RUSH HOUR

Event Description:

This is an autonomous robot competition. In the first onsite round, the robot performs a training session where it follows a path surrounded with obstacles. And in the final onsite round, the robot is made to search for a box in a line maze and return to the starting point through shortest path. For Finals, teams will be given with wireless communication based kit which should be integrated in their robot. For further details, refer problem statement.

It is compulsory that the bot is to be made with the components provided.

The last date of the abstract submission is **January 30, 2016**.

CASH PRIZES WORTH **25,000** INR to be won.!!

Event Format:

This event consists of two phases.

Phase 1 (Online):

Abstract submission (Eliminative)

Abstracts should be sent to rushhour@pragyan.org

The format of abstract can be downloaded from the following link https://www.pragyan.org/16/home/events/robovigyan/rush_hour/format/Guidelines%20for%20the%20submission%20of%20the%20abstract%20are%20as%20follows.docx

Each team is allowed to make only one submission. In case of multiple submissions, only first submission will be evaluated.

Shortlisted abstracts will receive MSP-EXP430G2 from Texas Instruments. The components sent must be used for the bot.

Phase 2 (Onsite):

Preliminary round (Eliminative)

Final round

Judging Criteria:

Preliminary Round:

- Time to reach the destination + Obstacle avoidance.

Final Round:

- Implementation of wireless communication based kit + maze algorithm + time it takes for shortest path.

Event Rules:

- Any student with a valid identity card (from their respective educational institution) is eligible to participate in the event.
- All teams will be given a calibration time of 10 minutes.
- Maximum time allotted for one trial is 10 minutes.
- The starting procedure of the robot should be simple and should not involve giving the bot any manual force or impulse in any direction.
- Each team is allowed a maximum of 3 trials. All trials require the approval of the presiding judges before the bot can be removed from the arena. In each trial, the timer and points will be set back to zero. The best time/points of the three trials will be considered.
- The judges can reduce the number of trials for any team if time constraint arises.
- During a trial, the bot will have to be restarted by putting it back on the start zone. For a trial, the bot will have to be in “Power Off” mode and turned on again at the start zone on the signal of the judges.
- Between the trials, participants should not feed information about the arena to the bot.
- However, participants are allowed to: adjust the sensors (Gain, Position etc.), change speed settings and make repairs. However, a participant should not alter a bot in a manner that alters its weight (e.g. removal of a bulky sensor array or switching to lighter batteries to get better speed).
- The judges shall arbitrate the points earned by the team till that time will be retained.
- Participants will not be allowed to handle the obstacle positions on the track. Only event managers are allowed to handle the obstacles.
- Participants are not allowed to keep anything inside the arena other than the bot.

- The judges may stop any robot at any time if they feel that it is performing, or is about to perform, any action that is dangerous or hazardous to people or equipment. No robot is allowed to use any flammable, combustible, explosive or potentially dangerous processes.
- Readymade sensors (e.g. line array sensors) could be used.

Robot Specifications:

- The dimensions of the bot should be within 200 x 200 x 200 millimeters (Length x breadth x Height).
- The Potential Difference between any two points in a robot should not exceed 12V.
- The Bot must only have on-board power supplies.
- The Bot should not have any sensor for sensing the environment around. (e.g. Kinect)
- Use of on-board camera is prohibited.
- The organizers reserve the right to disqualify any bot that is found to not adhere to the given specifications.

General Rules:

- The time and points measured by the organizers will be final and will be used for judging the teams. Time or points measured by any participant by any other means is not acceptable for scoring. In case of any disputes / discrepancies, the organizers' decision will be final and binding.
- Participants must bring their own computers, programmers and software if they wish to program their robots at the competition site.
- The participants are requested not to assume anything without discussing with the event managers.
- The organizers reserve the rights to change any or all of the above rules as they deem fit.

Team Composition:

- Maximum of 4 participants per team.
- Teams should register themselves online.
- No person shall be a member of two teams.
- A team can constitute of member from different colleges.
- Participants are requested not to assume any details.

- Other details regarding the arena can be clarified directly with the event managers.

FAQ:

- Who can participate?

Students from any college or university can participate in this event. If you are a beginner, resources may help you out.

- How many members are allowed on a team?

A team can have a maximum of 4 members.

- Can I participate without submitting the abstract?

NO, abstract is the important and necessary part of the event and is required as it is the first selection criteria for participating.

- Is there any prerequisite to register for this event?

NO.

- Will any facility for charging our equipment be given at the venue?

Yes, 220V power supply with extension cords will be given.

- Do I need a working prototype when registering for the Event to pass Phase 1?

No, the final working robot is needed only when you come down to Pragyan - to compete in phase 2. You need to describe the design aspects, Team members and team name in the abstract which you submit in phase 1.

Resources:

- http://www.argenox.com/library/msp430/
- http://www.embeddedrelated.com/blogs-1/nf/Enrico_Garante.php
- http://www.ermicro.com/blog/?p=2104
- http://learningmsp430.wordpress.com/2014/01/10/line-follower-using-msp430g2-launchpad/
- http://www.instructables.com/id/Maze-Solving-Robot/

Contacts:

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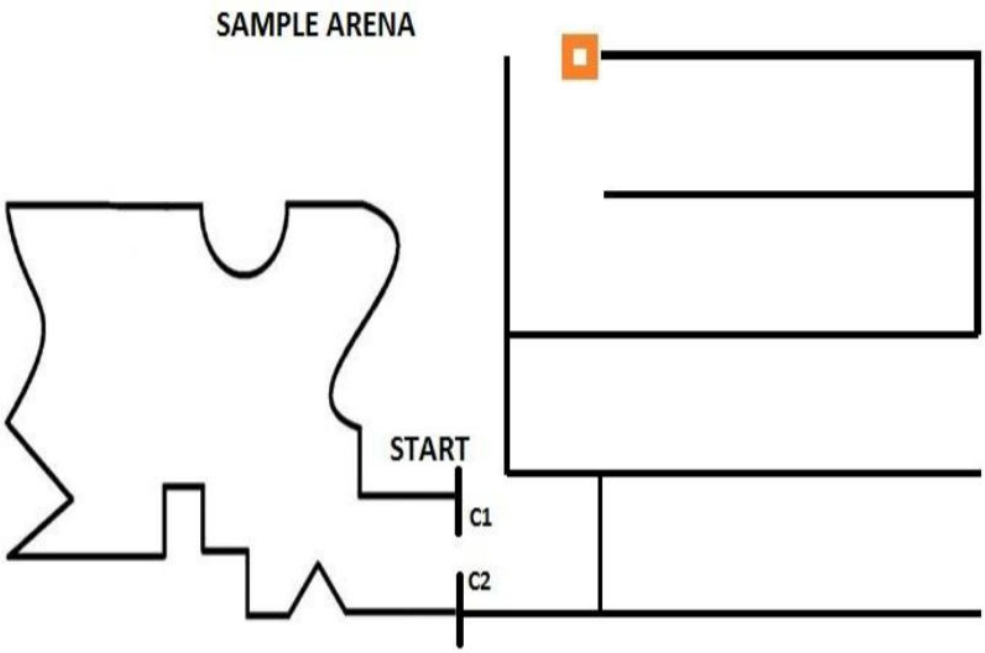
Problem Statement:



In the preliminary round, the bot will have to traverse on a black line drawn on a white background which will include acute angle turns, curved tracks and obstacles placed on the track.

Top teams from prelims will be given with special kit which they have to integrate with their existing bot for the final round. Any queries regarding the final round before the completion of preliminary round will not be encouraged. Details about the kit and its implementation in final round will be specified to the finalists on the completion of preliminary round.

In the final round, track is further extended to line maze where bot has to solve line maze by finding a box (should not pick) and return to the starting point through shortest path.

This sample arena will give you the idea about the event rounds. Prelims start at junction C1 and ends at junction C2. And in the Final Round, the track is extended to the maze where the bot has to find a box and return to the starting point C1 through the shortest path.

Note:

Obstacle and box dimensions: 5cm x 5cm x 15cm (Length X Breadth X Height).

Box will be located within the range of 10cm from the dead end of the track.

Lines to be followed are 3cm in width

All measurements and dimensions have 10% tolerance

Registration:

https://www.pragyan.org/16/home/events/robovigyan/rush_hour/+login