



# SCIENCE AND TECHNOLOGY COUNCIL

# TAKNEEK '18

## ON THE SHOULDERS OF GIANTS



## RoboTricks

*Team Event (Y18) | Points: 30*

### Team structure

The teams can have maximum eight members. Maximum five teams per pool are permitted to participate.

### Problem statement

As the name of the event suggests, the participating teams have to build a remote operated robot that shall be able to do a variety of tricks such as grab and place objects, fill the baskets and maneuver over the play field.

### Rules and Regulations

- Each team will get two attempts.
- The best of the two scores shall be used for scoring.
- The size of the robot in the beginning must be under a cubic volume of **25 cm\*25 cm\*30 cm**. If the size of the robot is outside these specified dimensions it shall lead to disqualification.
- The robot has to be kept inside the starting area initially with no extensions besides the wires (if present) outside this area.
- The robot must be inside the arena at all times.
- There is a gate in the arena that would be actuated by placing a block in the indicated location. You have to place the block using your robot only and only then you can enter into the free Zone.
- In case of manual interruption or any part of the robot going outside the arena, the corresponding team will have to start from the last basket where a ball was placed or the last passed checkpoint.
- Any damage to the arena while the team's attempt shall lead to **immediate disqualification**.
- **For the remote-control, use DPDT switches for driving the robot forward, backward, etc and can use either DPDT or DTMF for gripping & lifting mechanism .(DTMF means controlling by mobile phone). Extra points for using DTMF for Lifting and Gripping Mechanisms of the Robot.**
- Any other method such as usage of joysticks, microcontrollers, processors, or PS2 controllers is not allowed.
- The blocks should be placed in the region whose boundary color is same as that of the block.
- A block would be considered completely inside the region only if the whole base is inside the boundary and not touching the boundary.
- Each team has to use its **own mobile phones** for the DTMF circuit.
- The blocks can be placed using or without using gripping and lifting mechanism unless mentioned in the task.

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## Task

- As soon as the robot enters the main arena, it has to grab a *bomb* (viz. the green block). The robot has to then drop the bomb safely into the corresponding bucket located at the cliff (wedge).
- The robot shall then pass onto the free zone by passing through the manually controlled gate opened by placing the purple block on the button present on the floor. In the free zone, the robot shall encounter three colored Regions. The task here is to place the block (which will be spread across the arena) in the regions according to their colours. If you bring the block (using lifting) by crossing the speed breaker, you will get bonus marks.
- In this task, the *yellowberry* (viz. the yellow ball) in the arena has to be *plucked* and placed neatly in its basket.

## Scoring

Table 1 Overall Points Distribution

S. No.	Parameter	Points
1.	Placing the <b>Green</b> block while going over the wedge	80
2.	Placing the <b>Green</b> block without going over the wedge	35
3.	Placing the <b>Blue</b> block in its Region	30
4.	Placing the <b>Green</b> block in its Region	30
5.	Placing the <b>Yellow</b> block in its Region	30
6.	Passing the block over the <b>Speed Bump</b> (Bonus)	30
7.	Placing the <b>Ball</b> in the basket	40
8.	Placing the <b>Purple</b> block over the virtual button	50
9.	Extra Points if DTMF Technology is used for Lifting and Gripping Mechanisms.	50
10.	<b>Each manual interference</b>	<b>-40</b>
11.	<b>Going out of the arena</b>	<b>-30</b>

**MAXIMUM POINTS: 400**

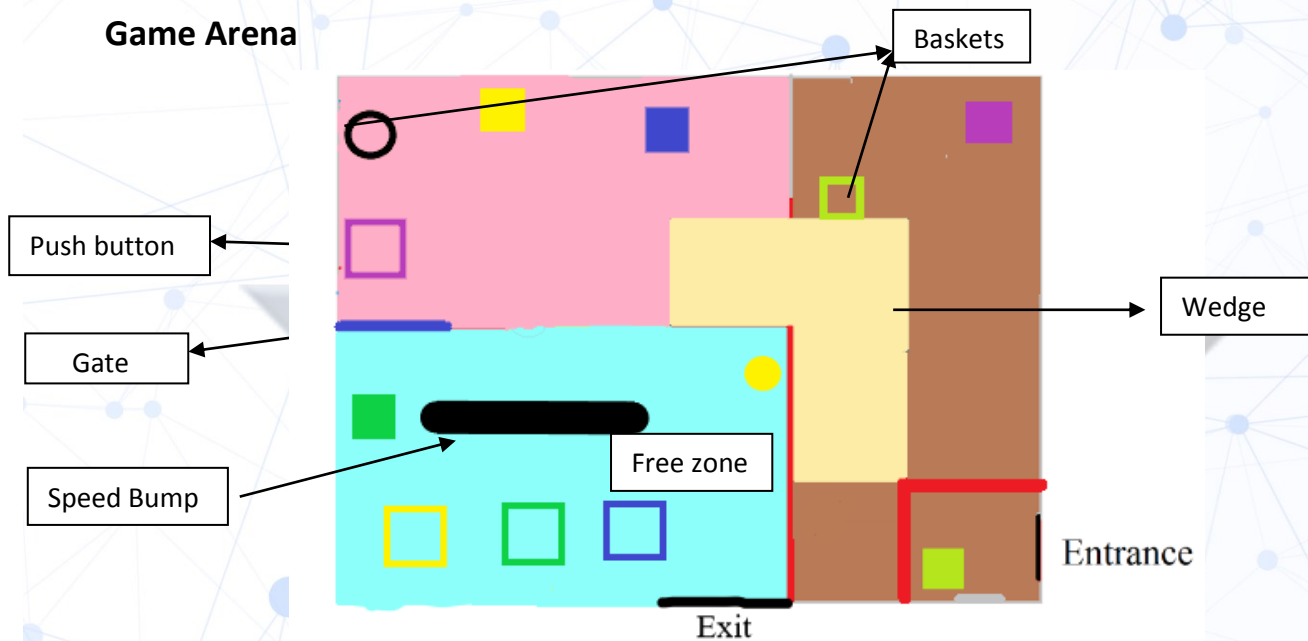
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## Game Arena



- The arena is of size 2 m x 2m, with a green background.
- A total of five blocks would be in the arena, with one being in the free zone.
- A virtual gate for free zone is present with a width of 40cm.
- Total two baskets are placed in the arena in different zones.
- **Dimensions:**
  - Arena's size: 2 m x 2m
  - Block's size: 8 cm x 8cm x 8cm
  - Thickness of strips: 1cm
  - Ball's radius: 4cm
  - Entrance to the arena is 30 cm wide.
  - Bridge (Full Wedge): width = 40cm, height = 10cm, length = 100cm
  - Half wedge: width = 35cm, height = 10cm, length = 65cm

### Note:

Dimensional Tolerance for the arena's size = 10%

Dimensional Tolerance for ball size = 10%



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## **Tie Condition**

In case there is any tie, team taking the least time to acquire the points shall be declared winner.

In case there is a tie in the total time of the play, team taking the least time to drop the bomb into the corresponding bucket located at the cliff (wedge) shall be declared winner.

**Note: In case of any disputes, the decision of the Coordinators would be final and binding to all.**

## **Incentive**

Members of the winning team would get direct entry to the final round of selection in one of the long term project teams.

## **Tutorials**

All the teams can find various tutorials in the following link:-

<https://docs.google.com/document/d/1GVHrFco8uaAlfJQxFqdbcjInZ01FEPOOfqnpvOhj-vk/edit?usp=sharing>

In case of any problem, feel free to contact the Club coordinators or secretaries. Contact details available on: <http://students.iitk.ac.in/roboclub/>

**All the best!**

**#HappyRoboting!**

**Coordinators, Robotics Club**

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