



RUHUNA

Robotic Challenge

2019

School Category





1 ROBOT SPECIFICATIONS

- 1.1 Dimensions of the robot should not exceed 20 cm x 20 cm x 20 cm (width x length x height). The robot should be fitted inside a box with dimensions of 20 cm x 20 cm x 20 cm.
- 1.2 The robot should be completely autonomous without any sort of remote controlling.
- 1.3 The interaction of the competitor with the robot is described in later.
- 1.4 The robot should be supplied with an internal power supply whose supply voltage should not be more than 15 Volts and the final unit including the power source should be within the limit described in 1.1
- 1.5 The robot must be completely built by the team members. No off-the-shelf kits are allowed except the processing boards, sensor modules and drive gears.
- 1.6 The robot should not cause any damage to the gaming platform. Any kind of damage to the gaming platform leads to disqualification.
- 1.7 The robot should be activated using a single start switch which is placed on the robot itself.
- 1.8 The robot should be able to operate under any lighting conditions.

2 GAME TASK

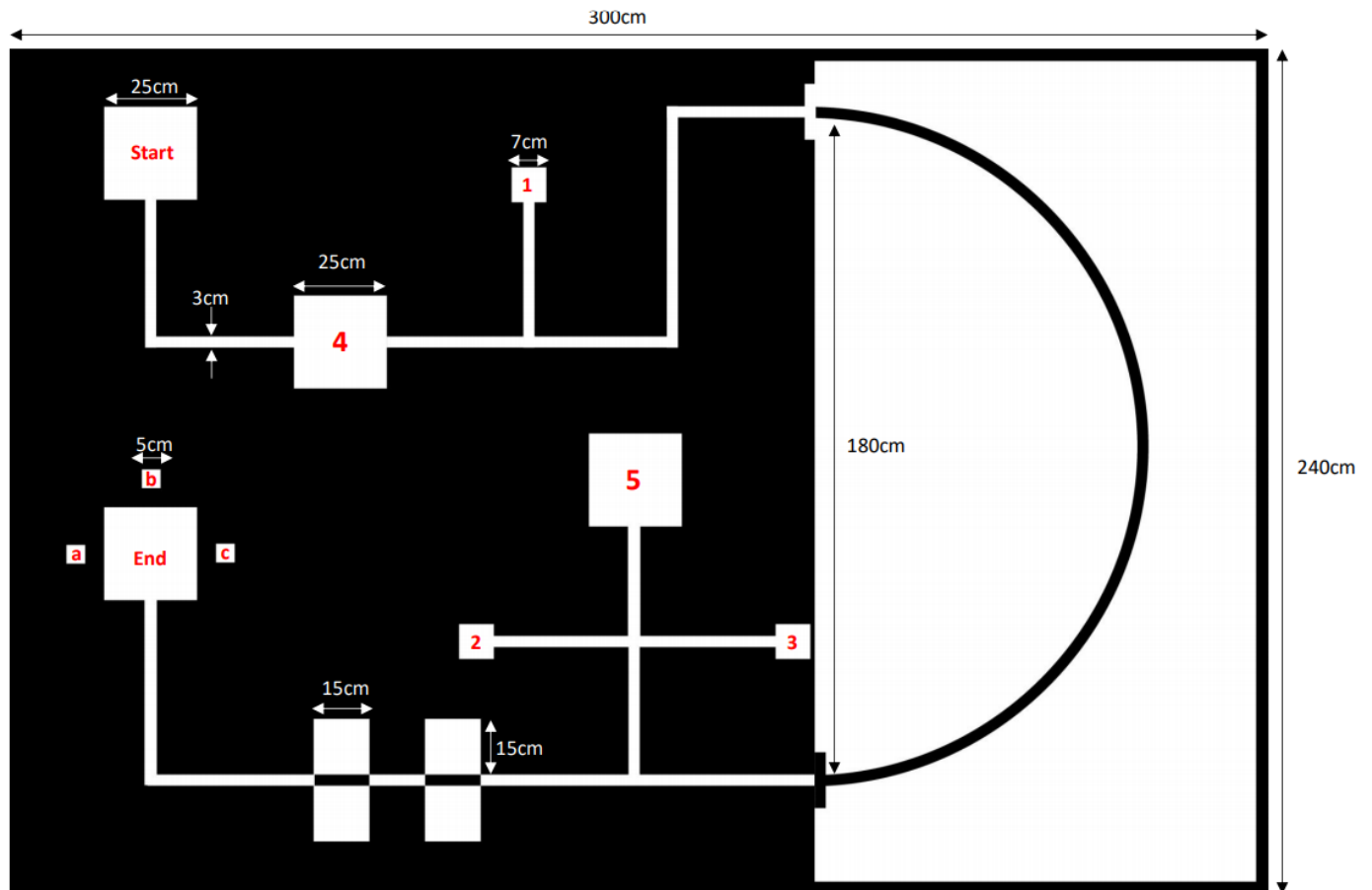


Figure 2.1: Sample Arena

- 2.1 The robot should be able to complete the given task while accurately tracking the course line from the start to finish as fast as possible.
- 2.2 It should begin from the inside of 'Start' square and should move fully autonomously by following the line to the inside of 'End' square shown in Figure 2.1
- 2.3 The robot should be capable of adjusting its course according to the curvatures, gaps of the path and should be able to take suitable decisions at junctions.
- 2.4 Cardboard boxes with dimensions of 5 cm x 5 cm x 5 cm and weight of 10g to 20g are placed at position 1 and at position 2 or position 3. (see Figure 2.2)

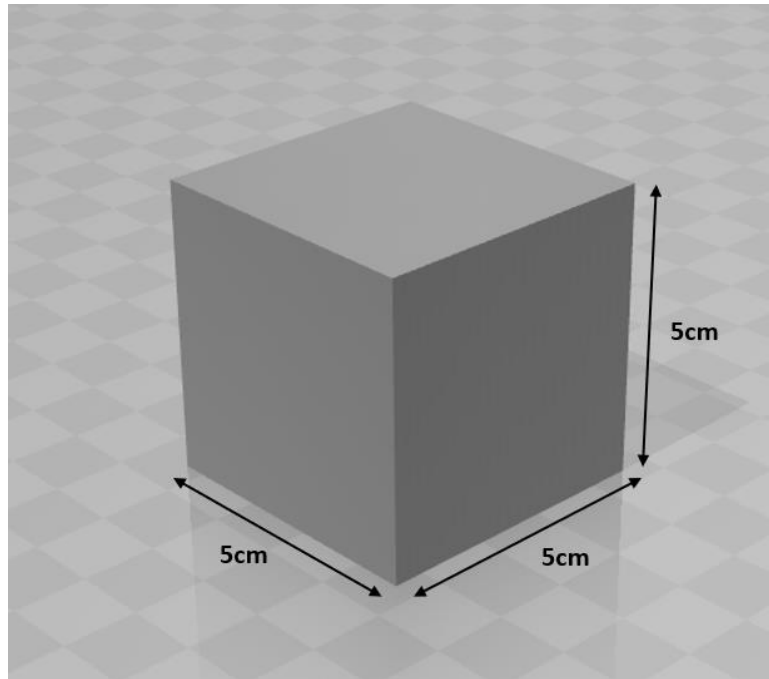


Figure 2.2:Box specifications

- 2.5 The autonomous robot can pick or push the box by any means but the method should not damage the arena.
- 2.6 One box is placed at above position 1 and one box is placed at 2 or 3 positions as required. Two boxes should be moved as quickly as possible to the positions 4 and 5 respectively, which are shown in Figure 2.1
- 2.7 The autonomous robot should be pass Liner Gap after the box placed in square 5.
- 2.8 At the End square, there are three positions named as “a”, “b” and “c” in Figure 2.1. The autonomous robot has to count the total number of boxes situated in “a”, “b” and “c” without touch the boxes. That boxes are same as shown in Figure 2.2.
- 2.9 Then robot should clearly indicate the Box count using any indication method like Beep tone, LEDs, or whatever. Indication method should be mention before the task begin.



- 2.10 A robot has to pass all the checkpoints in order to complete the task successfully. (Check points are the points along the course line through which the achievement of the robot is measured)
- 2.11 Time is measured from the referee signal from start until the robot approaches the exit area. A robot is deemed to have crossed the line when the forward most part of the robot contacts or crosses over the line.
- 2.12 All the robots are collected 15 minutes before the competition, no more modifications are allowed after the collection.

3 GAMING PLATFORM

- 3.1 The arena mainly consists of white lines on a black floor and also black curve lines on a white floor. The starting area and the exit area shall consist of white squares of 25 cm x 25 cm on a black floor. The line is 30 mm (+/- 3mm) wide. The start and the end points of the line course will be clearly marked via a transverse line.
- 3.2 The areas marked as 1,2 and 3 shown in figure 2.1 would be 7 cm x 7 cm squares. Two cardboard 5cm x 5cm x 5 cm boxes are placed center on two of those three squares.
- 3.3 That boxes are to be loaded on to areas 4 and 5 shown in figure 2.1 having dimensions of 25 cm x 25 cm.
- 3.4 The areas marked as “a”, “b” and “c” shown in figure 2.1 would be 5cm x 5cm squares.
- 3.5 The size of the arena is 300 cm × 240 cm.
- 3.6 The arena would consist of turns, crossovers (90 degrees), curves and gapped lines as shown in Figure 1.
- 3.7 The above listed arena locations will not be precisely what the robots will encounter at the contest, they are provided as general aids. The real arena would be disclosed at the time of the competition.



4 GAME RULES

- 4.1 The maximum time of 10 minutes is given for any attempt in each round. The maximum number of attempts in a round is three for a team. Any robot who will fail to meet the maximum allowable time duration leads for a disqualification. The best attempt is considered for grading.
- 4.2 During the commencement of an attempt any interaction between the robot and the team members would be prohibited. If any interaction with the robot is detected, it is considered as the termination of the attempt. Each new attempt should start from the starting point
- 4.3 The team can decide to stop the robot anytime and be credited with the distance traveled along the line and the time consumed until the robot stops.
- 4.4 A sample arena will be given separately, only for tuning purposes.
- 4.5 Participating teams are always responsible for the safety of their robots.
- 4.6 The organization and the organizing team members will not be held
- 4.7 responsible or liable for any incidents and / or damages to the robot caused by participating teams and/or testing and/or competing the task.
- 4.8 The team leader may forward their objections or doubts on the task and the game rules to the organizing committee. Then the organizing committee will attempt to these objections and doubts with the help of the judge panel.
- 4.9 If there is a tie between the robots, a run-off will determine the winner.
- 4.10 If nobody finishes the run, the one that reached the maximum check points on track wins.
- 4.11 There will be a technical inspection before every round.
- 4.12 All the robots are collected 15 minutes before the competition. No more modifications are allowed after the collection of robots.



- 4.13 The decisions taken by the judge panel will be the final decision. No objections shall be declared against the judge panels' decisions.

5 TEAM SPECIFICATION

- 5.1 A team should consist of maximum of 5 members from the same school

6 ELIGIBILITY

Team members are eligible to participate in the event under the following conditions.

- 6.1 All competitors with a valid recognition (by mean of student confirmation letter issued by the principal of the respective school) are eligible to participate in the event
- 6.2 Competitors should be younger than 18 years to compete (The birth date can be proved by means of a letter issued by the principal, a birth certificate and National Identity Card (NIC)).