TECHFEST 2023-24
COZMO CLENCH

TASK

- Teams have to build a manually controlled bot that can do simple tasks of gripping objects and putting them in target zones so that it can complete the route by overcoming the hurdles in its path.

BOT SPECIFICATIONS

- The dimensions of the bot should be less than or equal to 300 mm X 200mm X 300mm (lxbxh) failing which the team will be disqualified from the competition (this excludes the dimension of the gripper but includes tires). The bot can, however, extend its dimension once the run starts. An error of (±5%) is permitted.
- The bot must be controlled manually.
- Teams can use both wired as well as wireless control mechanisms. In the case of wired bots, the length of the wire should be a minimum of **2 metres** so that the wire remains slack at any instant of time. If the participants use a wireless mechanism they have to use either a dual-frequency remote, Bluetooth, or Wifi.
- The dimensions of the remote are not included in the size constraint of the bot.
- The Bot must have an onboard power supply in any case.
- Participants are not supposed to use any readymade Lego components or readymade gripping mechanism. However, the participants are allowed to use ready-made gear assemblies.
- The mechanism used should be such that only one person will control the bot.
- Failing to meet any of the above specifications will lead to immediate disqualification.

POWER SUPPLY

- The participants should use an onboard electric or non-electric power supply i.e. the power source should be on the bot itself. The power source must be non-polluting and must satisfy the safety constraints determined by the organizers. In the case of the non-electric power supply, the participants must get it approved by the organizers beforehand via email. Organizers are not responsible for the inconvenience if approval is not sought.
- In the case of an electric power supply, the voltage between any two points should be less than or equal to 24V DC at all times during the run.
- AC power supply will not be provided and cannot be used in the competition.

ARENA

- The outer dimensions of the arena are 2500mm X 2500mm (lxb).
  It consists of the following:
  - Five thermocol blocks out of which four (block 1,2,3 & 4) of dimensions 120mm X 120mm X 120mm (lxbxh) and one block (block 5) of diameter 120mm and height 120mm.
  - 3 Circular Pipes of dimension 400mm length & 10mm Radius.
  - 2 Semi-Circular Pipes of dimension 400mm length & 20mm Radius.
  - "**Deposit Zone 1**" of dimensions 150mm X 150mm (lxb) (shown in green light colour).
  - "**Deposit Zone 2**", "**Deposit Zone 3**" of dimensions 200mm X 130mm X 120mm (lxbxh) (shown in light green).
  - "**Deposit Zone 4**" of dimensions 120mm X 120mm X 120mm (lxbxh) (shown in light green colour).
  - "**Deposit Zone 5"** of diameter 150mm (shown in light green colour).
  - Ramp assembly has an inclination of **20 degrees**.
  - One Half Ramp assembly with a declination of **~30 degrees**.
  - One Half Ramp assembly of inclination **15 degrees** before the sand pit.
  - Two square rods of width 40mm with a gap of 300mm between them.
  - A curved Box of marbles of dimensions 400mm X 25mm (bxh) and arc angle of 90°.
  - The ramp after Checkpoint C has inclination and declination of 23 degrees and three smaller triangles of height 15mm and base 40mm each.
  - The strip bridge (in Fig. 6) spans over a dimension of 540mm X 400mm X 200mm.
  - Each strip is of width 80mm and the gap between them is 80mm.
  - The bridge (in Fig. 6) spans over a dimension of 550mm X 400mm X 100mm.
  - An individual wood piece (in bridge) is of dimension 400mm X 25mm with gaps of dimension 400mm X 10mm.
  - 3 stairs each of width 50mm and height 45mm.
  - 3 half ramp assemblies of dimension 175mm X 120mm X 60mm (lxbxh) with a gap of 80mm between first two and 100mm between last two.
  - Sand Box of dimensions 400mm X 400mm X 25mm (lxbxh).
  - "**Checkpoints" A, B, C & E** of Dimensions 400mm X 40mm are shown in Green Colour.
  - "**Checkpoint D**" of dimensions 400mm X 30mm is shown in Green Color.
  - "**START**" and "**FINISH**" of dimensions 400mm x100mm are shown in Green Colour.

Fig.1 Top View

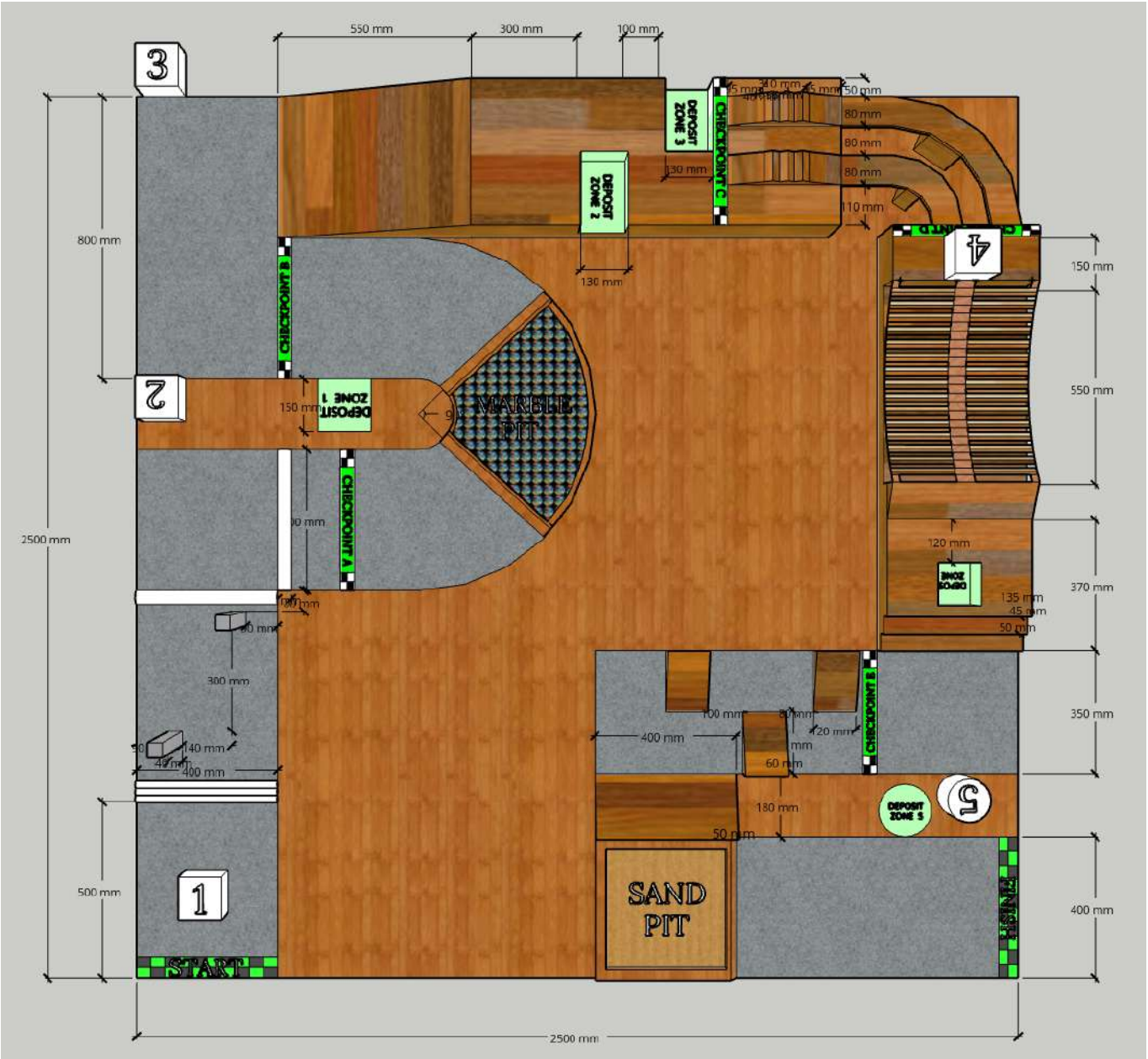


Fig.2 Side View

Fig.3 Side View

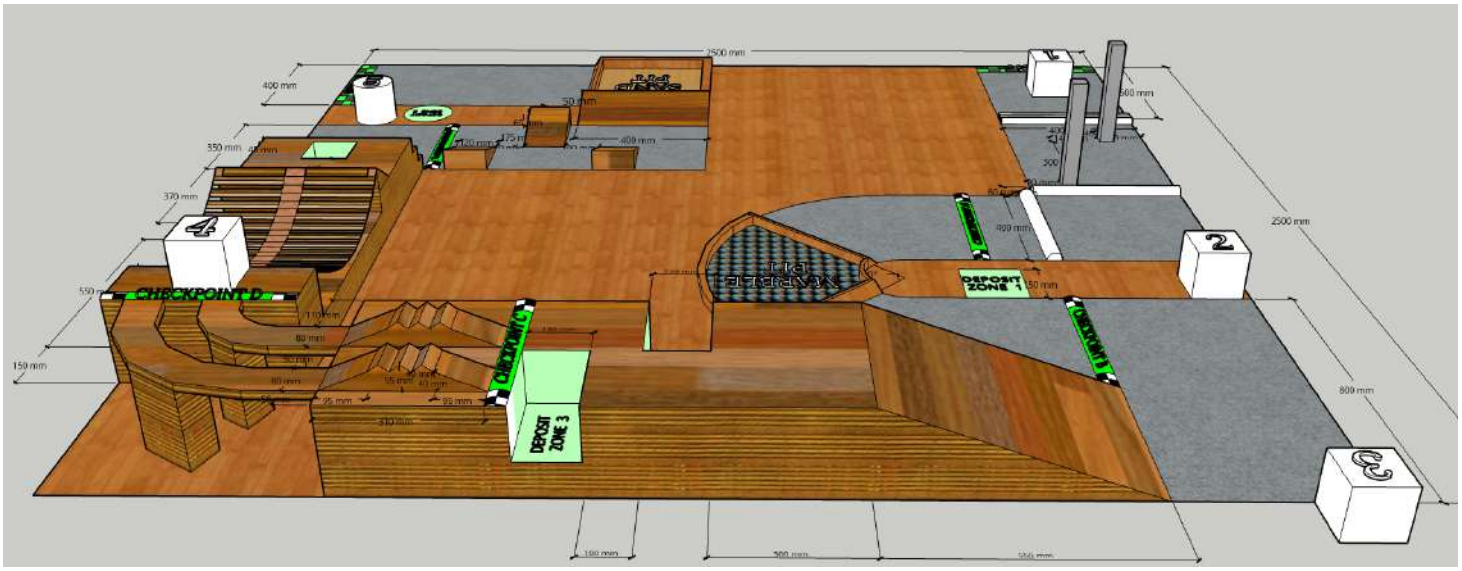


Fig.4 Start

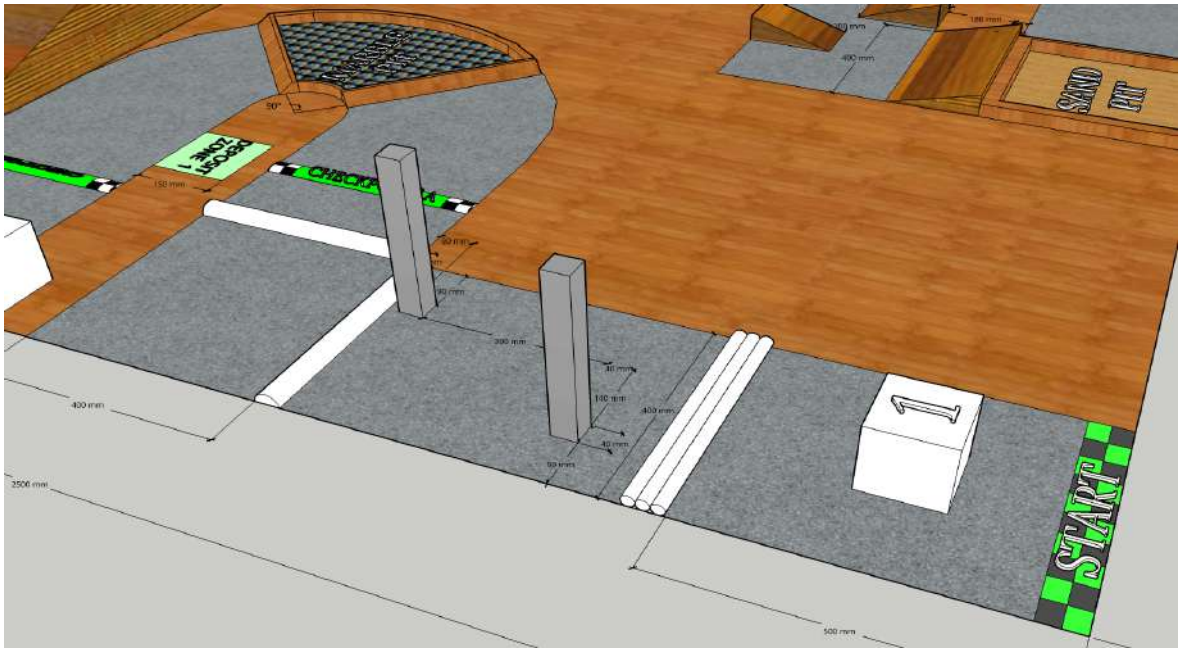


Fig.5 Checkpoints A,B and C

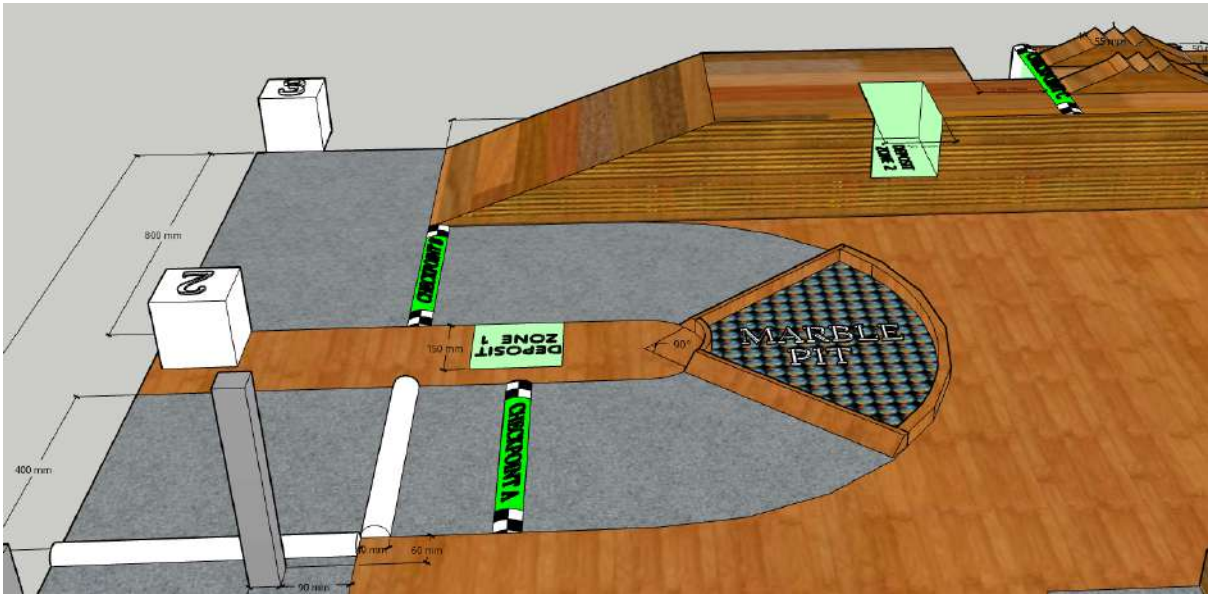


Fig.6 Bridge and Checkpoint D

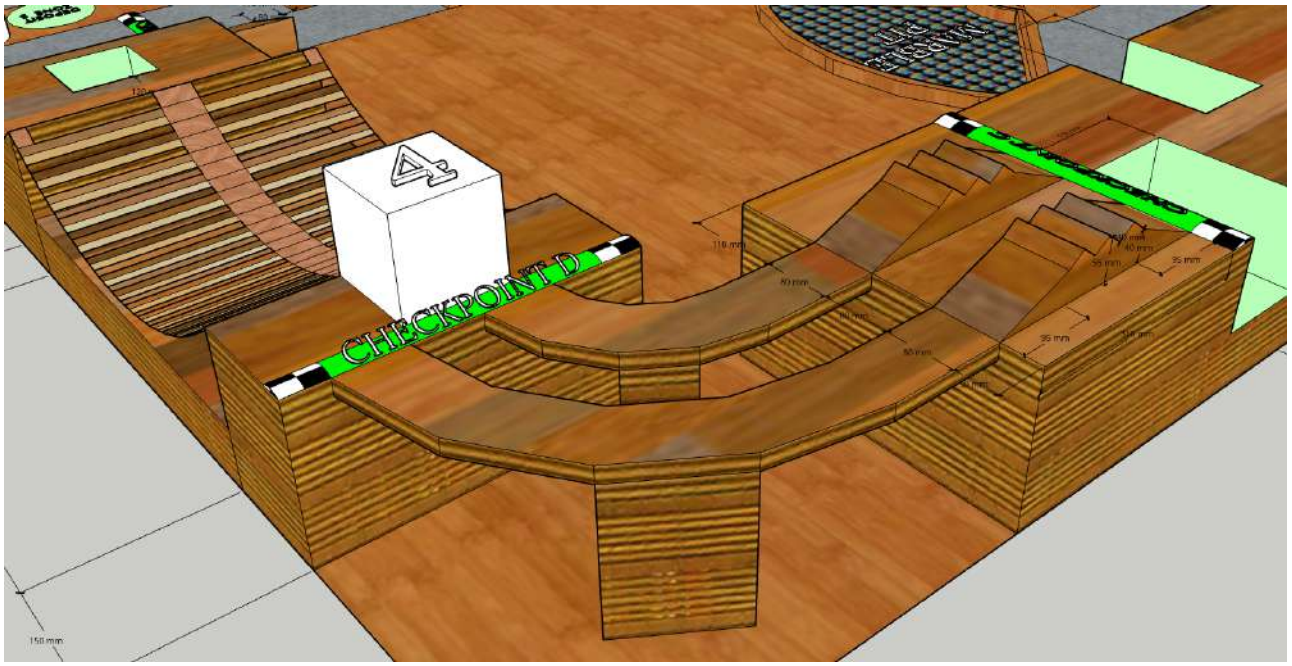
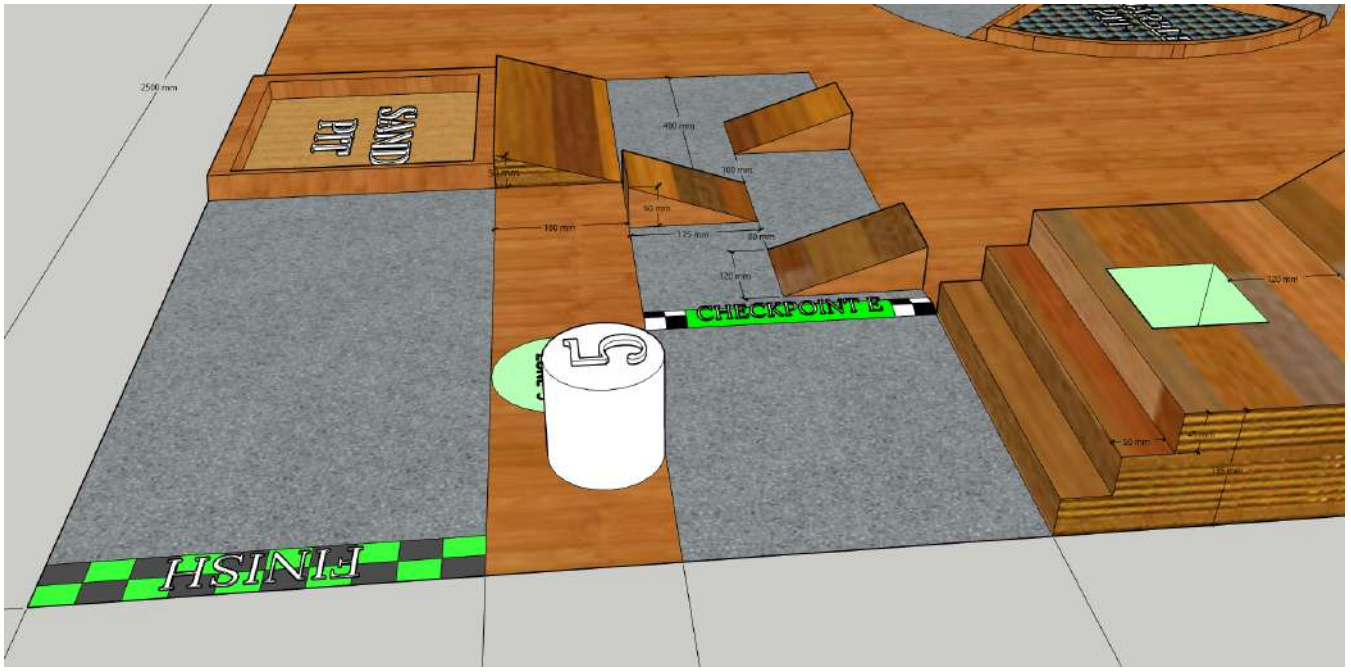


Fig.7 Finish



GAMEPLAY

- The bot must start from the '**START**' mark.
- The bot has to arrive at Checkpoint A by manoeuvring through the obstacles along the track while carrying Block 1.
- The bot has to place Block 1 in Deposit Zone 1 after crossing the marble pit.
- The bot arrives at Checkpoint B after placing the Block 1 in Deposit Zone 1.
- Now, the bot has to pick Block 2 and place it at Deposit Zone 2. If Block 2 gets dropped on the ramp, the bot will have to go again to Checkpoint B.
- Once Block 2 is placed in Deposit Zone 2, the bot has to go down the ramp and pick Block 3 to put it in Deposit Zone 3. **If Block 3 gets dropped on the ramp, bot will have to go again to the top of the ramp and descend.**
- After this, the bot arrives at Checkpoint C.
- Bot passes through the ramp assembly and cross the strip bridge to reach Checkpoint D.
- **If bot goes off track on the strip bridge then it has to go back to Checkpoint C.**
- Now, the bot has to pick Block 4 and place it in Deposit Zone 4. If the block gets dropped while moving on the bridge, it has to go again to Checkpoint D.
- After placing the Block 4, **if bot falls while descending through stairs, it has to restart from Deposit Zone 4 instead of going back again to Checkpoint D**.
- Bot has to descend through stairs and pick up Block 5 to reach Checkpoint E.
- After this, the bot has to manuever through the half ramp assemblies and jump from the ramp (inclination of 15 degrees) and land safely in the Sandbox. **If the Block gets dropped while landing, then again it has to go back to Checkpoint E**.
- The bot has to place Block 5 in Deposit Zone 5 while crossing the obstacles.
- Then it has to cross the gate to arrive at the final **FINISH** mark to finish the run.
- There might be **surprise obstacle(s)** in the track (images are for descriptive purposes, the actual track might be different).

GAME RULES

- The bot would be checked for safety before starting and will be disqualified if found unsafe for other participants.
- **Only one team member is allowed to handle the bot.** No other team member is allowed to enter the arena.
- The bot will be liable for disqualification if it causes any kind of damage to the arena.
- The bot is not allowed to slide the blocks against the ground except for fine adjustments in the Deposit Zone.
- Any damage done to the blocks will lead to immediate disqualification.
- **One technical timeout of 30 seconds** can be taken during the run.

- A maximum of **6 minutes** will be given to each team.
- The arena has 5 checkpoints. In case the bot gets stuck at any place, then the block it is carrying (if any) will be repositioned at its initial position and the bot will be kept in the checkpoints corresponding to that zone. There will be no penalty for this.
- Blocks that are correctly deposited in deposit zones/pushed from the ramp won't be disturbed.
- The timer won't be stopped during this process.
- Each team can **skip a maximum of 5 hurdles** during the race (no penalty for skipping).
- **In case of any disputes/discrepancies, the organizer's decision will be final and binding.**
- **The organizers reserve the right to change any or all of the above rules as they deem fit.**
- Change in rules, if any will be highlighted on the website and notified to the registered teams.

JUDGING

- 30 points will be awarded for successfully crossing hurdles between the START mark and Checkpoint A.
- 20 points will be awarded for crossing the marble pit.
- 20 points will be awarded for placing Block 1 in Deposit Zone 1.
- 20 points will be awarded for placing Block 2 in Deposit Zone 2 and crossing the wedge, points will be awarded only once for crossing the wedge. Points will not be awarded if the bot crosses the wedge multiple times.
- 20 points will be awarded for placing Block 3 in Deposit Zone 3.
- 30 points will be awarded for crossing the ramp assembly and strip bridge combined.
- 20 points will be awarded for placing Block 4 in Deposit Zone 4.
- 60 extra points for crossing the bridge.
- 10 points will be awarded for successfully surpassing the stairs.
- 20 points will be awarded for crossing the half ramp assemblies.
- 30 points will be awarded to Land safely in the Sand Box while holding Block 5.
- 20 points will be awarded to keep Block 5 in the Deposit Zone 5.
- In case the bot falls/crosses the referred path then 10 points will be deducted and the bot will be placed at the previous Checkpoint corresponding to that zone as shown in Fig. 1.

SCORING

- A = Points scored.
- P = Penalties
- T = (360 -Time taken in seconds) / 2
- **Total points scored = A + T - P**
- The team with maximum points will be declared as the winner.

TEAM SPECIFICATIONS

- A team may consist of a **maximum of 4 members.**
- Students from different educational institutes can form a team.

ELIGIBILITY CRITERIA

- All students with a **valid identity card** from their respective educational institutes are eligible to participate.

TIMELINE

- The **top 5 teams** from the Wildcard **round**(which will be held from **27th December 2023**) will qualify for the Grand Finale at Techfest 2023-24.
- The **Grand Finale** will be held from **28 December 2023.**
- The top three teams in the grand finale will be awarded Certificates of Excellence.

- **Update:** Please fill this google form along with an abstract to confirm your registration. (Google Form - https://forms.gle/dcMDTgmjC8gDVyed8)

CERTIFICATE POLICY

- E-Certificates of participation will be given to top 5 winners and the teams scoring more than the critical marks which will be decided later.

PRIZE MONEY

- The Prize money will be awarded to the **top 3 Winners** of the Final Round via NEFT and will be processed within **30 working days** after receiving the Prize Money from Sponsors.
  The Winners have to mail the following information (immediately after the announcement of the results) to akshat@techfest.org.

  Subject: Cozmo Clench, team id- your position (example- Cozmo Clench, CZ10005- 3 rd Position)

  Body of mail-
  1. Account Holder's Name
  2. Account Number
  3. Bank name and Branch name.
  4. IFSC Code