



# KRITI'25

## Rain Rain Go Away

Organizer :  
Electronics Club



High Prep  
| 600 Pts

# Rain Rain Go Away 600 Points

Start : 10/01

End : 31/01

## OBJECTIVE

Design and implement an **automated rain-detection and wiper control mechanism** that:

1. Activates wiper rotation (0-180°) upon rain detection.
2. Offers and displays **4 discrete controllable speed levels**.

## SPECIFICATIONS

The automated wiper control system should activate a wiper that moves periodically in a **0° to 180° semicircle** upon detecting rain. The mechanism should support **four discrete speed levels**. The speed should be displayed on 4 LEDs i.e, the third highest speed should glow 3 out of the 4 LEDs. The four speed levels should be **roughly** quarter, half, three quarters of the maximum speed and the maximum speed.

## INPUT METHODS

There are two options to control the speed of the wiper. One can choose only one of the two methods listed below. However they carry different weightage as specified in the marking scheme below.

1. **METHOD-1: Wirelessly** control the speeds of the wiper. The wiper should switch on only if rain is detected, but need not change the speed based on the amount present on the **custom made Rain Sensor**. The rain sensor should be a **binary on/off** type sensor. It should have two probes, one should be at **GROUND** and the other one is at the sensing interface.

**2. METHOD-2:** Control the Speed based on the **amount of rain** received using the existing available Raindrop Detection Sensor Modules.

## **BONUS ADD-ONS**

To enhance functionality, one can add bonus features for more points.

1. A **wireless braking mechanism** should be included, allowing users to stop the wiper. Irrespective of the input method chosen, Teams may use Wireless means to achieve braking.
  
2. To make the speed display more intuitive, the 4 LEDs should be arranged in a **semicircular dashboard** including a needle (apart from the wiper) mimicking a speedometer. The needle must point to the LED corresponding to the **current speed** level. The needle should be able to move from any position to any other position, depending upon the input signal. Eg : L1 to L2, L2 to L4, L3 to L1 etc.

## **EVALUATION OF DESIGN APPROACHES**

1. Choice of **ALL** circuit components is **open ended**, subject to evaluation scheme mentioned below.
  
2. If a task has a maximum score of X points, then leveraging the microcontroller to achieve the desired results, a penalty of  $3X/4$  points is imposed. So the team gets  $X/4$  points for that task.

3. Similarly if NE555 or similar ICs are used, a penalty of X/4 points is imposed. So the team gets  $3X/4$  Points for that task.
4. Implementing using discrete analog/digital ICs fetches the maximum X points for that task.

### **MARKING SCHEME (Total: 600 Points)**

- **INPUT MARKING SCHEME (Max : 250 Points)**

Input “METHOD-1” : 150 Points

Implementing the binary rain sensor : 75 points

Implementing the speed control using wireless means: 75 points

Input “METHOD-2” : 250 Points

Implementing wiper speed control using signal from the rain sensor module : 250 points

- **WIPER MOTION CONTROL (Max 100 Points)**

Smooth and periodic motion of the wiper in a  $0^\circ$  to  $180^\circ$  semicircle : 100 Points

- **LED Indicators for Speed Levels (200 Points)**

Clear and accurate indication of speed level through LEDs: 50 Points

Proper arrangement of LEDs in a semicircular dashboard with a dynamic needle pointing to the current level (**No penalty for using microcontroller for this task**) : 150 Points

- **Wireless Braking Mechanism (50 Points)**

## **PENALTIES**

- The circuit Schematic and block diagrams of the system designed along with code being used on the microcontroller {if any} need to be submitted. There will be a penalty of 50 points if this is missing.
- **Direct Control of Speed Indicator LEDs : -50 Points**  
If the speed indicator LEDs are directly controlled via input signals instead of the actual wiper speed, a penalty is imposed. The speed should be controlled based on the current wiper speed.
- **Manual Controlling of speed levels : -100 Points**  
If the team chooses Method-1 as the input method and manually control speed instead of wireless control, then 100 points are deducted from the maximum 150 points.

## **WHO CAN PARTICIPATE?**

- a) The team should consist of **8 members**.
- b) A minimum of **3 freshers** should be a part of the team.
- c) A maximum of **4 people** can enter the arena from a given team.
- d) Only one team is allowed to participate from each hostel.
- e) The Core Team Members of Electronics Club cannot participate in this Problem Statement.

For any violations of rules regarding participation, 50% of the total points of this PS (i.e. 300 points) will be subtracted from total points of the hostel