MIT | Academy of Engineering

[An Autonomous Institute affiliated to Savitribai Phule Pune University]

# Module
# Hardware Prototyping

Second year bachelor of technology

Mechanical Engineering

School of mechanical and civil engineering

# U-Turn Indicator

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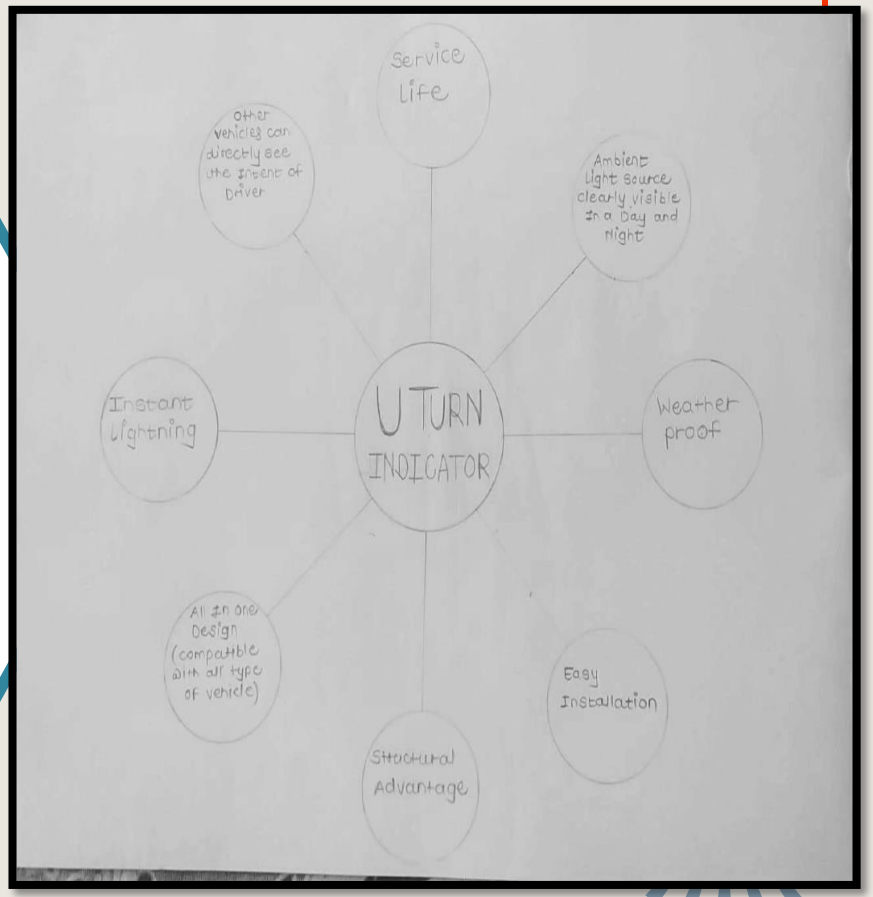
# Introduction

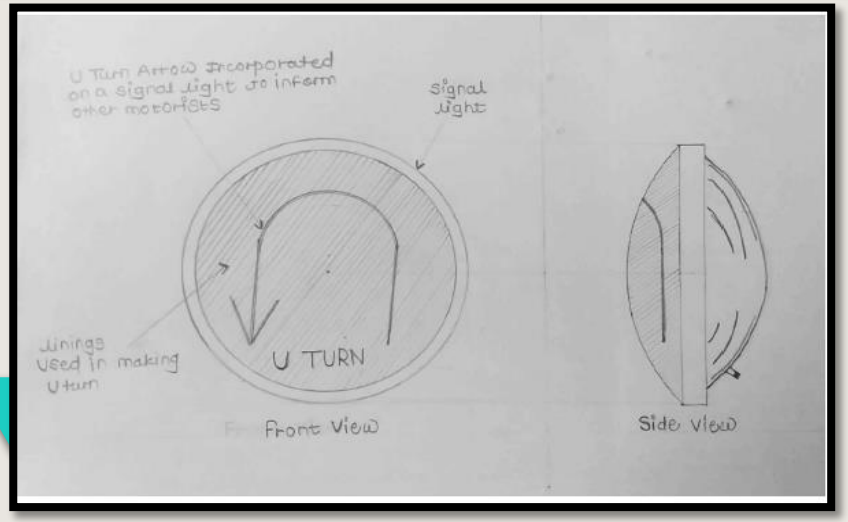
- This Project relates generally to motor vehicle Signaling devices and, more specifically to a signal light for vehicles having a U-turn Symbol incorporated on a signal light to inform other motorists of the vehicle's intent.
- The Signal is used when making a U-turn and is located on the driver's side front and rear of the vehicle and/or rear windshield of the vehicle.
- The device is activated by the vehicle's operator by means of a Switch that is located on the dashboard of Said vehicle.
- •U-turn vehicle, can clearly See the intent of the driver, avoiding what could be a potential accident.
- The U-turn light is located on the vehicle in conjunction with turn signal lights and headlights.
- The Signal light comprises an ambient light Source Visible during day light and night hours.

# Concept Description Sheet (CDS)

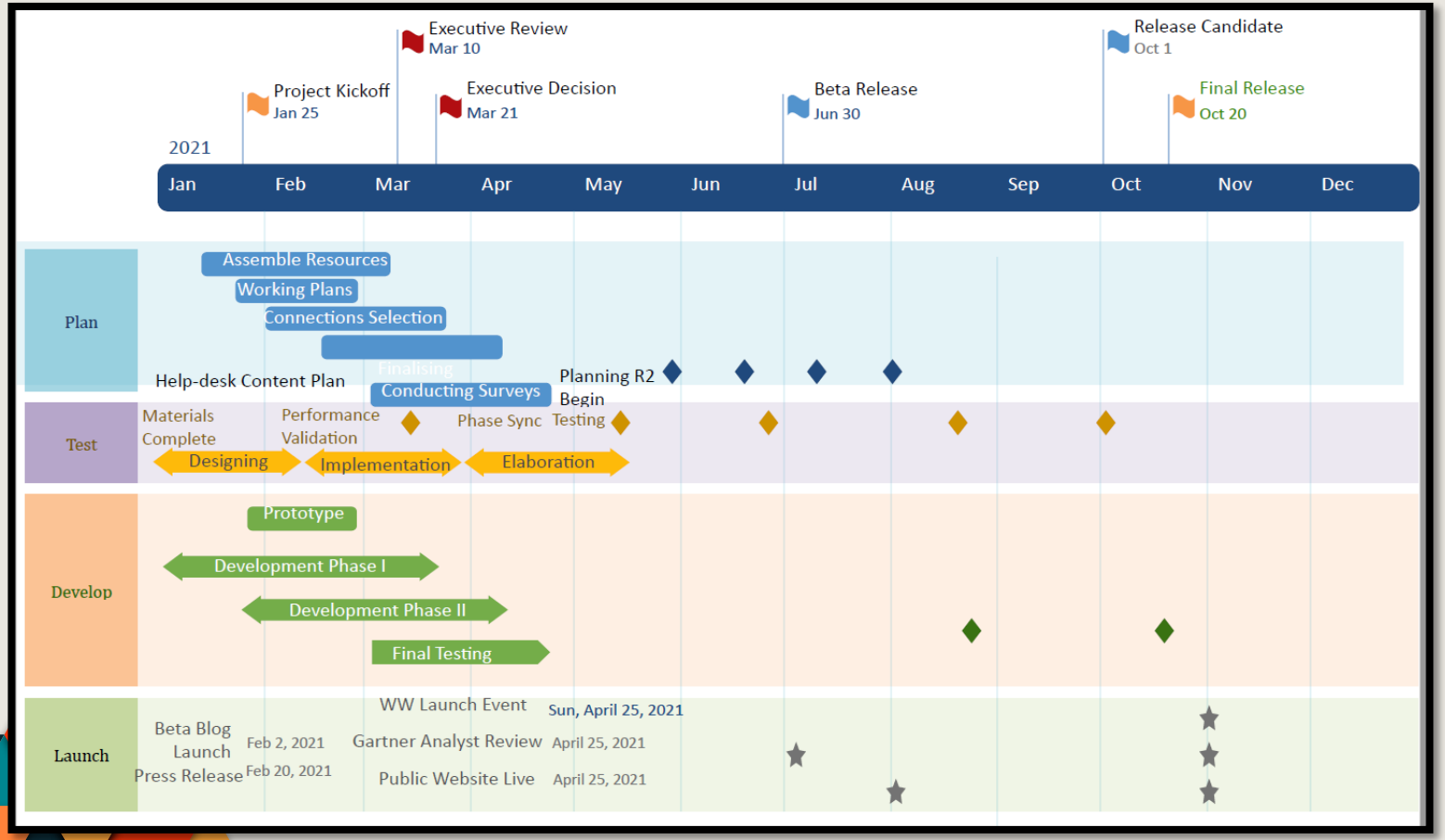
This Project relates generally to motor vehicle Signaling devices and, more specifically to a signal light for vehicles having a U-turn Symbol incorporated on a signal light to inform other motorists of the vehicle's intent. • The Signal is used when making a U-turn and is located on the driver's side front and rear of the vehicle and/or rear windshield of the vehicle. • The device is activated by the vehicle's operator by means of a Switch that is located on the dashboard of Said vehicle. • U-turn vehicle, can clearly See the intent of the driver, avoiding what could be a potential accident. • The U-turn light is located on the vehicle in conjunction with turn signal lights and headlights. • The Signal light comprises an ambient light Source Visible during day light and night hours.



# Conceptual Drawing

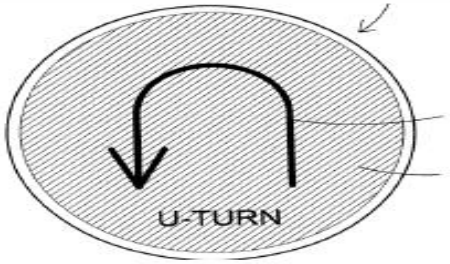
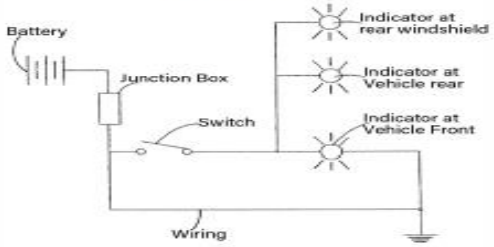
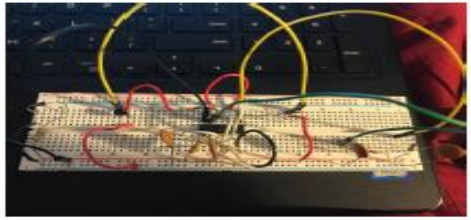
# Product description plan

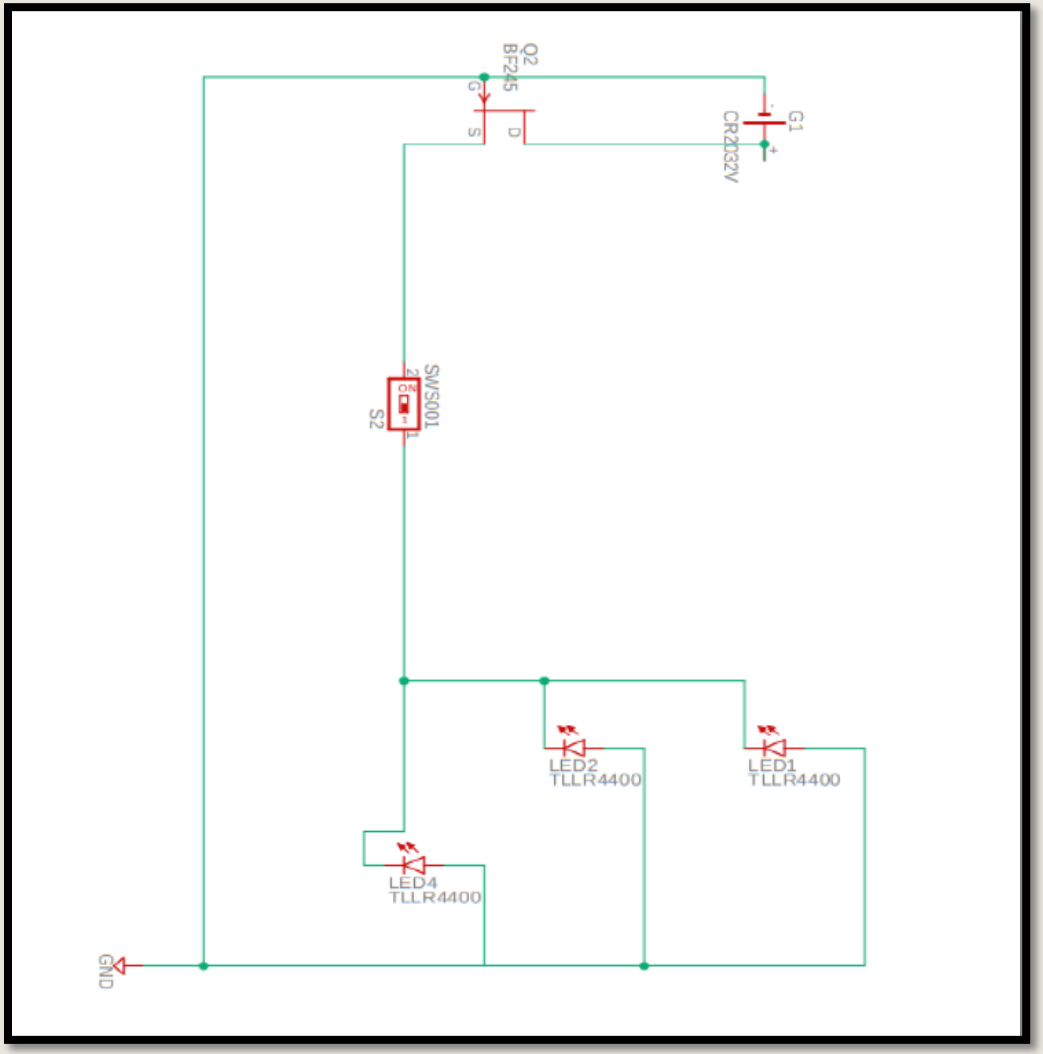


# Requirement Analysis

| No | Requirement | Description |
|---|---|---|
| **Electronics Hardware Requirements** | | |
| 1. | Electronic Components | For Micro-Controller units and Indication |
| 2. | PCB | For Compressing space |
| **Software Requirements** | | |
| 1. | PCB Design | Solidworks, other Software |
| 2. | Simulation | TinkerCAD |
| **Mechanical Requirements** | | |
| 1. | Nuts & Bolts | For fixing |
| **Enclosure Requirements** | | |
| 1. | Plastic | For Casing |
| **Service/Maintenance Requirements** | | |
| 1. | Sensors | If some failure occur then need to change |
| 2. | Lights | If some damage happens then need to change |

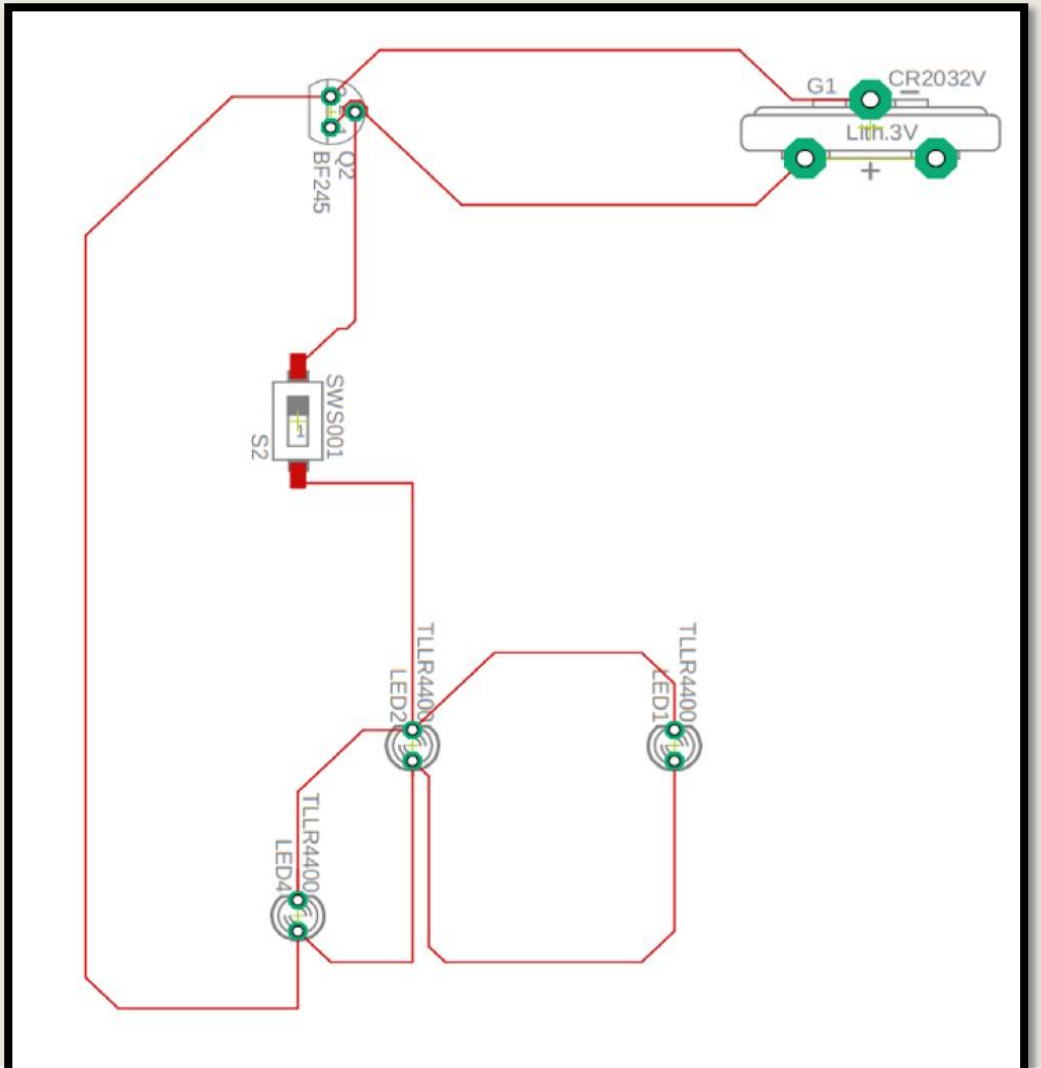
# Technical Specification

| FEATURES | |
|---|---|
| • Reliable<br>• Both Front and Back side will send indication to surrounding while U- Turning |  |
| **INPUT SPECIFICATIONS** | |
| Voltage | 12.6 V |
| Current | 6-7 amps |
| **OUTPUT SPECIFICATIONS** | |
| Power Consumption | Uses Battery |
| LED | For showing the sign on the display |
| **GENERAL SPECIFICATIONS** | |
| Operating Temp | Normal |
| Dimensions | 300 - 400 mm |
| Color | Black (U - Turn sign -Red) |
| Weight | 300 -350 gm |
| **DRAWINGS** | **CONNECTION DIAGRAM** |
|  |  |




# PCB SCHEMATICS

https://drive.google.com/drive/folders/1PtKSjG3DnrbSRBxXeJpkrSfdMUZwAXES?usp=sharing




# PCB Track layout

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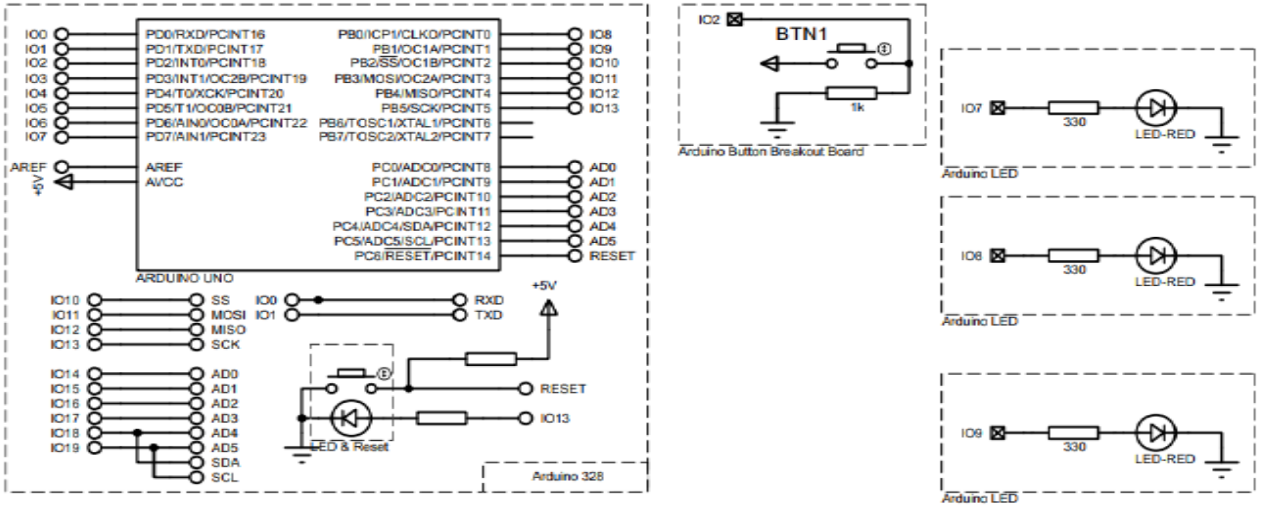
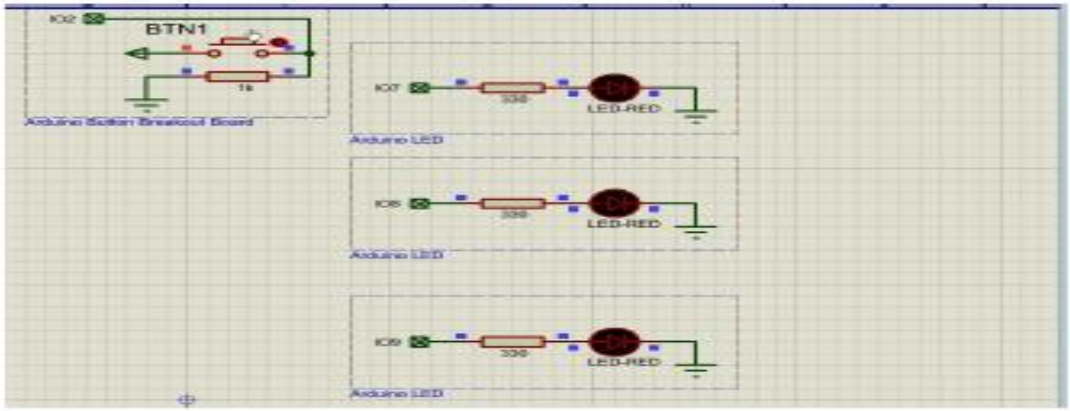
# Circuit Diagram



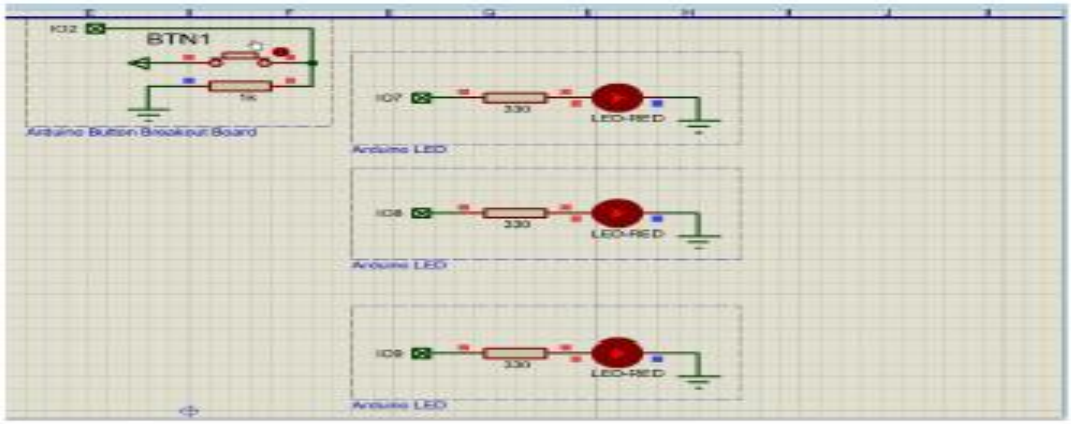

| | | | |
|---|---|---|---|
| FILE NAME: | DP Hardware Proto.pdsprj | DATE: | 21-04-2021 |
| DESIGN TITLE: | DP Hardware Proto.pdsprj | PAGE: | 1 OF 1 |
| PATH: | C:\Users\Amey Vaikar\Desktop\Proteus files\DP Hardware Proto. | | |
| BY: | @AUTHOR | REV: | @REV |
| | | TIME: | 14:51:16 |

## 2. Simulation Result

**a. U Turn Button is Off (Normal State):**
Led used as Indicator are not blowing.



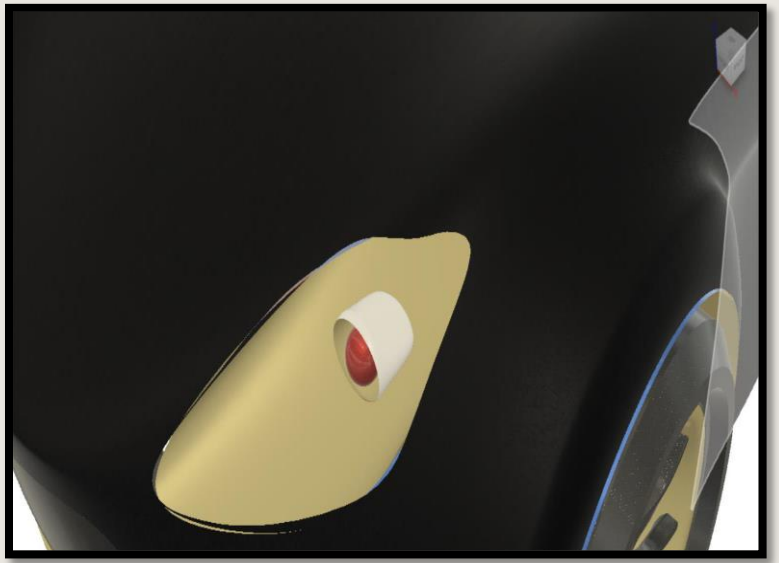

**b. U Turn Button is On (Completely pressed):**
Led are blowing.

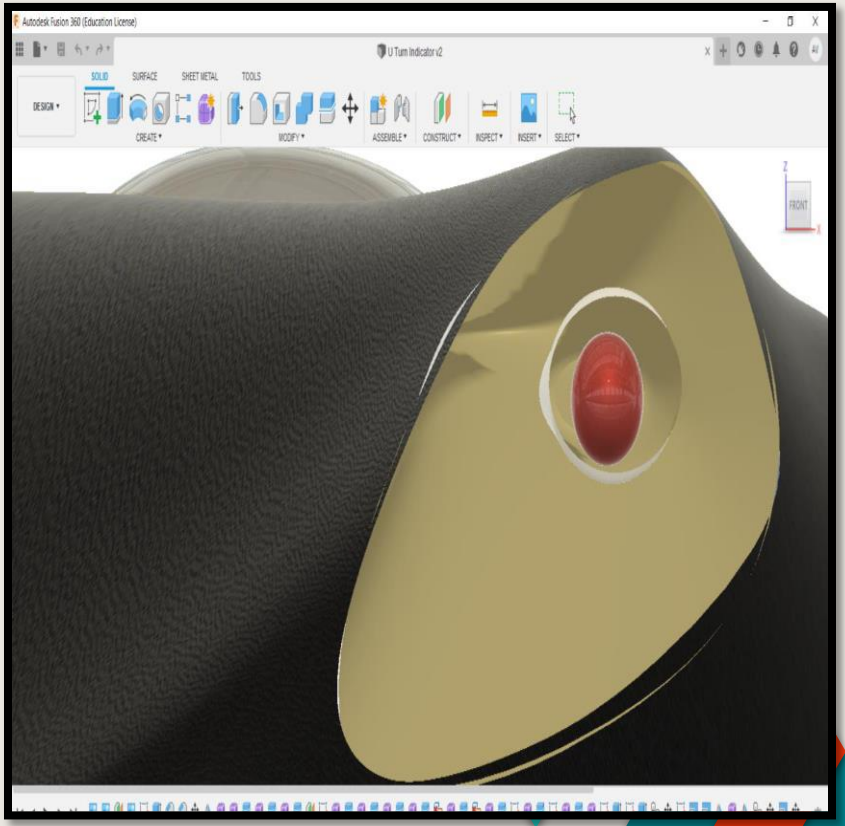



# Circuit Simulation

https://drive.google.com/file/d/1rvq4guTw3hrg4tvXdW3vUxvERd94bGz2/view?usp=sharing

# Enclosure/Cabinet Design

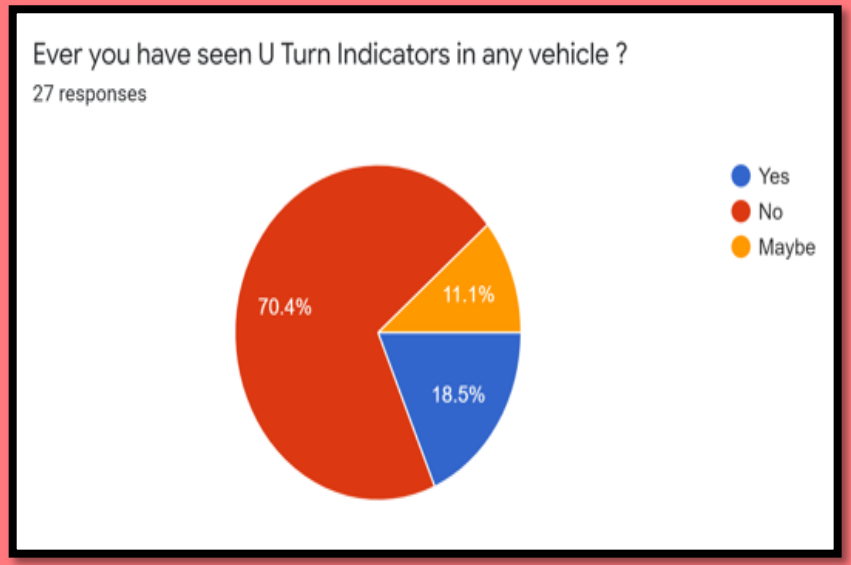





## Cabinet Technical Information

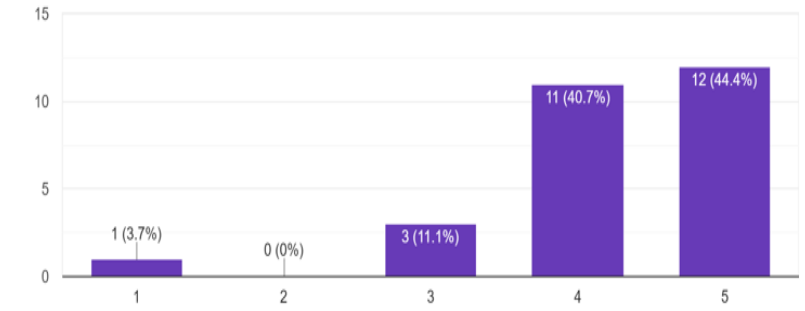
| No | Item | Details | | |
|---|---|---|---|---|
| 1. | Dimensions: | Length | Width | Height |
| | [ L X W X H ] MM | 150 | 100 | 80 |
| | | | | |
| | | | | |
| 2. | Material Selected | ABS, Polycarbonate | | |
| | | | | |
| | | | | |
| 3. | Name of software/app used | Fusion 360 | | |
| | Version | | | |
| | | | | |
| | | | | |

# Customer feedback analysis



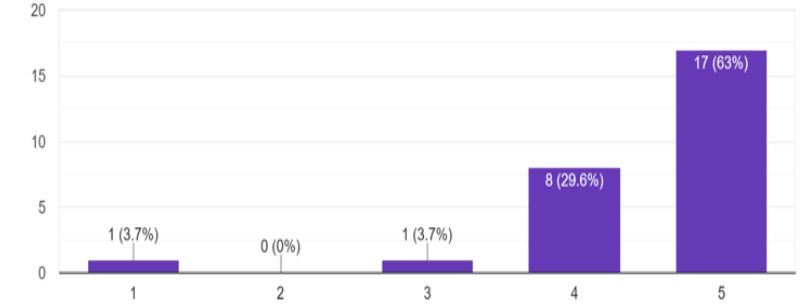
You have installed U Turn Indicators please tell us how you are convinced with features of the Product?

27 responses



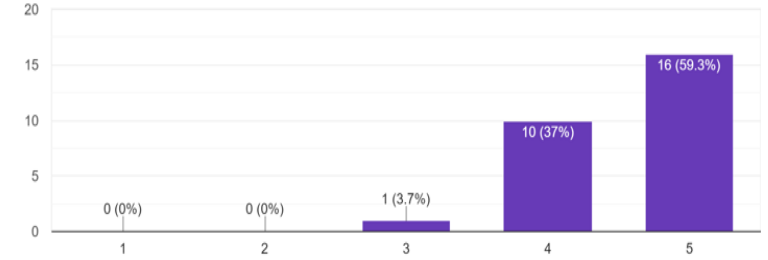

According to your experience with this product, how would you like to recommend this to someone ?

27 responses



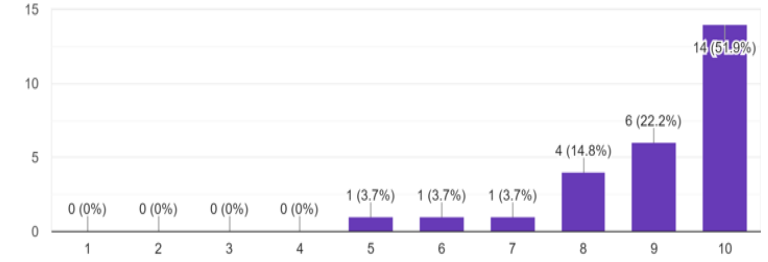

Can you please tell us how is the quality of material used in it ?

27 responses



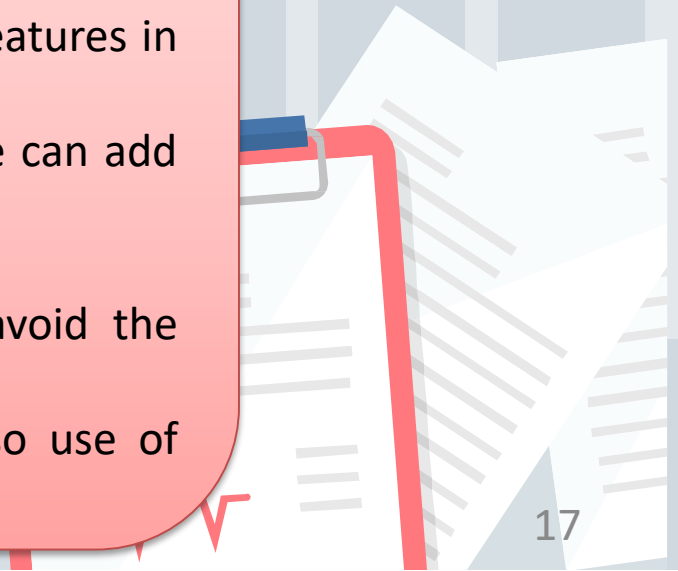

Please Give Us rating for your overall satisfaction of the product.

27 responses



# Improvements From Analysis

- After our product analysis, what we get to know is that our product is definitely worth the cost and meets the expectation of what a U-Turn Indicator is supposed to do (warn others that driver is going to take U-Turn).
- But some responses also had suggestions stating that our product would have been better if there were more features in it.
- So in our U-Turn Indicator, the other features that we can add are-
- Wide and long range of light.
- Best material for glass protection for the light to avoid the damage.
- Easy on/off button below the parking light button so use of proper space in the dashboard of car.



# Conclusion

Engineering is the branch where we apply the laws of science and nature to the real life and solve the problems and using the prototype system, we can provide the working model of the product even before building it. And this prototype project helped us to sufficiently complete the design and build the phases of the product.

By conducting survey on the electronics related problems. We came across the problems of customers and then we solved it using our knowledge and creativity and also with the guidance of mentor and by gaining some information through references.

The main aim is to make the product affordable and user friendly and also is to increase the technical knowledge and solve the customer problems so that it applies our knowledge to the real-world problems.

# THANK YOU!