ROBO-CROSS

OVERVIEW:

Think you can assemble and code a robot? With two gruelling levels that involve coding, calibration and the deployment of bots. Robo-Cross is here to put forth a challenge designed to test your skill in every department of robot assembly. Only the best of the best shall prevail.

RULES:

Once the event has begun, each team has to complete task in the following sequence:-

ROBOT:
Participants can bring their own Robot according to the specifications or else the organizers will provide the robot at the event.

WRITING A CODE FOR THE ROBOT:

- One and a half hour would be provided for coding the robot provided before event begins.
- Participants will be provided with a blank sheet, pen and carry your own laptops. They have to write the code during the time allotted in the presence of a volunteer.

CALIBRATION ROUND:
Each team gets a calibration round one day before the competition or before the event starts. Period of calibration is 20 minutes.

DEPLOYMENT OF ROBOTS:
After finishing the calibration round, participating teams are allowed to start their event from start zone.

ZIGZAG:
It should cruise along the zigzag path and completely enter the Highland.

Team members are not allowed to touch any robots except during starting operation.

RETRIES OF ROBOT:

- A retry can be made only after referee permission.
- Team members are allowed to touch robot during retry operation.
- A retry is compulsory if robot conducts any types of violations.

TEAMS:

- Each team should consist of minimum 2 and maximum 4 members.

***Rules can be altered by the organizers at the time of competition.**

EVENT LEVELS:

Event is divided in two levels:

- LEVEL 1) in this level robot and wheel control is done by DC and Servo Motors.
- LEVEL 2) in this level robot and wheel control is done by only DC Motor.

EVENT FIELD AND SPECIFICATIONS:

- Field consists of a event area having dimensions of 14,000mm*14,000mm and surround by a wooden fence with a height of 100 mm and thickness of 5 mm.
- **WHITE GRID LINES** with width of 30 mm made of non-shiny sticker are drawn on floor of event area which can guide the motion of the robot.
- Start area is with a length of 1,000 mm.
- 3 slopes and hills have width of 600 mm each.
- Zigzag path has a width of 600 mm.
- Hill 1 is 200 mm, hill 2 is 400 mm, and hill 3 is 600 mm above floor.

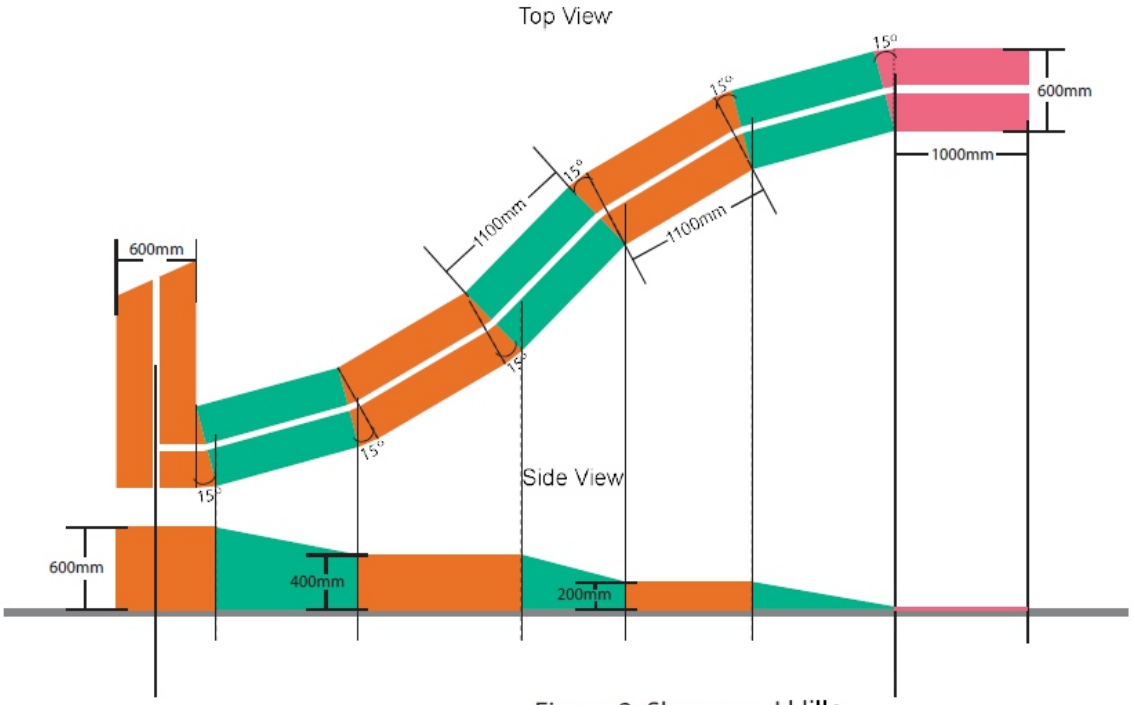
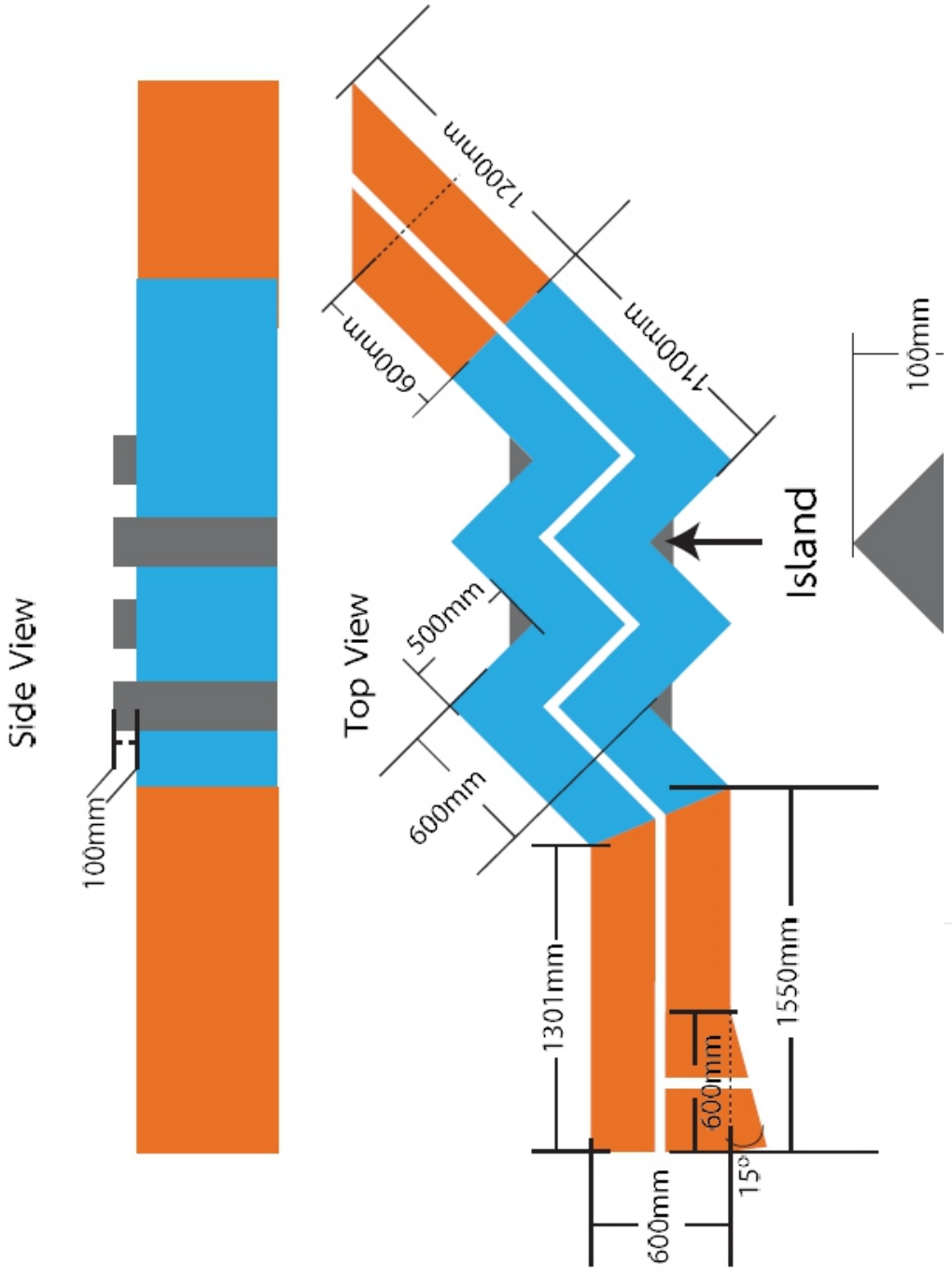


Figure 2: Slopes and Hills

Hill 1 is 200 mm, Hill 2 is 400 mm, and Hill 3 is 600 mm above the floor respectively. Slope 1 connects Eco Robot Start Zone with Hill 1.
Slope 2 connects Hill 1 and Hill 2. Slope 3 connects Hill 2 and Hill 3.


Side View
100mm
Top View
1200mm
600mm
1100mm
500mm
600mm
Island
100mm
1301mm
1550mm
600mm
600mm
15°

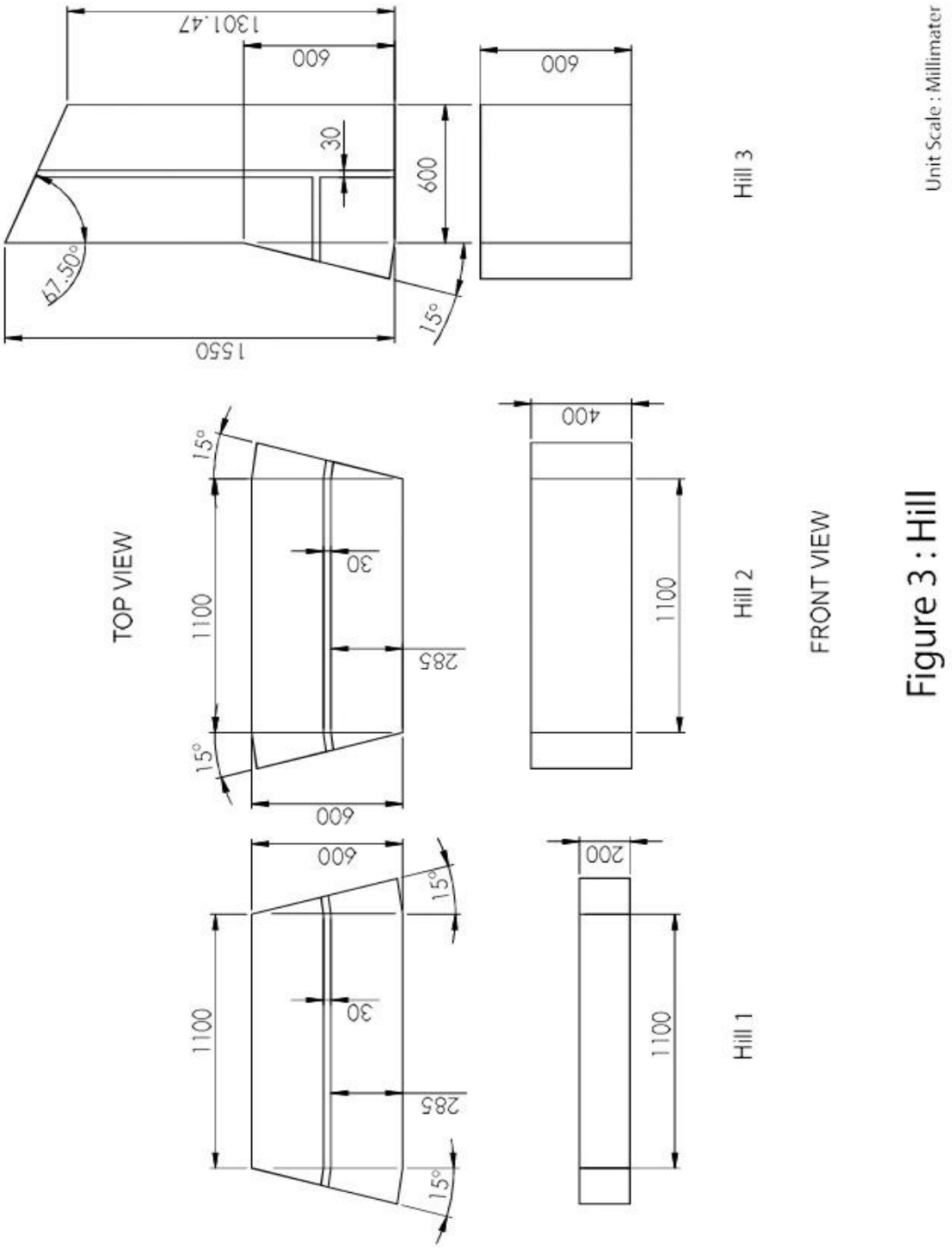


Figure 3 : Hill

Figure 4 : Slope

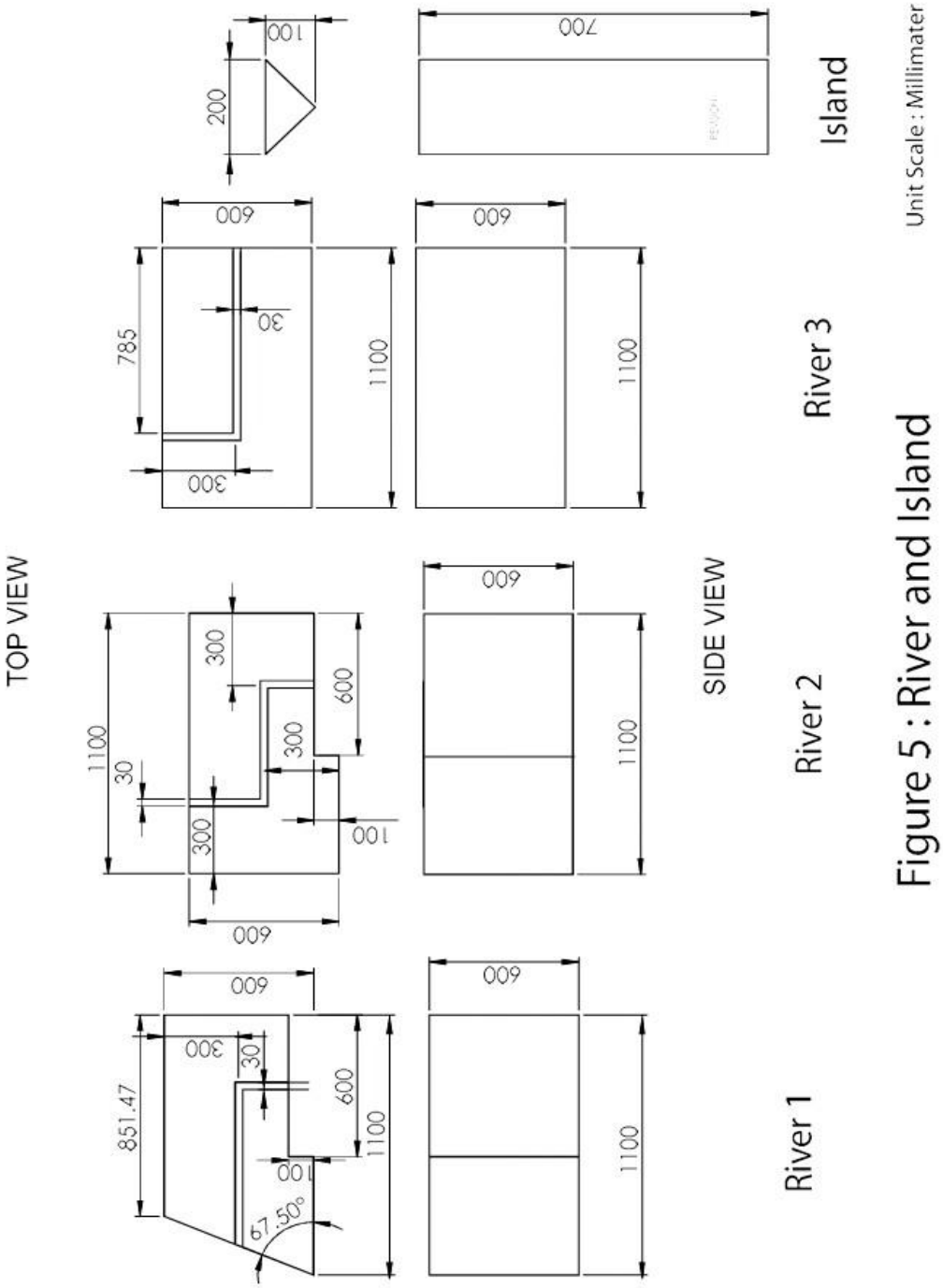


Figure 5 : River and Island

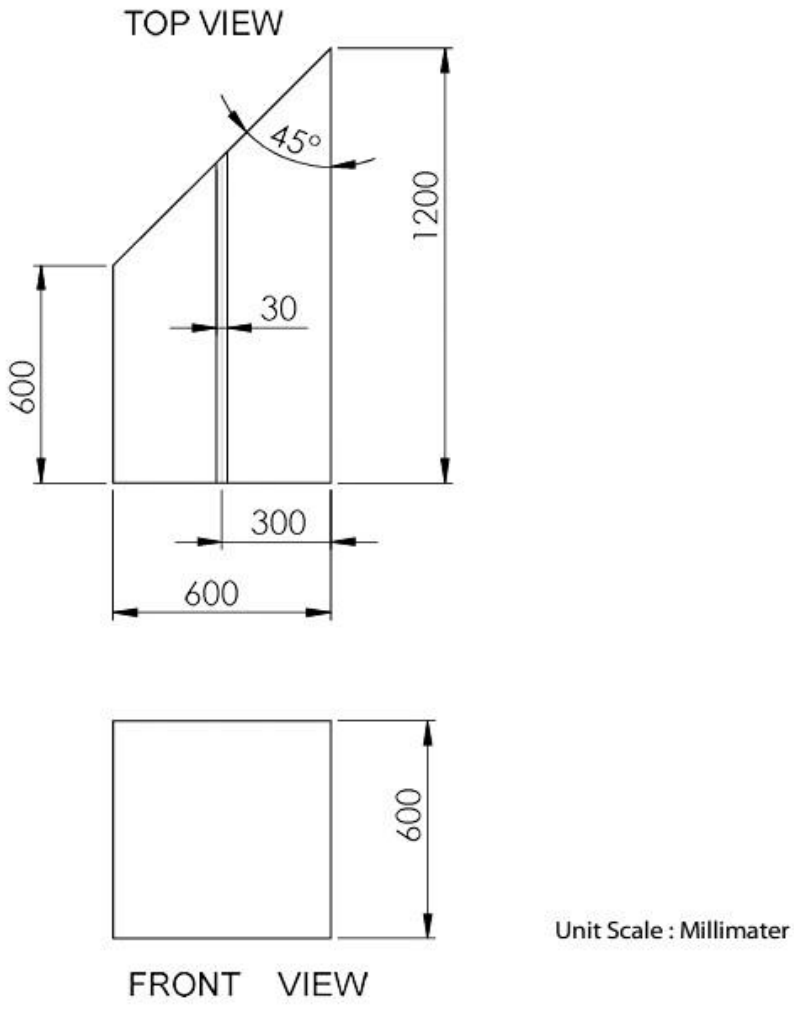
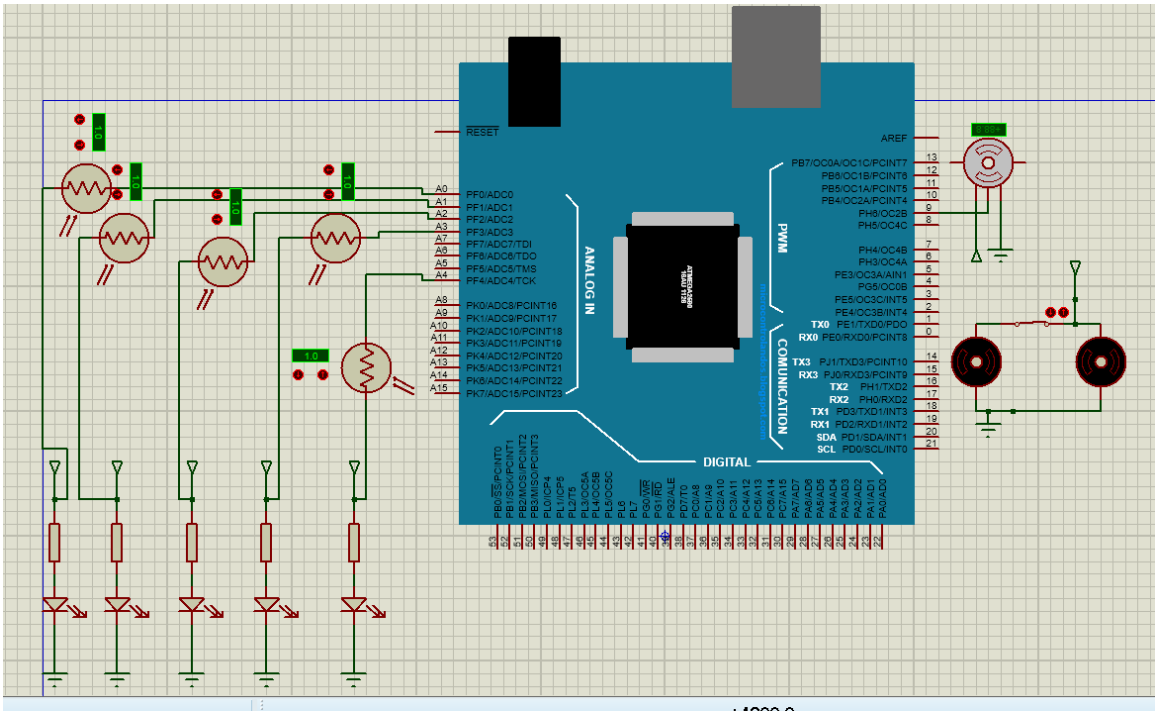


Figure 6 : Highland

Circuit Diagram For Level 1:

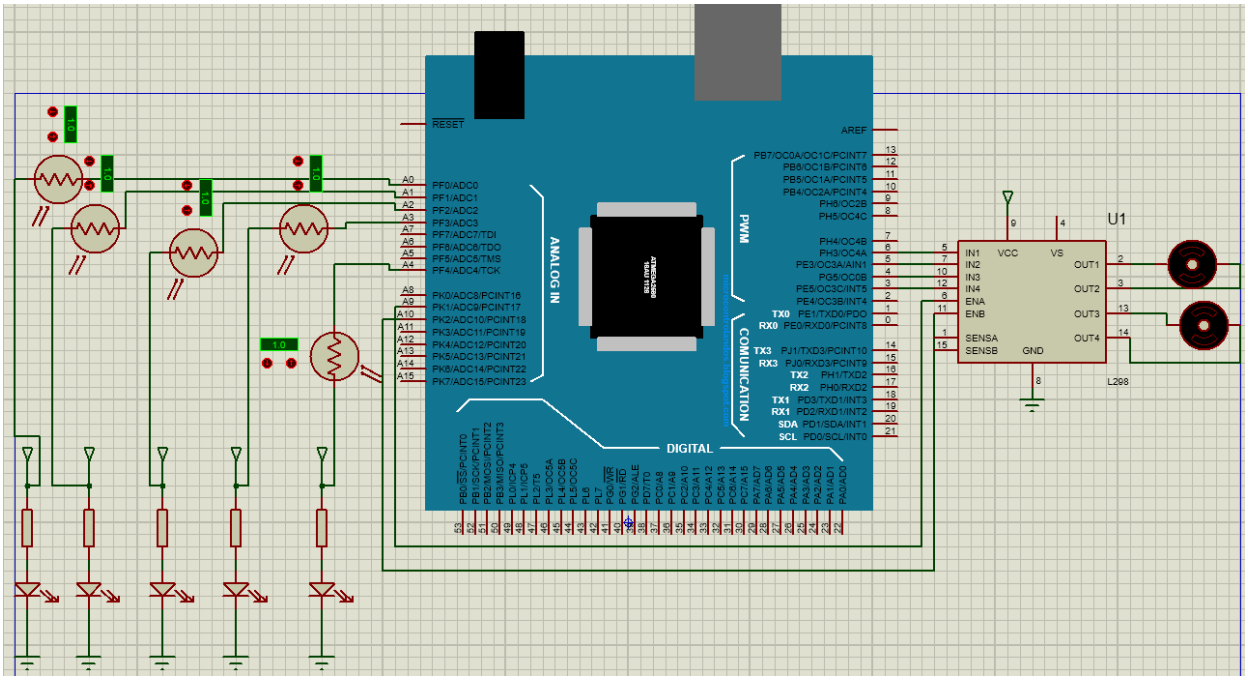


PIN CONFIGURATION:
(Dc motor and servo motor)

A0 – LDR-LED pair 1
A1 – LDR-LED pair 2
A2 – LDR-LED pair 3
A3 – LDR-LED pair 4
A4 – LDR-LED pair 5
A5 – LDR-LED pair 6
A6 – LDR-LED pair 7
A7 – LDR-LED pair 8
A8 – LDR-LED pair 9

LED is connected to power source and ground via resistor.
PWM_PIN 9 is connected to data pin of servo motor.
DC motors are connected directly to the power supply as they are required for forward motion of robot.
DC jack of Arduino is connected to power supply.

Circuit Diagram For Level 2:



PIN CONFIGURATION:

(Only 2 dc motors and a castor wheel connections to mega via Motor driver)

A0 – LDR-LED pair 1
A1 – LDR-LED pair 2
A2 – LDR-LED pair 3
A3 – LDR-LED pair 4
A4 – LDR-LED pair 5
A5 – LDR-LED pair 6
A6 – LDR-LED pair 7
A7 – LDR-LED pair 8
A8 – LDR-LED pair 9
LED is connected to power source and ground via resistor.
L298N Motor controller is used Pin 3 of Arduino is connected to INT1 of L298N.

- Pin 4 of Arduino is connected to INT2 of L298N.
- Pin 5 of Arduino is connected to INT3 of L298N.
- Pin 6 of Arduino is connected to INT4 of L298N.

- Pin A9 of Arduino is connected to ENA of L298N.
- Pin A10 of Arduino is connected to ENB of L298N.
- OUT1 to OUT4 of L298N is connected to DC Motor Terminals

DC motors are connected directly to the power supply as they are required for forward motion of robot.
DC jack of Arduino is connected to power supply.

Maximum 12V battery.

JUDGING CRITERIA:

LEVEL 1 And Level 2:

- If the contestant fails to code the robot within provided time their points would be deducted according to following constrain: for every extra ten minutes five points will be deducted.
- Contestant if codes his/her robot within the time allotted and the robot has completed the calibration they would be awarded with fifty points.
- If the contestant crosses the all the HILLS in Arena they will be awarded 10 points for crossing each HILL.
- Contestant will be awarded with 10 points for crossing the zigzag path and the highland.
- Max points that can be earned by any contestant are 100.

CONTACT:

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