

MAGNETEER

Introduction

Asteroid mining is a major source of minerals in the year 2065, and your bot near asteroid B1242 is sending the mined ore through its local wormhole to the other side, which opens up near Mars. The receiving bot needs to sort the ore for magnetic and non-magnetic materials to send to their respective processing sites. Build a viable means to sustain life on earth for generations in the event Magneteer!

Problem Statement

Build a robot capable of lifting objects having shapes such as cuboidal, pentagonal, hexagonal etc. and transferring the objects through a wall having holes with shape like that of the objects to another robot capable of classifying them into magnetic and non-magnetic ones.

Two participants can control the bots at a time.

General Rules

1. Total time allotted for the event will be **15 minutes**.
2. Maximum of 2 timeouts are permitted, with each not exceeding 2 mins. Each timeout will attract penalty.
3. 2 mins penalty would be imposed on restart.
4. Maximum number of participants allowed is **6 per team**. The members from different colleges can form a team.
5. The team cannot touch the bot during the course of run.
6. Bot has to remain within the arena throughout the run.
7. The participants will be provided with 220V, 50 Hz AC power supply, and any other power supply they require has to be arranged by themselves by the participants.
8. Microprocessors used should not be more than 16-bit microprocessors.
9. Rules are subjected to change.
10. Decision of Team NSSC will be final and binding under all circumstances.

Round One

Participants would have to build two manually controlled robots that can lift an object using grippers. Both bots will be on opposite sides of the wall which is dividing the arena into two parts. In the first half of the arena objects in the shape of cuboids are present in three different colours namely Red, Blue and Yellow. Each colour has equal number of cuboids. Participants would have to pick up the objects and pass them through a wall which will contain holes present at different height. Objects must be transferred through the hole which is having the same colour as themselves. On the other side of the wall the other bot will collect the object and classify them as magnetic or non-magnetic and place them in their respective position.

Round Two

In round two the shape of the objects is changed from cuboidal to hexagonal, pentagonal and triangular and so have the shapes of holes in the wall. All other rules are the same for both the rounds.

Judging Parameters

Scoring points:

1. Each team will be awarded 100 points at the start of the run.
2. 10 points will be awarded if the bot successfully picks up the object.
3. 10 points will be awarded if the object is transferred through the wall only from the corresponding hole.
4. 20 points will be awarded for correctly differentiating between magnetic and non-magnetic and placing the object in its respective regions.
5. If the objects are stacked one upon the other the points will be in order of 10, 20, 30 and soon as the objects are stacked. If the objects are just placed on the ground 10 points are awarded.

Penalties:

1. 5 points will be deducted every time the object falls after being completely lifted from the ground.
2. 30 points will be deducted for each timeout.
3. 10 points are deducted if the object is incorrectly classified as magnetic or non-magnetic.
4. 50 points will be deducted for each restart.

Arena Specifications

1. The arena will be a rectangle with Length as 4 meters and Breadth as 1.5 meters.
2. Height of the wall is 30 cm and Length will be 1.5 meters.
3. In Round One the size of the cuboidal objects will be 5cm*5cm*5cm (l*b*h).
4. The size of the holes in the wall in Round One will be 7cm*7cm (l*b).
5. The base of the holes will be present at heights of 5cm, 12 cm and 19 cm.
6. In Round Two the size of the object will be such that they can completely fit into a circle of radius 3 cm and thickness will be 7 cm.

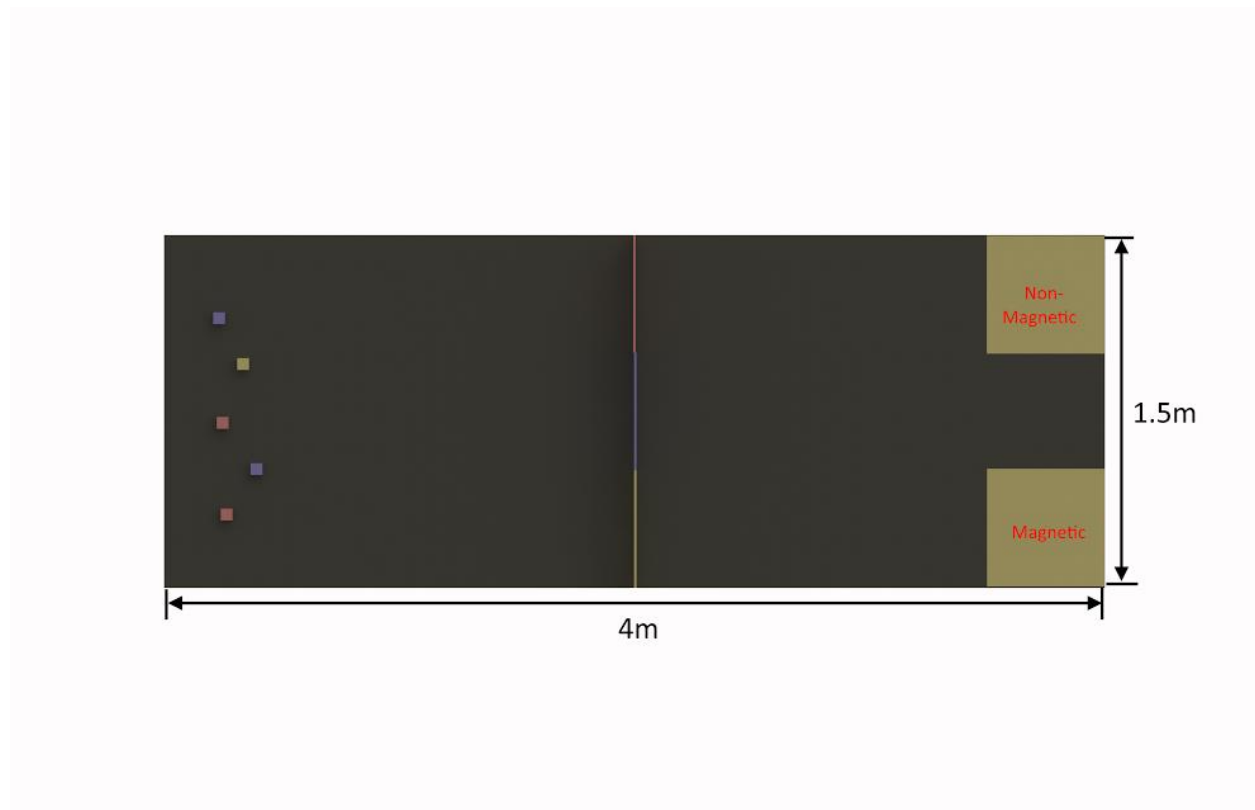


Fig: M01: Top View: Arena

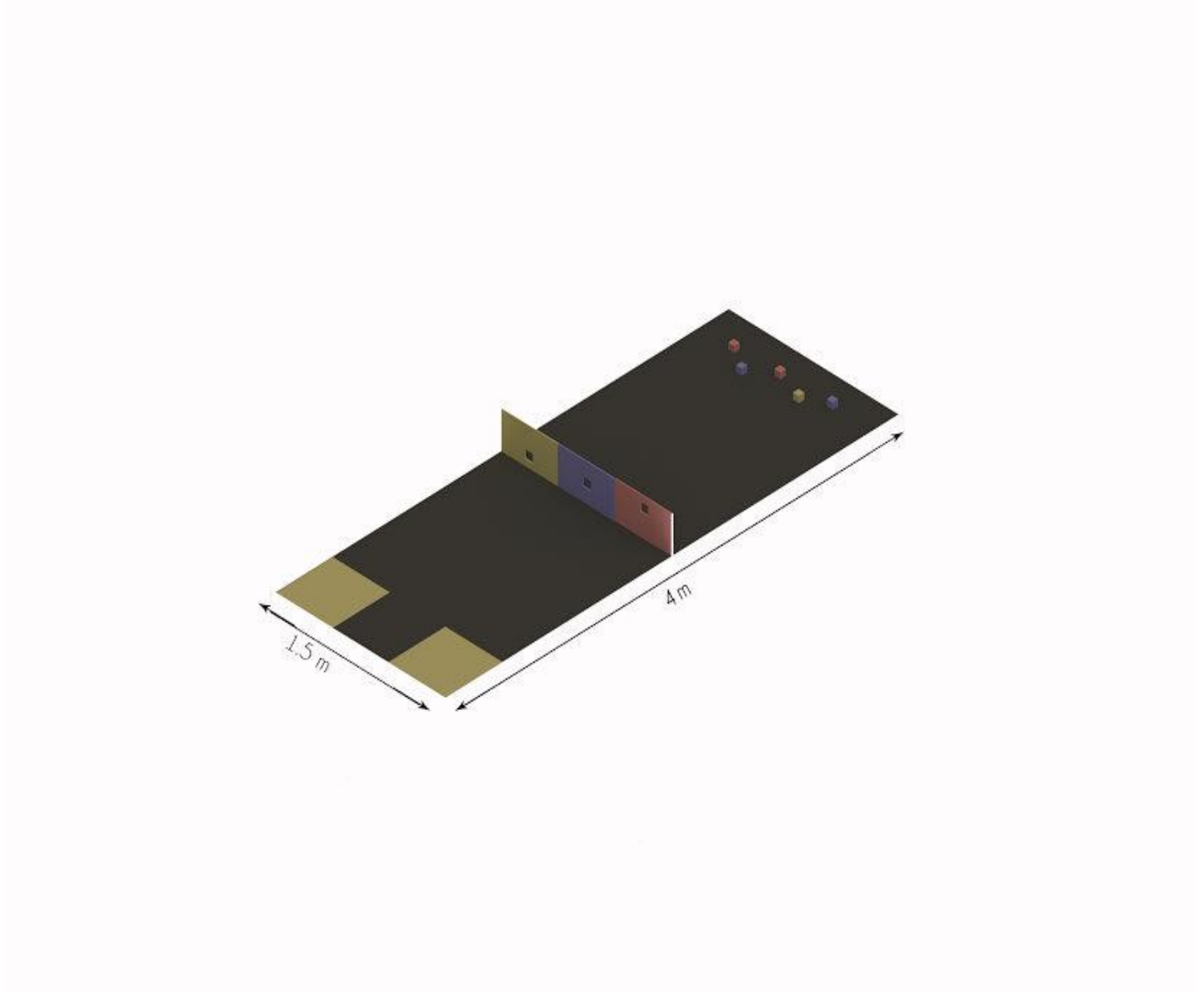


Fig: M02: Isometric View: Arena

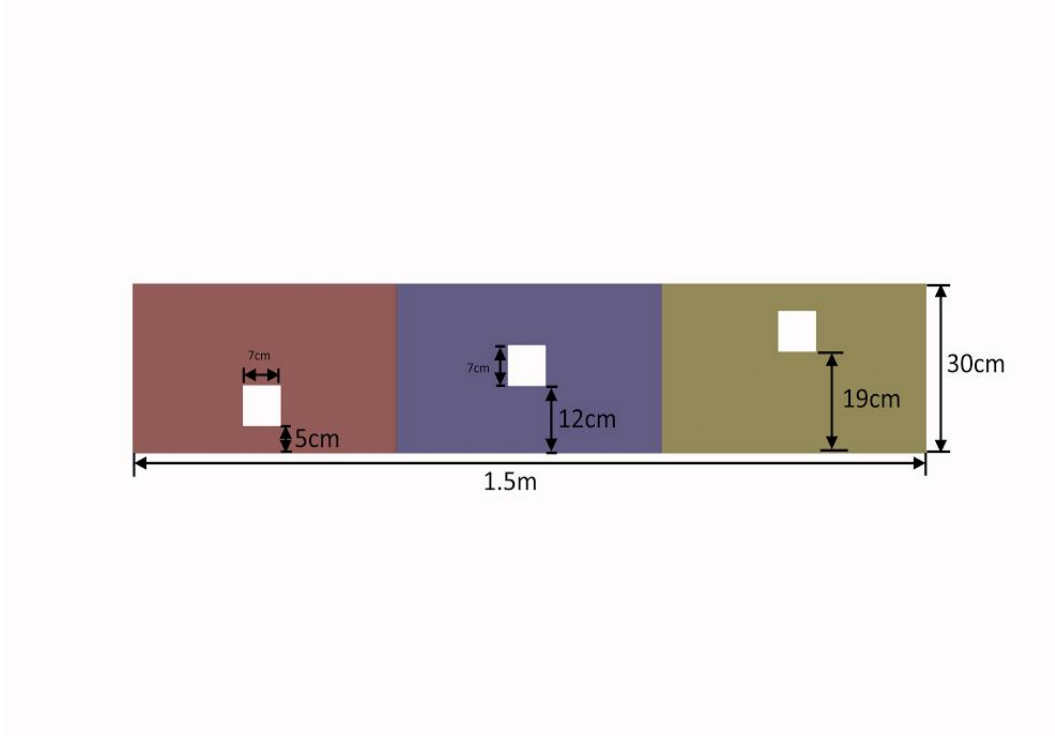


Fig: M03: Front View: Portal

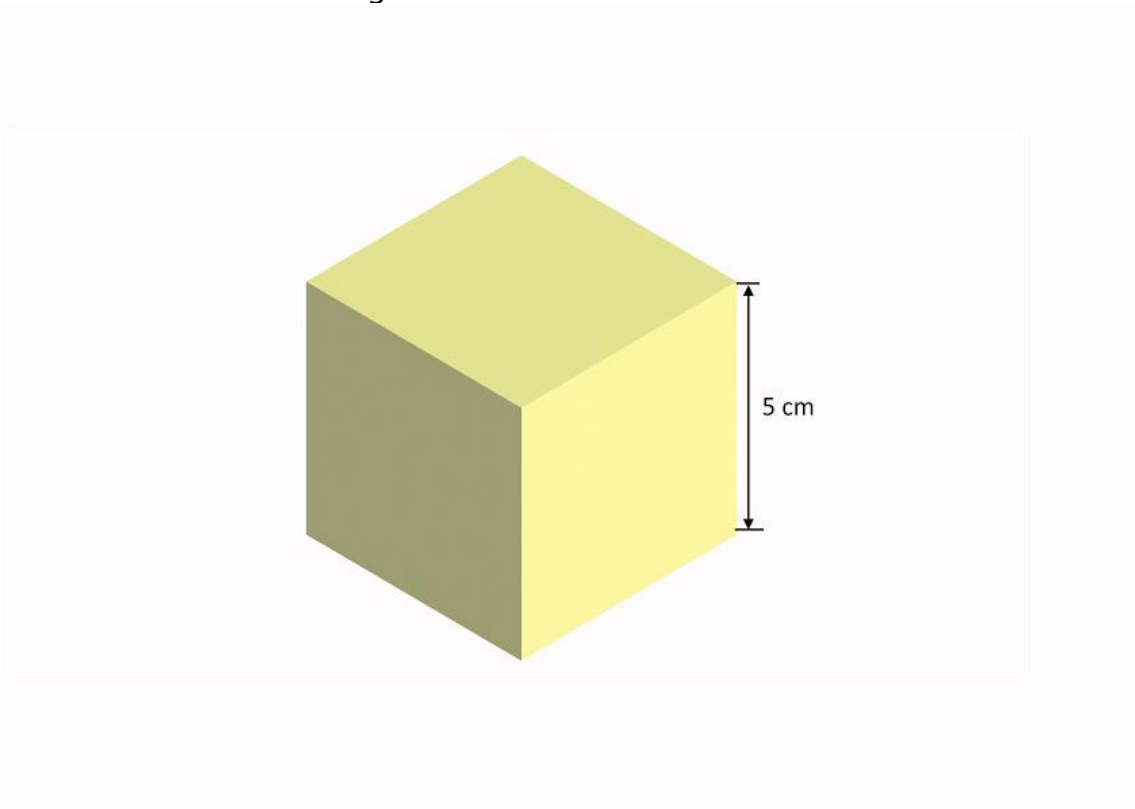


Fig: M04: Isometric View: Sample Ore Block

Bot Specifications

1. Maximum dimension allowed for the bot is 25*25*25 cm (l*b*h) and the extended length (stretched in a single direction) with the gripping arm stretched should not exceed 35cm.
2. In case the team is using a non-electric power supply, the team must get it approved from the organizers beforehand via email. Organizers will not be responsible for inconvenience if approval is not sought.
3. The wires for the power supply should be at least 15 metres long.
4. In all cases, any on-board power supply devices like batteries are to be included in the maximum dimension limit.
5. Potential difference between any two points on the bot should not exceed 24 volts.
6. The bot dimensions would be subject to tolerance of 5%.

CERTIFICATION POLICY

1. Top 3 teams will be awarded by Certificate of Excellence for the event.
2. Prize money worth 30,000 INR will be distributed to the winner teams.
3. The winner team has to complete the task, if they fail to complete the task then they will be not eligible for Certificate of Excellence.
4. Participation Certificate will be awarded to the teams who are registered at the event arena with bot approved by the event manager.