7 STONES

EVENT DESCRIPTION :

Let's play the traditional game of 7 stones the engineer's way.

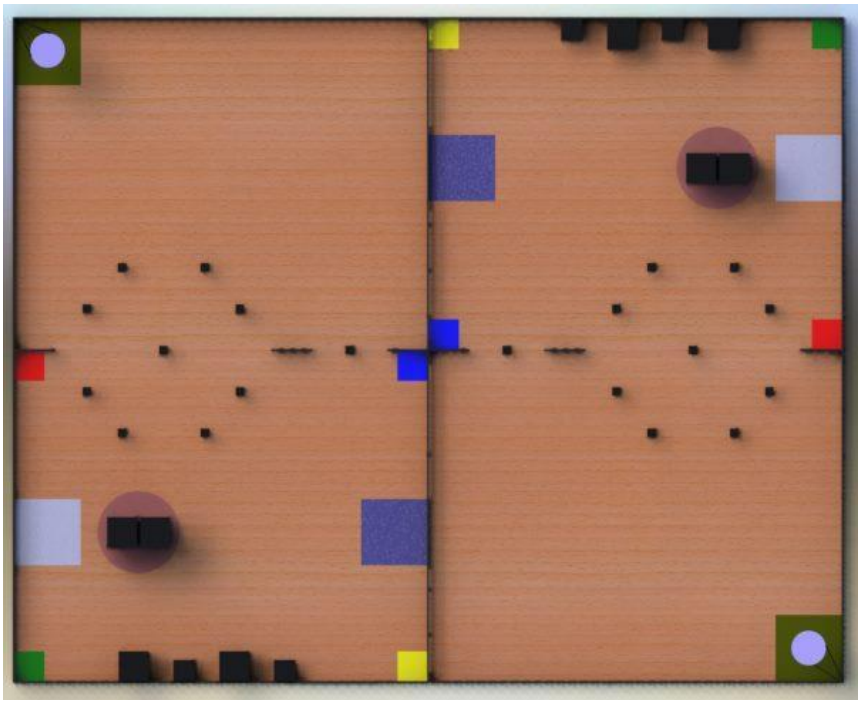
Seven Stones, a traditional South Indian game, is a game played between two teams in a bounded area involving a ball and a pile of flat stones. A member of one team (the seekers) throws a soft ball at a pile of stones to knock them over. The seekers then try to restore the pile of stones while the opposing team (the hitters) throws the ball at them. If the ball touches a seeker, he is out and his team continues without him.

Pragyan'15 gives you an opportunity to play the traditional game like an engineer.

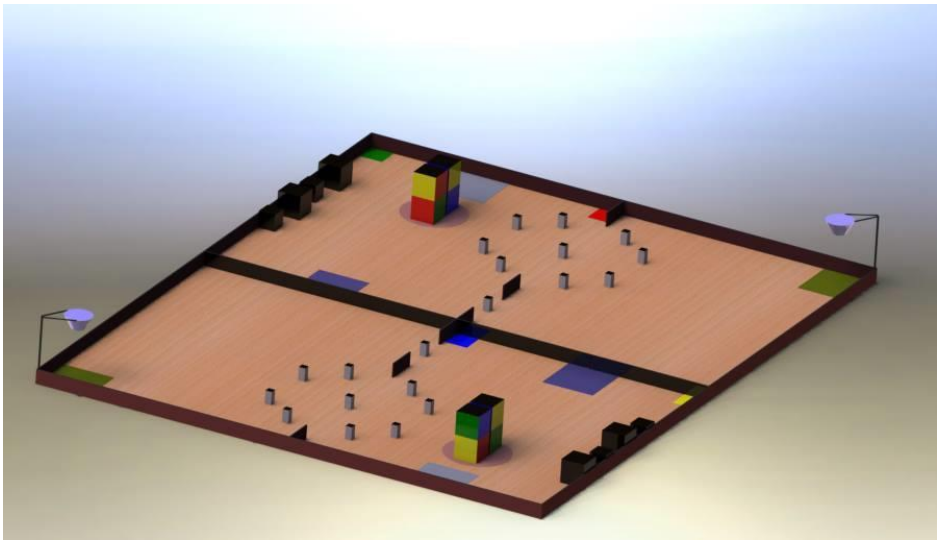
FORMAT :

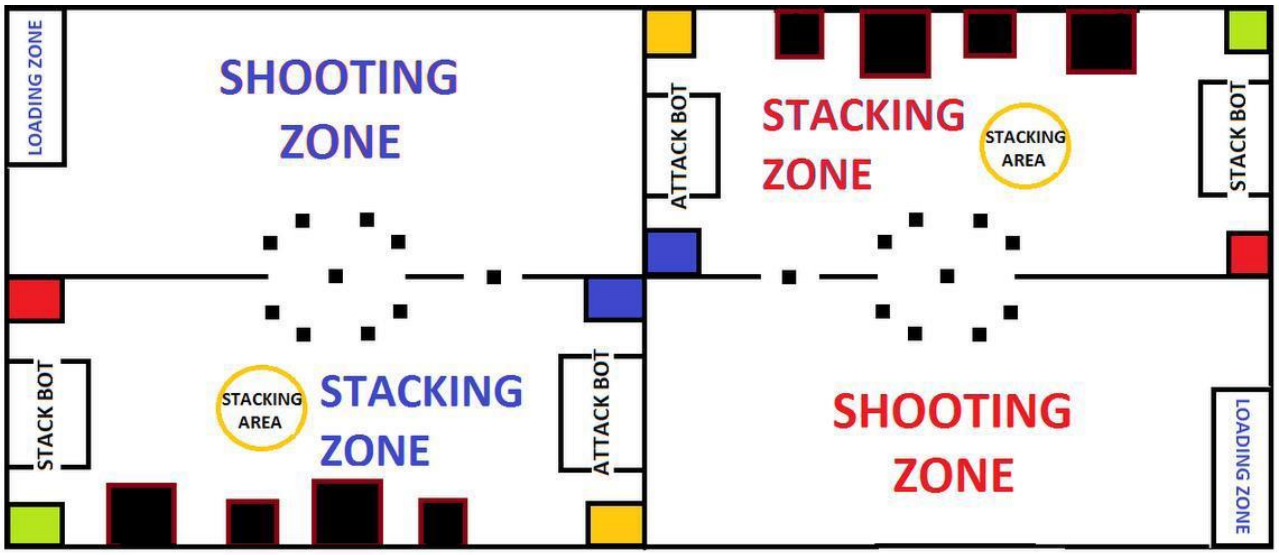
The Game Field consists of a Game Area having the dimension of 500cm X 400cm which is equally divided for two teams, and this game arena is divided into four quadrants, two for each team.

TOP VIEW OF THE ARENA:



ISOMETRIC VIEW OF THE ARENA:





STACKBOT: Starting Position of the stack bot.

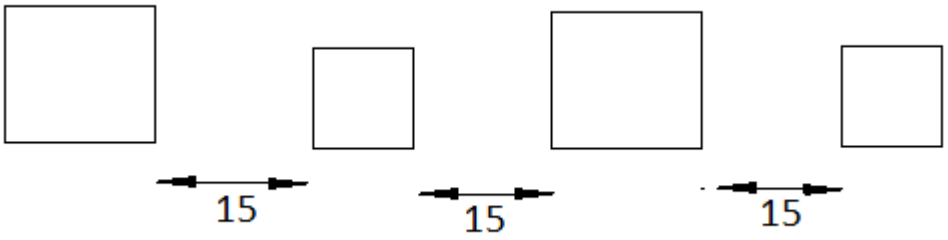
ATTACKBOT: Starting Position of the attack bot.

SHOOTING ZONE: Arena from where the attack bot can shoot at the opponent stack of boxes or the opponent's stack bot.

LOADING ZONE: Loading Zone is the place where the attack bot has to collect table tennis balls to shoot at the opponent.

MULTICOLOURED BOXES: 4 multi-colored boxes will be present in the stack arena. One pair of opposite sides is black and the rest four sides are red, yellow, green and blue respectively in order. Edge length is 10cm.

SINGLE COLOURED BOXES: Single colored boxes of dimensions 10cm and 8cm will be present in the arena. New boxes will be replaced as the boxes are used up. Distance between two faces of the cubes is 15cm.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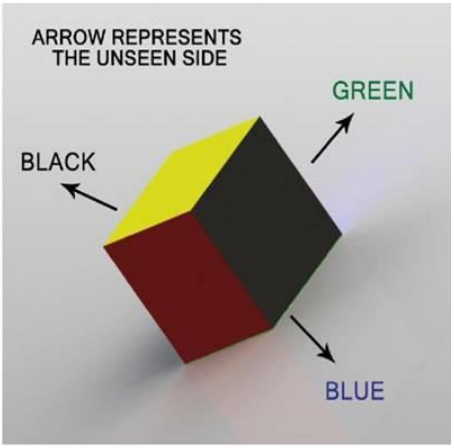
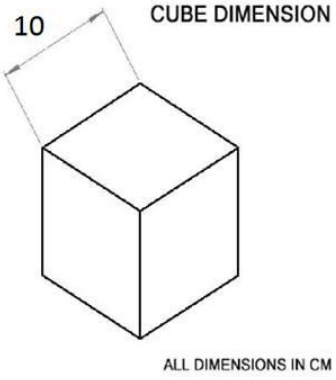

ARROW REPRESENTS
THE UNSEEN SIDE
GREEN
BLACK
BLUE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CUBE DIMENSION
ALL DIMENSIONS IN CM

The Game is one on one match in which one team competes against the other team. On the blow of the whistle the game begins.

The left half of the arena is for Team1 and the right half for Team2.

FROM THE POINT OF VIEW OF TEAM 1

TASKS FOR THE STACK BOT

- Initially both the stack bot and the attack bot are placed in their respective start positions as shown in the arena. The attack bot is initially inactive.
- The stack bot should pick up the multi colored boxes from the stack area and should place it over the colored strips in the corner, in such a way that the top face color matches with the stripe color.
- As soon as one team completes arranging the boxes, the attack bot of both the teams are released. Both the attack bots are released if no team completes placing the 4 colored boxes within 6 minutes.
- Now the stack bot can start stacking 7 black boxes inside the stacking circle.
- Teams would get points according to the number of boxes stacked in stack zone at the end of the game.

The game ends when the stacking bot places seven single colored boxes inside the stacking circle or when time limit of eight minutes starting from the time attack bot is released.

TASKS FOR THE ATTACK BOT

- Both shooting bots are expected to proceed to the attack zone either through gate 1 or gate 2 once they are released.
- Gate1: The attack bot should move over an obstacle of dimensions 5cm x 5cm x 10cm.(height : 10cm) NOTE: If the bot lifts its base by a minimum of 5 cm from its normal base position to move over the obstacle then the team is awarded a bonus of 50 points.
- Gate 2: The Gate 2 consists of 9 obstacles as shown in the figure. The bot should move in between the obstacles without touching them. Points will be deducted on touching the obstacles.
- Once the bot reaches the attack zone the bot should load the ping pong balls in the loading zone.
- Maximum of 3 balls can be loaded in the bot at a time and can be reloaded later.
- There will be a funnel of height 10cm in the loading zone through which the ping pong balls will be dropped . The lower end of the funnel is at a height of 40cm from the ground level. The bot should orient itself to receive the balls from the funnel.
- The participants are allowed to load the balls into the funnel once the bot reaches the loading zone.
- The attack bot can shoot either at the opponents black boxes in the stack circle or at the opponents stack bot till the game ends.

RULES :

Bot Specification:

- Each team shall use only two manual robots (one shooting bot and one stacking bot).
- Maximum dimensions of the robots at the start of the game are 350 mm in width, 350 mm in length and 400mm in height. The robots can extend after the start of the match (applicable for both the bots).
- Maximum allowable weight of the robot is 8kgs
- The robot must not use ready made parts (like controllers, sensors, boards/development boards etc.) and shall be designed and constructed by the students themselves. If a self-designed PCB is used, a copy of the Gerber file or schematic has to be produced before the match.
- Manual robot can be wired or wireless. In case of wired bot, the length of the cable should be at least 4 meters and in case of wireless controlled bot, the communication of the bot should not interfere with the opponent bot (e.g. In case of RF controlled bot, make sure transmission is possible with two different frequencies).
- The maximum voltage between any two points can be 12V.
- Hydraulics or chemical energy should not be used for any mechanism, however pneumatics can be used and in case of use the pressure should be less than 6 bars.
- If a team is using Li-Po or Li-ion batteries, it is the team's responsibility to make sure there is no risk involved in its usage.
- The robot or the operator cannot modify the arena in any case.

Rules and Regulations:

- A robot cannot split into two subparts. Subpart implies a robot which has a drive mechanism of its own.
- The manual robot operator CANNOT walk on the arena but should not disrupt any part of the arena. Damage to arena is unacceptable and will lead to instant disqualification.
- All the statements written in this Problem Statement form the official framework of the rules to be followed by the teams. Violation of any statement in the Problem Statement may lead to disqualification.
- Referees have all rights to ask the teams to produce the additional explanations on design issues. Also the referees can ask for additional explanation on the safety of the bots if required anytime during the event.
- Participating robots will be checked and tested, according to these rules and regulations.
- In case of any technical glitch in any manual robot, the robot can be brought back to the start zone.
- A retry can be opted at any time in the match and no additional time would be provided. The referee needs to be informed before going for a retry.
- Mechanisms on the robot cannot be changed during the course of the match.
- Intentionally touching either blocks or robots with hands will be considered as penalty and 25 points will be reduced from the total score.
- Game field dimensions are subject to a tolerance of ±5 %. No tolerances will be given in case of maximum bot dimensions.
- The authenticity of any action not provided for in this rule book shall be subject to discretion of referees.

Team Specification:

- Maximum no of players per team is 6.
- Intercollege teams are allowed.
- Only 2 players are allowed to enter the arena.
- Players are not allowed in the stacking arena.
- All the participants should carry their College ID cards.
- No two teams registered can have common participants.

JUDGING CRITERIA :

Scoring:

- For each multi-color box kept over the colored stripe will be awarded 20 points.
- If a team keeps all the multi colored boxes within 6min, before the other team does and releases the Shooting bot, extra 50 points will be awarded.
- For keeping each box on the stack, 15 points for larger black box and 20 points for smaller black box will be rewarded.
- If a team completes the stacking of 7 boxes first they will get 100 points
- At Gate 1, if the bot lifts its base by a minimum of 5cm from its normal base position to move over the obstacle then the team is awarded a bonus of 50 points.20 points will be awarded if Gate 1 is crossed without touching the obstacle.
- Touching the obstacles in the Gate 2 brings a penalty of 5 points for each obstacle touched. On crossing Gate 2, 30 points will be awarded.
- If the ball hits the stack (single colored boxes inside the stack circle) 10 points will be awarded for each hit.
- If team hits the stacker bot, 20 points will be awarded for each hit.
- If a team hits the opponent's attacker bot when in stack arena, 30 points will be awarded for each hit.

Judging criteria:

- Participant start with zero points
- For each correctly placed colored box +20 and the first to finish placing all the boxes +50.
- Shooting bot crossing the obstacle +50.
- Shooting the box or the bot from zone A -20, from zone B -30, from zone C -40 for the opponent team.
- Each time the box is hit – (denomination of the box)
- Each time the bot is hit ,the bot must go into the freezing zone within 20 seconds ,for each extra 5 seconds taken -20
- Participant who scores the highest wins.

PROBLEM STATEMENT :

The problem statement is quite simple, the match ends when either of the team stacks seven boxes (either small or big) in the stacking circle present in the stack zone. The team with the higher score is the winner. Each match will be between two teams (Team 1 and Team 2). The participant should build:

- One stack bot (pick and place bot) that is capable of moving the cubes and at the same time it should be able to rotate the cubes according to their color. The bot must be able to stack boxes of the sizes mentioned below one over the other.
- One Attack bot that is capable of aligning and shooting table tennis balls at the opponent's stack of boxes or the opponents stack bot. The bot must be able to cross the different arena to reach the shooting quadrant.

FAQ :

1. What is the maximum number of people in a team?

Maximum of 6 people in a team are allowed.

2. Is it necessary that all the team members should be from the same college?

No, it is not mandatory that all the team members should be from the same college.

3. Can any part of robot detach from itself?

No, any kind of separation or detaching things from the robot is not allowed.

4. Is it compulsory to make two bots for participating in the competition?

No, the participants can also come with the stacking bot alone (but making a stacking bot is mandatory).

5. Will the ping pong ball be provided by the organizers?

Yes, the ping pong balls will be provided by the organizers.

6. Is it mandatory to load 3 ping pong ball every time?

No, 3 ping pong ball will be given to the participants each time the bot enters the loading zone, the participants can use any number of them to load (lesser than 3).

7. Will points be deducted if the participant controlling the bot obstructs the ball?

The participants will be given specific areas only within which they can control the bot in such a way that they do not obstruct the game.

RESOURCES :

1. **http://www.robotshop.com/blog/en/how-to-make-a-robot-lesson-1-3707**

2. **http://playwithrobots.com/make-it-form-scratch/manually-controlled-robot**

PRIZE MONEY: Worth INR 50,000

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