MECH 2401 – Engineering Graphics & CAD Modelling

Final Project

Lab 05 - Group 01

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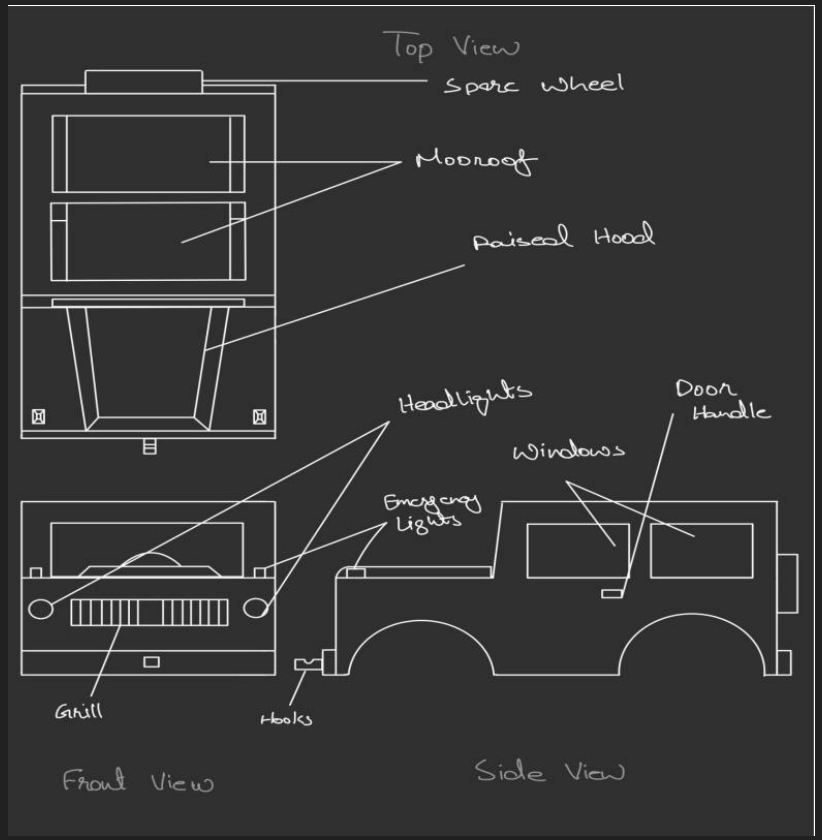
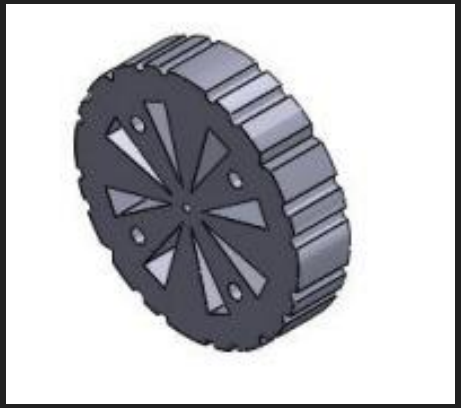
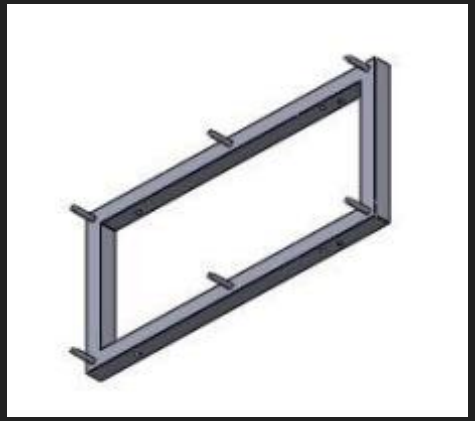
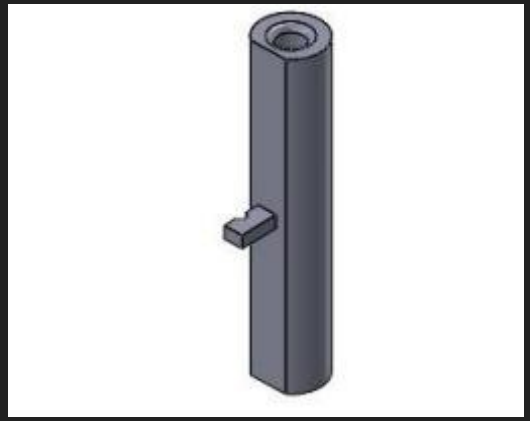
Initial Design / Sketches







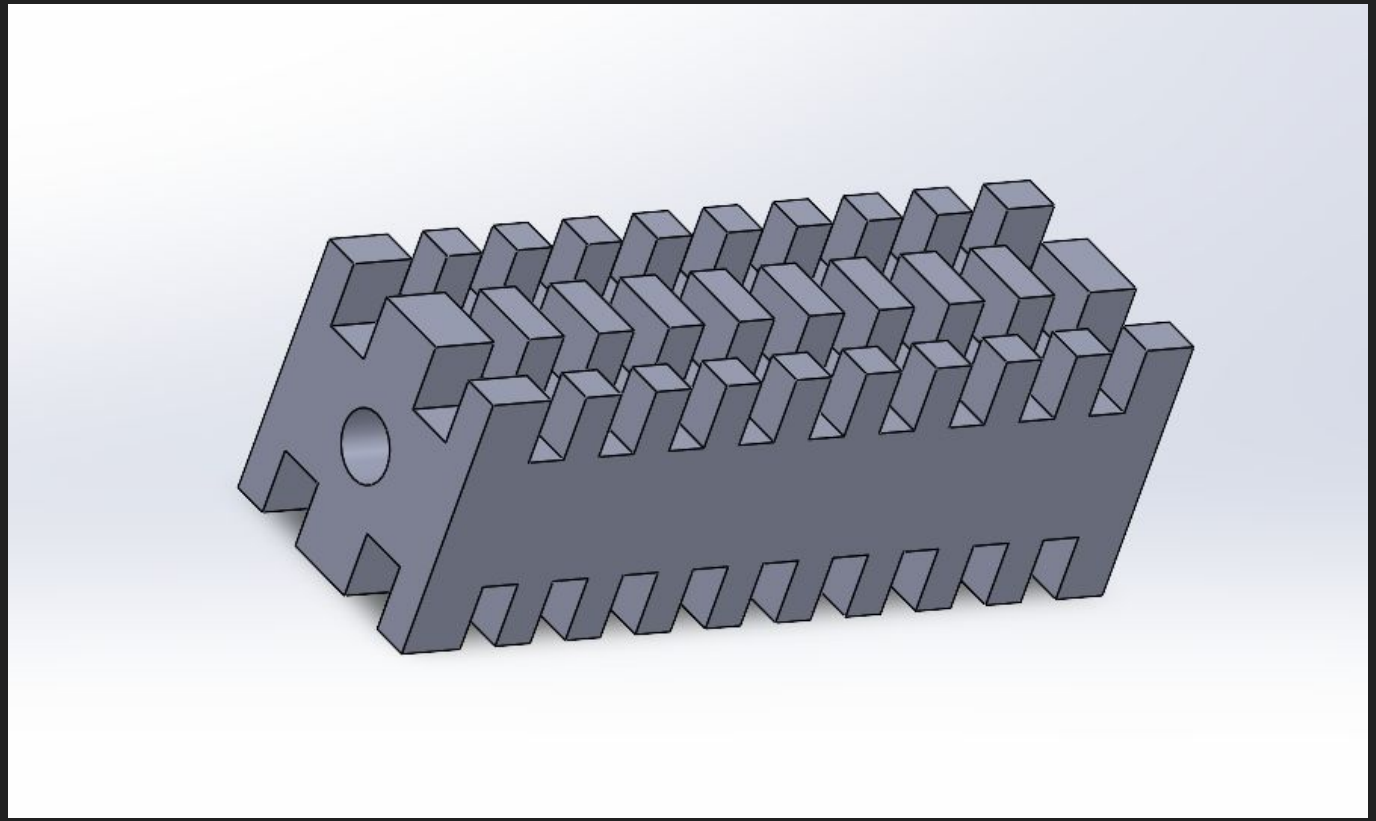


Fundamental Design Shortcoming

Initially, the design may not have accounted for precise fitting, but adjustments were made to ensure functionality. For example:-

- The tire hook was too fragile and small in size to fit on the rear axle.So we designed a new cuboidal tire hook.
- The body holders on the chassis were too thin which made them fragile. So,we made the body holders on the chassis more thick and shorter in height so that they won't break easily.
- Due to the material used in 3D printers, the tires used to slip on the floor.So we wrapped two rubber bands each on the rear tires in order to achieve the grip we needed.

New tire hook



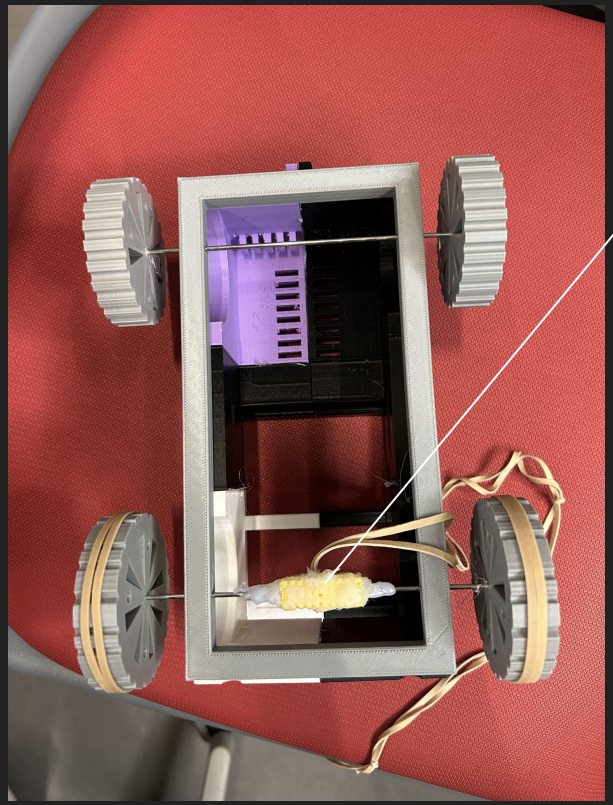
Accuracy and Tolerance of Parts

- Despite the initial size discrepancies between designed and printed parts, adaptations were made. We designed a new tire hook for the rear axle and made the body holders on the chassis more thick and shorter in height to make them sturdy enough to not break easily.

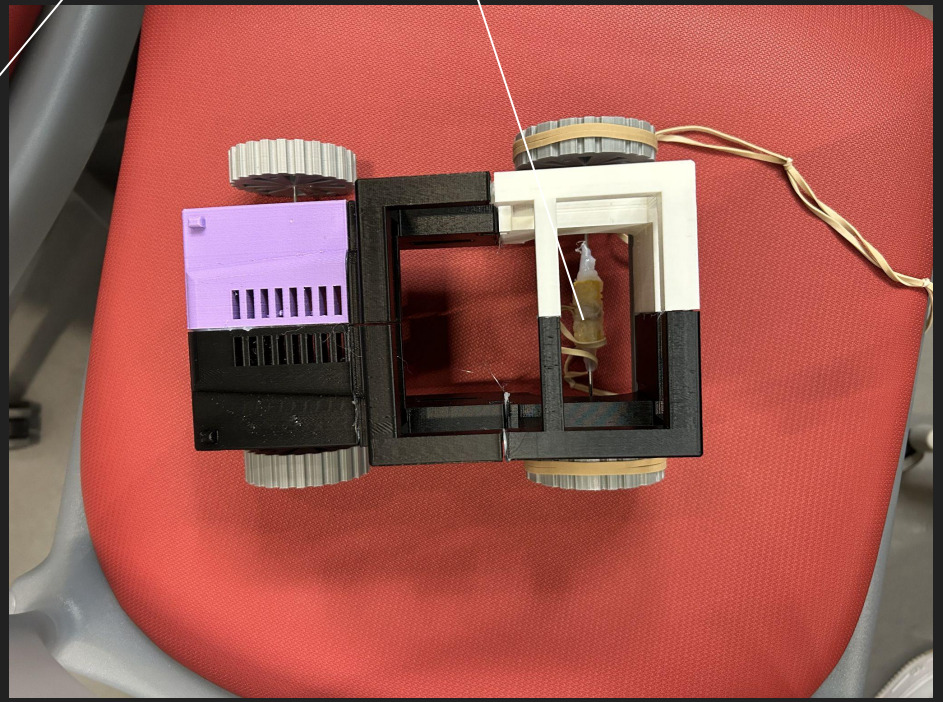
- There was another minor issue with tire hook, the extruded hole in the center wouldn’t come out perfect due to printing errors.The issue was resolved using glue on the hook and the axle, demonstrating a practical solution to fitment problems.

- The process of printing multiple parts in various sizes eventually led to finding parts that fit better.

"Visual Representation of Identified Issues for Enhanced Understanding"



Tire hook glued to the axle, to get a tight fit on the axle



Fabrication Approach

- The initial challenges with 3D printing tolerance were overcome through repeated trials and adaptations.

- Initially the 3D printer at sandbox was not functioning properly, hence it was really difficult to obtain accurately printed and sturdy components. However after several attempts at printing, the team successfully gathered desired and functioning parts.

- Due to some last minute mishandling by the guru’s at sandbox, the team was not able to acquire printed models of the tyre stoppers final design. Despite the issue with the missing tyre stoppers, the team managed to work around this setback and make the car function properly.

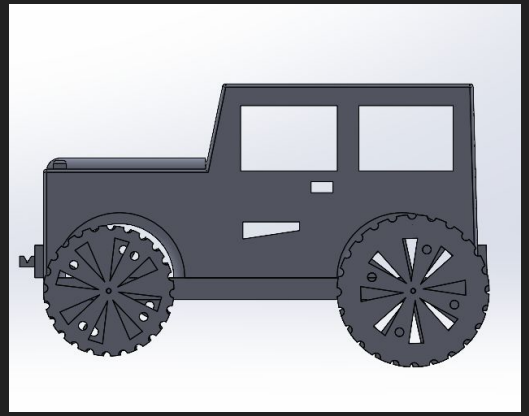
Final Outcome

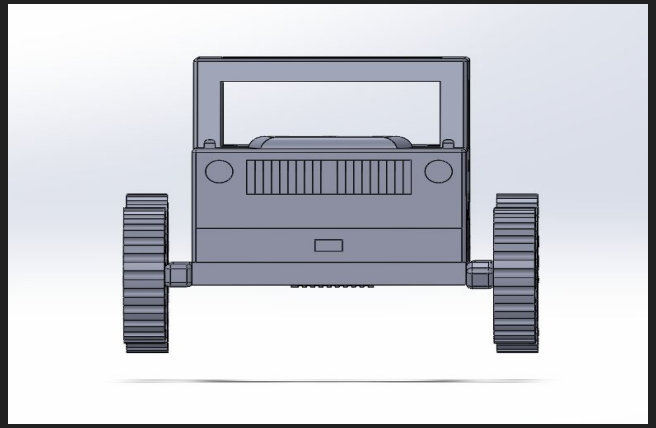
- Despite these challenges, the final rubber band car functioned well.

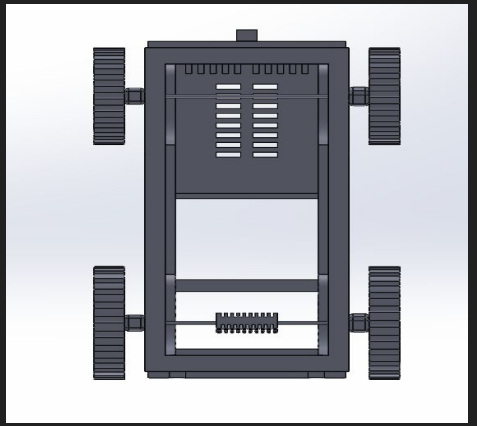
- The issues encountered during the design and fabrication process were successfully addressed and resolved.

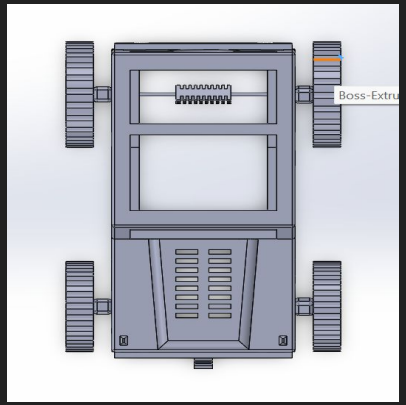
- The addition of rubber bands over the wheels and proper use of adhesives significantly improved the car's performance, leading to a successful final project.

Final CAD design

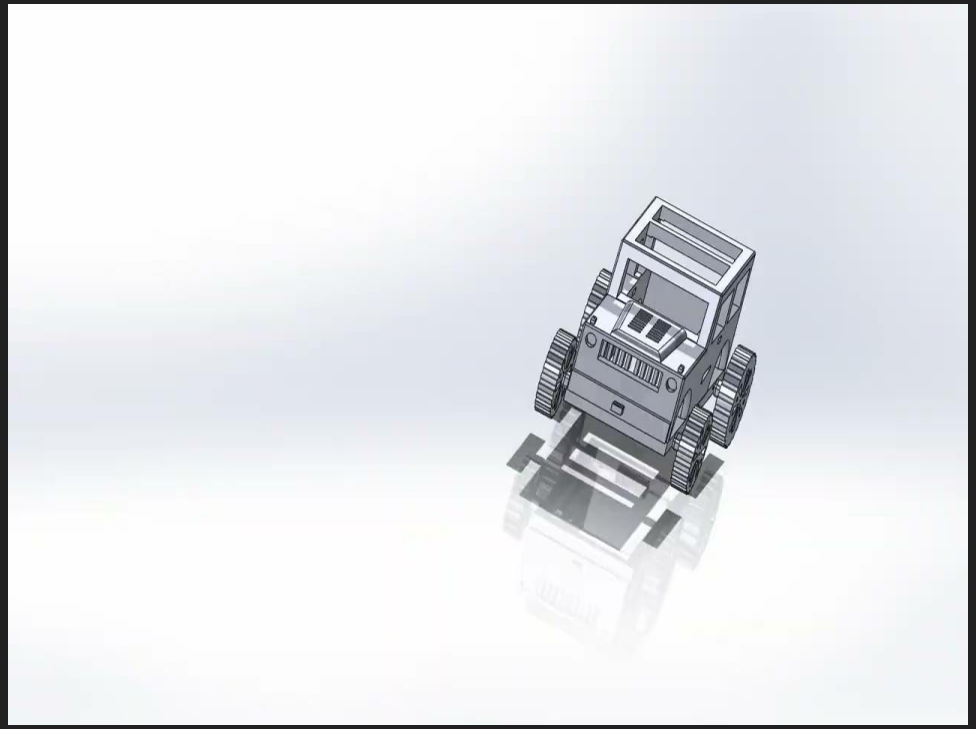








"Video Demonstration: Disassembly and Reassembly Process"



"Assessment and Evaluation of the Completed Project"