MECHATRON

"Will robots inherit the Earth? Yes, but they will be our children"

-MARVIN MINSKY

Problem Statement

Introduction

The really fascinating thing about mechatronics and control is this process: you start with a "dead" piece of hardware such as a robot arm, a disk-drive, a drug delivery device, or pick your favorite example. You add some sensing and some motors around it. You then go through a process of mathematical modeling and algorithm design that is usually highly abstracted and can be very detached from reality. But then, and here's where it gets interesting, you apply those algorithms to the hardware, and voila! Now you have a living, breathing machine with character and embedded smarts, and it's thrilling!

Event Format

The task is to construct a robot, which can **pick** and **place** objects from one place to other. There will be **two (2)** teams competing simultaneously from their respective zones. The game play for each team is as follows.

Game Rules:

1) A team can consist of a maximum of **5 members**, including the team leader.
2) Dimensions of the robot must not surpass **30X30X35 cm^3** (lxbxh).
3) The robot must be properly endowed with a sturdy gripping mechanism to hold a cube of 10X10X10 cm^3 dimension.
4) The robot may be controlled by either a wired or a wireless remote control.
5) Wires of the robot must be at least **25 cm** above the ground.
6) If the robot is a wired remote controlled one, the sagging wire between the robot and its remote control must be a minimum of **2 metres** length.
7) The power supply must not exceed **24 volts**.
8) Any external power supply will not be provided. Participants are required to carry their own power supply (adapter, battery, SMPs).

Problem Statement:

Kohinoor, The Mountain of light, the pride of India was kept at the Imperial Museum in Kolkata. After numerous efforts, a few conspiratorial agencies succeeded in replacing it with a hoax!

One of the security officers noticed the difference in time and reported the forfeiture.

With an immediate response a team of surpassing commandos was notified of this emergency. You are one of those unexcelled commandos and your team gets a lead about the shipment that is to leave for England via a ship from Haldia Port, West Bengal and is recently placed in the dockyard.

Your technical support informs you that the area is swarming with traps and it is impossible for any human to enter the laser shielded area without turning on the siren alarm and apprising the enemy. The only way to get hold of the Kohinoor is to enter the area using a remote controlled device which cannot be detected by the lasers.

Meanwhile, you are informed that other nations are also trying to take advantage of this opportunity to grab the world's most famous jewel. It is up to you to infiltrate the enemy's area and pass through all the crests and troughs, fill in the gaps to make your own way without leaving your trace behind and reach the KOHINOOR before the other team does and win back the pride of India.

Game Play Rules:

Preliminary Round

LEVEL1: Reaching the Dockyard in Haldia.

1) This level will be a do or die round (eliminative).

2) Place all Red blocks on checkpoint 1 to cross the Laser sirens.

3) Cross the hurdles coming in the way & make the way through the harbour by putting yellow block in the trench (Checkpoint 2).

4) Now breach the dockyard security of the conspirator agencies and change your identities by placing green blocks in the form of biggest tower possible (Checkpoint 3).

Final Round

LEVEL2: Breach the security of Dockyard and get the Kohinoor.

1) Two teams (India & Pakistan) will compete simultaneously for getting Kohinoor.

2) Place all Red blocks on checkpoint 1 to cross the Laser sirens inside the shipment area.

3) Escape the security guards by placing Red block in the trench (Checkpoint 2).

4) Pre plan your escape route by forming a tower using the green blocks (Checkpoint 3)

5) Hack the CCTV cameras in the shipment area by placing White/Yellow balls in checkpoint 4 i.e. rotating disc in their respective positions (Rotating disc will have position specified for each team to place the ball).

6) Now stop the Infrared rays around the Kohinoor by placing the master key (silver blocks) to complete the circuit and glow the lights (Checkpoint 5).

6) HURRY! Get the Kohinoor and party!!!

JUDGING CRITERIA:

1) Judging is based on the completion of two levels (**Reaching the dockyard and finding the Kohinoor**).

2) Placing the cube in the slots will earn **10 points** each.

3) Successful completion of 1st level will give another **10 points**.

4) Stacking of 4 blocks will earn 50 pints, 3 blocks in one row and one block in other will earn 35 points and 2 stacks of two blocks each will earn 15 points.

5) Crossing the hurdles will give another **10 points.**

6) Filling the balls in rotating disc will earn **40 points.**

7) Completing the circuit to glow lights will earn **20 points.**

8) Finding the kohinoor will give **20 points** which indicates the completion of 2nd level.

9) The team with **maximum score** and **minimum time taken** will be declared as winner.

Event Head (Final Year)

Aaroh Vishnoi (EE) | Alok Singh (EC) | Deeksha Singh (EC)
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