

# Perfect Machine

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## GENERAL RULES

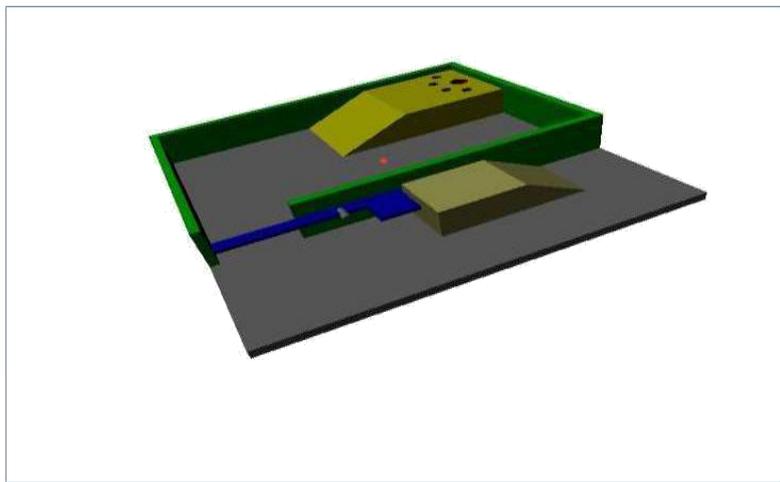
- The students must carry valid student ID cards of their college which they will be required to produce at the time of registration.
- Contestants will have to register online. On spot registrations can also be done.
- A team may comprise a maximum of **FIVE** participants.
- Readymade kits are **NOT** allowed. Judges' decision in this regard will be final and binding.
- The team is **NOT** permitted to compete with more than one bot.
- Teams will **NOT** be allowed to modify their bots during their trial.

## EVENT FORMAT

The event will be of two rounds.

### FIRST ROUND

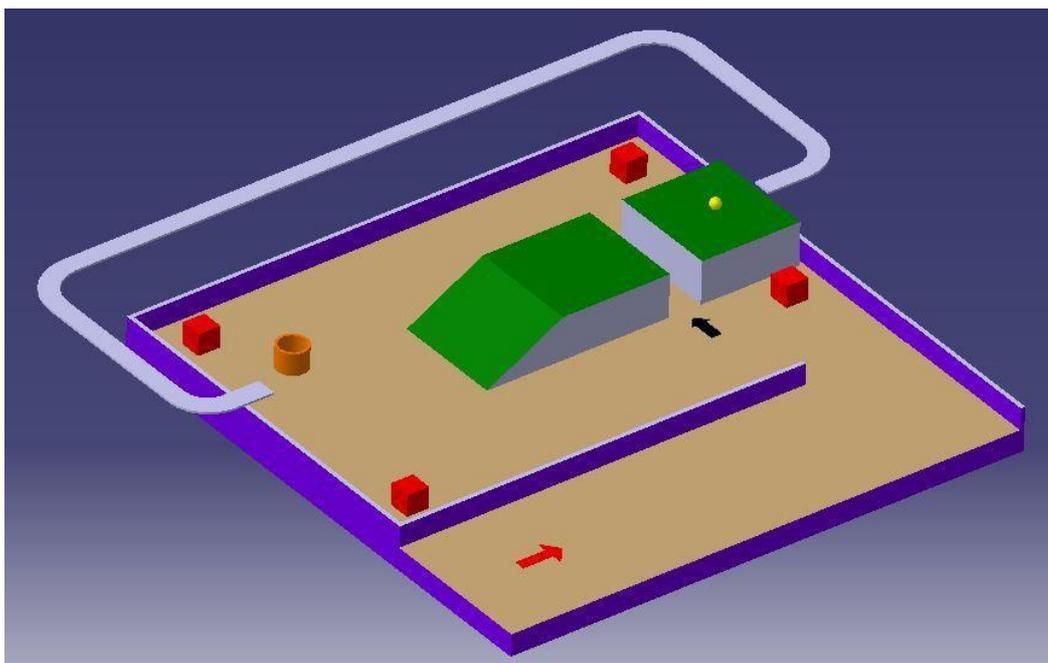
- In this round, the bot will be initially outside the arena.
- To enter the arena the bot has to displace the given block from an initial position to the marked position to open the mechanism to enter the arena.
- The second task inside the arena is to lift/ push the given table tennis ball and drop it in one of the five holes as shown in the figure.
- If the ball is dropped in the center hole then a total of 30 points is awarded. If any other hole, then only 10 points is awarded.
- This points is added to the points that is obtained by converting the total time taken to points.
- The bot should come out from the entry gate itself to stop the time.
- Each bot must have a mechanism to lift/drag the cubes.
- Maximum time given for the first round is 15mins.
- The arena and the path to be followed for each team are shown in the fig. 1 shown below.



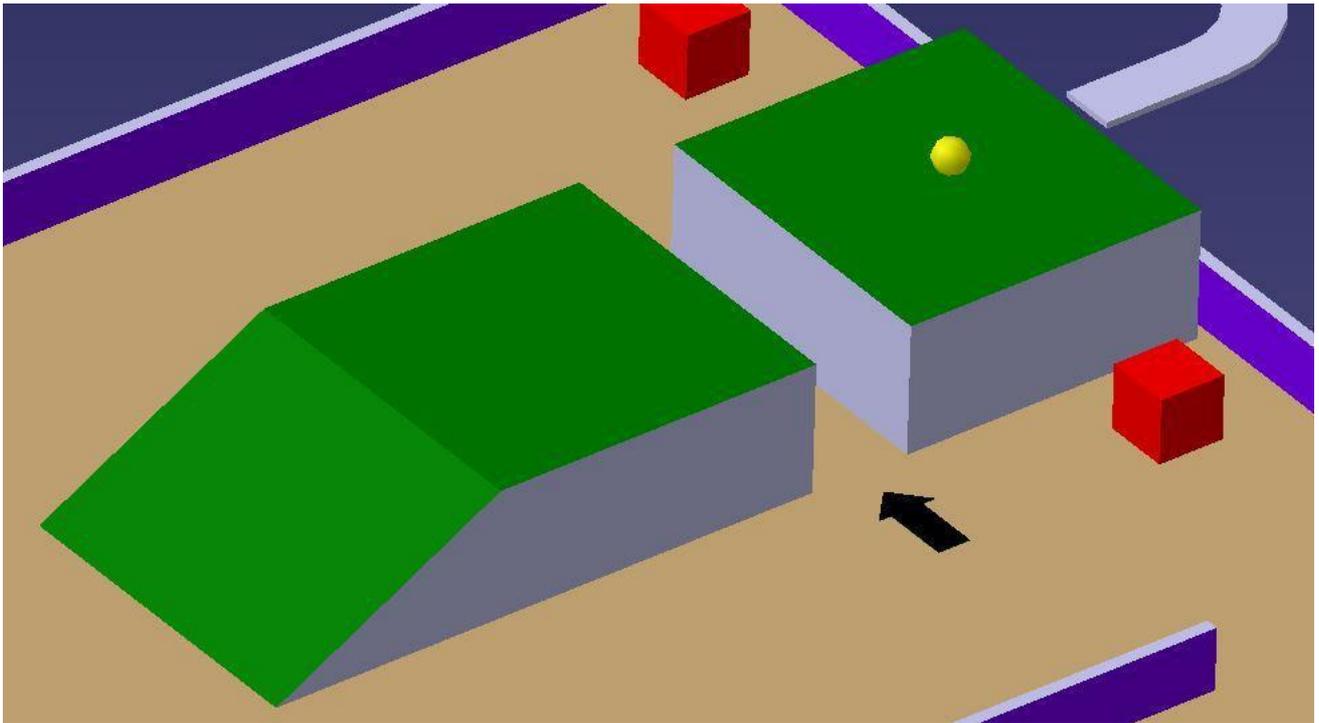
*Arena for the first stage*

Second Round:

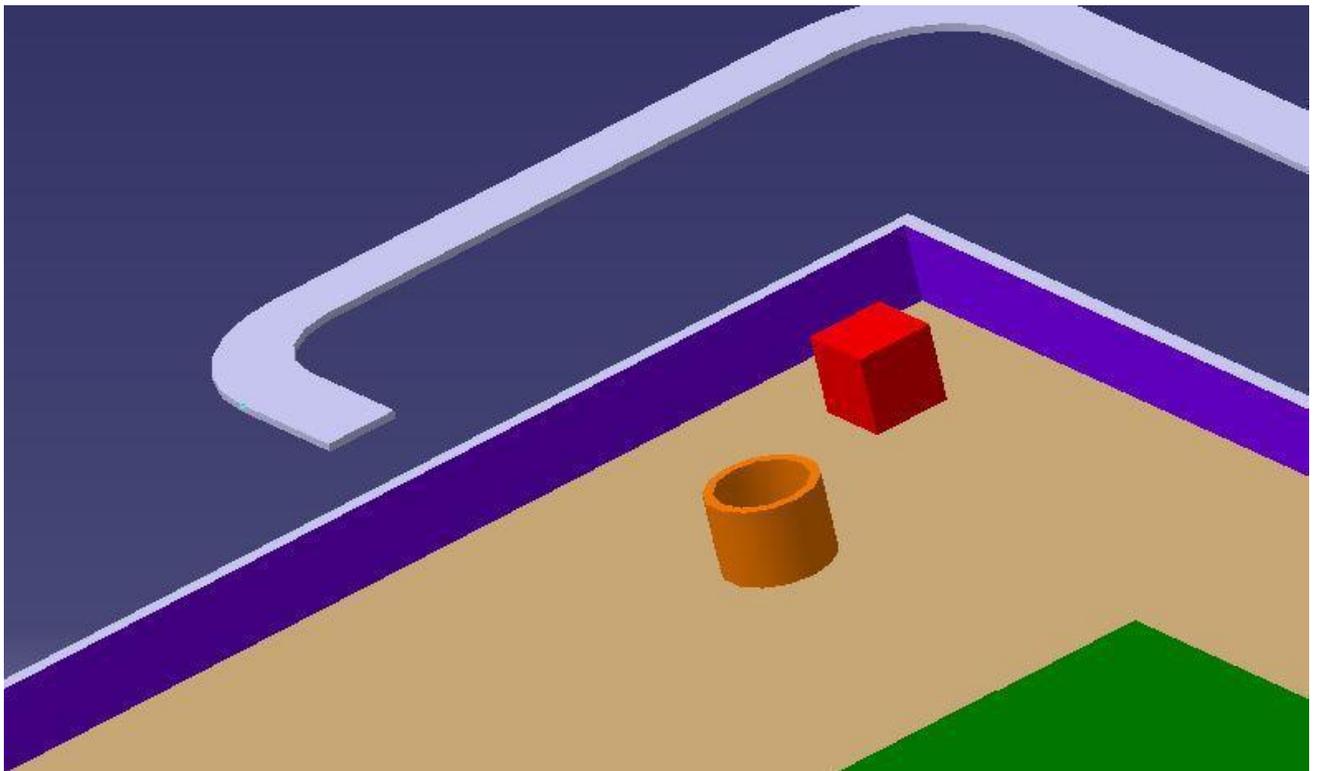
- The bot begins again at the spot marked by the red arrow.
- It has to enter the inner arena and place the four red blocks in the gap between the two platforms (denoted by the black arrow) so as to complete the pathway to access the ball placed on the platform to the right.
- The blocks have to be placed in the gap in such a way that the bot can move across the gap.
- Once the ball can be accessed, it is pushed onto the outer pathway that goes around the arena.
- The bot then has to come down from the platform and move the cup into position so as to catch the ball that falls from the other end of the outer pathway.



*Arena for the second stage*



*Red blocks have to be placed in the gap between the platforms*



*Cup has to be moved in place to catch the ball falling from the other end of the pathway*

## **JUDGING CRITERIA & SCORING**

- A task is considered as completed only if all the objects are placed in their respective places in the intended positions.
- The scoring system will include the time taken to perform the tasks and the closeness of the position of all objects to the intended locations.
- The scoring system will be informed to the participants on the day of the event.
- Decision by the judges is final and non-negotiable.

## **SPECIFICATIONS**

### **BOT SPECIFICATIONS**

- The bot dimensions should not exceed  $30 \times 30 \times 20 \text{ cm}^3$  excluding the control device and the dimension of lifting mechanism.
- The weight of the bot should not exceed 15 kg.
- The bot can be wireless or otherwise.
- Readymade wireless remote control units may be used.
- In case wired control is used, the wire(s) must remain slack throughout the event. If the wires are visibly taut, the team will be disqualified.
- Single phase external 230V AC power will be supplied. Maximum voltage between any two points on the bot must not exceed 24 V DC or 24 V AC.

### **OBJECT SPECIFICATIONS**

- No. of cubes for the first round = 1 of size  $10 \times 10 \times 10 \text{ cm}^3$
- No. of balls for the first round = 1 (standard golf ball)
- No. of cubes for the second round = 4 of size  $10 \times 10 \times 10 \text{ cm}^3$
- No. of balls for the second round = 1 (standard golf ball)
- No. of paper cups for the second round = 1

### **MOBILITY**

- All robots must have easily visible and controlled mobility in order to compete.

- Any machine component should not be detached (intentionally) during any point of the event.
- Methods of Mobility include:
  - ☐ Rolling (wheels, tracks or the whole robot)
  - ☐ Walking (linear actuated legs with no rolling or cam operated motion).
  - ☐ Shuffling(rotational cam operated legs)

**NOTE:**

- ☐ Jumping and hopping is not allowed
- ☐ Flying (airfoil using, helium balloons, ornithopters, hovercrafts etc.) is not allowed.

### **ARENA SPECIFICATIONS**

- ☐ The arena will be square in shape with dimensions of 8 ft X 8ft (Arena for first round will approximately be of dimensions 2.5 ft X 8 ft. Inner arena will approximately be of dimensions 5.5 ft X 8 ft).
- ☐ The bridges on the arena will have 40 to 50 cm width and 10 to 20 cm height. The inclined planes will make an angle of about 20-30 degrees with the horizontal.

### **CONTACT DETAILS**

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