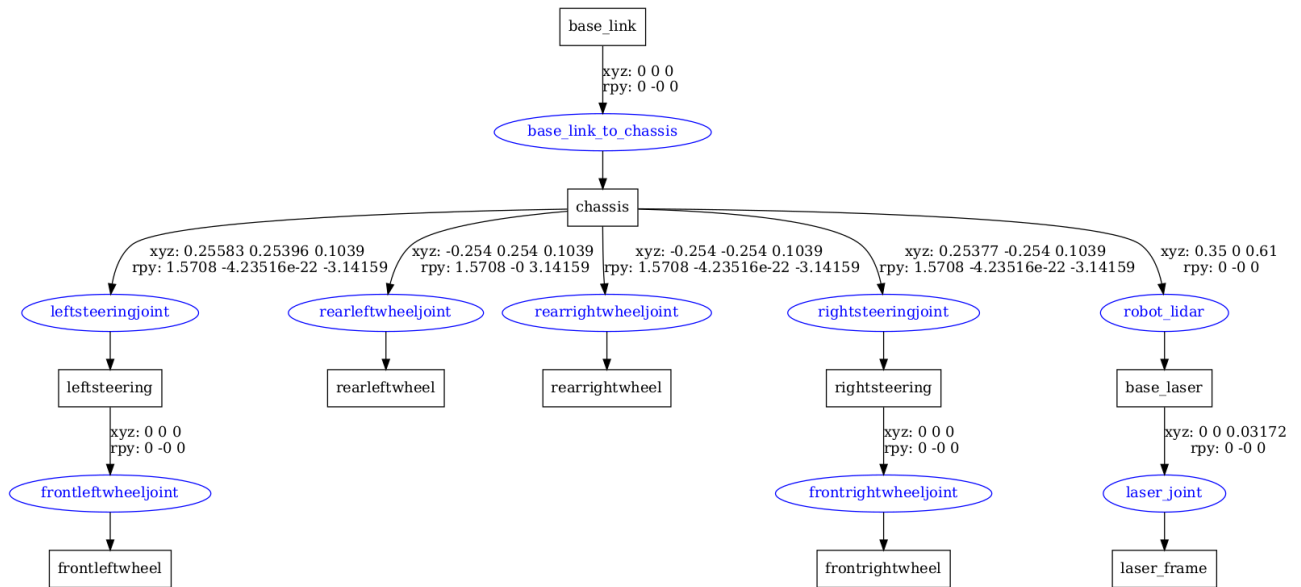


The assembly had concentric mates for aligning the axle with chassis, and wheels with the axle. Each part in the assembly was then given a coordinate frame which defined the points for the URDF file. Using the SW2URDF exporter the joints and links were defined and exported. The exported URDF was then checked using the `check_urdf <filename>` command in the terminal.

URDF

After exporting the transmission and joint controllers were added to the URDF file. These transmission and controllers help in operating the robot using teleop. The joints limits, effort and

velocities were set and the robot was spawned in the Gazebo environment. A xacro integration file was created to integrate the robot and the LIDAR URDFs.



Problems Faced

1. The first iteration did not have the coordinate frames defined due to which the robot would break as soon as it would spawn in the Gazebo environment.

ROS

Teleop

The teleop template file was downloaded and modified. The required publishers were added and few modifications were made to the key bindings as our robot was driving in the reverse direction when a forward command was given.

Publisher Subscriber

A simple publisher was coded which published the linear velocity and angular displacement for steering to the robot. This was also displayed on the terminal. A separate subscriber was coded which subscribed to the same publisher and displayed the values on the terminal.

RViz

The data from the LIDAR sensor added to the robot was to be visualized in RViz. For this after launching the gazebo environment RViz was launched in a separate terminal. The laser_scan topic and robot model were added in RViz for visualization.

Problems Faced

1. The robot would not turn whereas the forward and backward commands were working properly. After checking the URDF file changes were made to the limits, effort and velocity parameters of the steering joints to resolve the problem.

Members contributed equally in all aspects of the project. My contributions were majorly in the development of the publisher subscriber, teleop, & RViz. I also contributed in modifying URDF.