Electromania-II

Points: 40
Event Type: Medium Prep Team Event

IR MANIA

Preamble:

Have you ever wondered how your motion is sensed when you travel through automatic entrance gates in malls? Or how the automatic hand dryer installed in washroom senses your hand and turns off after you remove your hand from it?

These devices make use of infrared sensors and a microcontroller. To give you a feel of the same, the problem statement of Electromania stage 2 focuses on applications built using the IR sensor and microcontroller.

Team Structure:

- **Only** the teams who cleared Electromania stage-I would be allowed.
- Two teams of the same pool **can be merged** (every member of the newly formed team must have cleared the round 1 from some team). After merging, the stage-1 score for the team would be **max** of the two teams that are merged.
- Maximum **5 members** are allowed per team.

Problem statements:

1) **Toggle switch using IR**: The state of the LED should switch from "ON" to "OFF and vice versa when an obstacle is placed and removed from between the receiver transmitter pair. The state should not change and retain its previous state until the obstacle remains between the receiver transmitter pair.

2) **People counter using IR**: Implement an up and down counter for keeping a count of the number of people entering or leaving a room.

3) **Card reader using IR**: A card has a specific pattern of holes. Identify this pattern by swiping the card through a card reader made of IR sensors.
   You have to make the card of 8X1 shape with some random code. The card reader should be designed such that the pattern is read in just 1 swipe across the reader.

4) **Heart beat counter using IR**: Count the heart beats per minute using an IR sensor.
   Hint: You will need to study the waveform of the data given by IR sensor through Arduino. You will also need to amplify and filter the sensor's data.

General Rules :

- You will have to demonstrate **any of the 4 tasks**.
- You are allowed to use arduino in this round.
- The teams must adhere to the spirit of healthy competition.
- Judges reserve the right to disqualify any team indulged in misbehavior.
- In case of a tie, there will be an on-spot tiebreaker.
- Video would be considered only in **extreme circumstances** and if it is **properly** showing all the functionalities (points of which are to be claimed).
- The marks obtained in the round1 would be added to that of round2 for final scores.
- In case of any dispute, the judge's decision would be the final decision.

Marking Scheme: Max Points: 260

Problems (You can attempt only one)	Points
Task 1	50
Task 2	100
Task 3	150
Task 4	200

Task 4 points distribution	Points
1) If only able to show the pulse on arduino Serial monitor (depending upon the shape and amplitude of waveform)	160
2) Displaying Heart Rate	40

Additional Judging Criteria	Points
Good Circuiting and Coding Practises	10
Accuracy	20
Innovation and Simplicity in Code and Approach	30