IEEE-RAS Robotathon 2013 General Rules

As a condition for participating in Robotathon, participants must pay a $20 non-refundable entry fee, in addition to membership dues, which will help cover the kit of parts for their team. Teams will not receive their kit of parts until all members of the team pay their entry fee.

Throughout the competition, the Robotathon mentors and RAS officers have the final say in any deliberation or problem that might arise.

Participants will be divided up into teams of 6 and assigned a team mentor who is a RAS leader. Teams and mentors will be assigned by the following in the order of priority: member preference (friends), times and availability, specialty, and prior experience. The team mentor is allowed to assist the team in designing and programming the machines but is not allowed to present any specific ideas for the robot design or write any code for the team. There will also be many RAS leaders roaming the RAS Office at all times and you are encourage to ask for help from any of them, not just your specific mentor.

Each team will accumulate points which will determine their final rank at the end of the competition. Points are earned through completing checkpoints and in the final competition.

Checkpoints may be evaluated at any time during the competition by a pair of Robotathon mentors who are not mentors of the team being evaluated. Teams are allowed unlimited attempts at the checkpoints (within reason). The push-of-war game points will be evaluated on the last day of the competition, November 18th.

Push-of-war

Game Description

This game is an Inverse Tug-of-War. The goal of the competition is to move as far as possible during the given time limit while dealing with a competitor's interaction. The team that has progressed the farthest or has ended in the starting position of the opponent will win that match; best two out of three wins the round and moves on through the traditional bracket system. As with the nature of this competition, both robots will operate autonomously of human interaction. A robot's progress is defined as the distance along the line following the center path of the field that the center of the robot passes or reaches while touching the ground or the furthest such distance the robot has so far reached, with the center of the robot defined as location of the center of the battery's projection on the floor.

Field

The game will be played on an 6'x4' field in the shape of an "||/||" shaped track as shown below. Each starting box will be 12"x12" and will be marked off by red electrical tape. All walls forming the perimeter and lane dividers will be made of 2x4 beams standing approximately 3.5" tall on a plywood base; all of the wood will be painted white. There will be one continuous line of black electrical tape running between both starting bases. The line will run through the middle of each lane and will form smooth curves where the lanes change directions. There is also a red line in the middle lane denoting the halfway point between both bases as shown below.

Robot and Component Rules

Size - The maximum starting configuration for your robot shall not extend beyond the bounds of a 1'x1'x1' box. There is no minimum size.   Robots may expand after starting.

Components - The RAS Office has a wide selection of parts already available in addition to those provided in the kits. You may purchase additional parts (a list of online vendors is on the resource page). Items which may be considered dangerous (i.e. combustion engines, power tools, weapons, living things, etc.) are prohibited. The total value the components of your robot may not exceed $80 in addition to the parts provided in the kit; including the costs of materials found in the office.

Communication and Control - The robot is to be completely autonomous, i.e. no human interaction with the robot during a competition run, or a checkpoint trial. Teams are also required to use the RAS microcontroller given to each team with the kit of parts, although

additional boards are allowed.

Checkpoint Point Values

There will be a series of checkpoints to be completed before the final competition. The following are all 6 checkpoints and their associated max point values. In addition to these points, and in an attempt to help curb procrastination, any team who completes a challenge before the checkpoint's date gets additional bonus points..

Checkpoint	Initial Point Value	Checkpoint Date	Bonus Points
Valvano Design Approval	5	October 3rd	2
Blinky LED/Demo	5	October 12th	2
Moving Base	5	October 19th	2
Line Following	10	October 26th	5
Wall Following	10	November 2nd	5
Square Dance	10	November 9th	5
Outreach	1 per member per event	N/A	N/A

Game Point Values

On the competition day, November 18th, we will be holding a double-elimination bracket to determine the top five teams of the competition, and each team will receive the following points in addition to their challenge score:

1st place	50
2nd place	40
3rd place	30
4th place	20
5th place	10

Additional Awards

To celebrate all your hard working, along with awesome robots these are judges awards, to be given out at the push-of-war competition. Although these awards do not have point value they will come with an award certificate.

Innovation Award - Most unique solution to the problem
Programming Award - Most interesting game logic, while writing understandable code
Mechanical Award - Most elegant, along with functionality without over complicating it
Judge's Award - Do something that impresses us; we'll know it when we see it
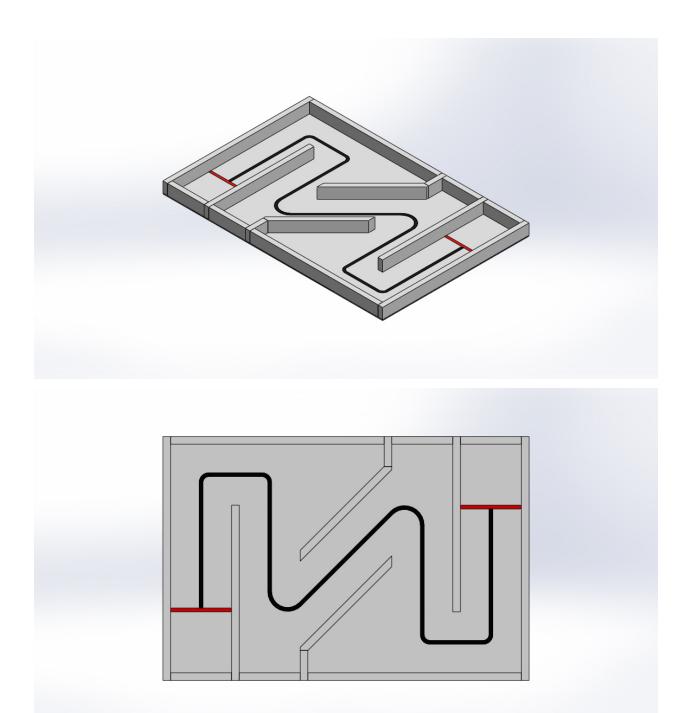
Checkpoint Descriptions

1. Design approval by Valvano
    a. Present a robot design to Valvano for approval. Must have his signature to count as being approved.
    b. Valvano's office hours, in ENS 627:
        i. Tuesdays 12-1
        ii. Fridays 1-2
        iii. Wednesday 5-6
        iv. Thursday 12-1, 5-6
2. Blinky LED/Running Demo
    a. Demonstrate the RAS Demo program working on the board and run a program that toggles an LED with a period of 2 seconds (1 second on and 1 second on)
    b. The led cannot be the built-in led on the microcontroller
3. Moving Base/Assembled Board
    a. Have the base drive at least 4' forward without drifting to either side by more than 1'.
4. Line Following
    a. The robot must follow a black line on a white background for at least 10 seconds.
    b. The path will be made up of 1' tiles placed next to each other to form a path.
    c. Each tile will contain either a straight path and/or left/right turns.
5. Wall Following
    a. The robot must follow a wall of 2"x4" provided by the mentors for at least a minute.
    b. The wall will form a continuous perimeter for an enclosed area. All angles formed by any two consecutive 2"x4" will be between 90° and 270°.
    c. The robot must remain within 1' of the wall at all times while never physically touching the wall.

6. Square Dance
    a. A square will be set up with four sports cones placed at the corners 4' apart.
    b. The robot must complete a lap around the outside of the square while remaining within 2' of the square and not touching the cones.

Game Rules/Procedures
1.   The robot must start entirely within the designated starting square
2.   There will be a clearance of 1 foot around the field at all times
3.   Each round will be ended after 60 seconds
4.   The winner will be the robot that has progressed the farthest. (See clarification of "progress" in the game description)
5.   If the robot progresses into the starting square of the opposing team before time has expired, then that team will automatically be declared winner.
6.   If there is a tie for either the most progress or both teams entering the opposing starting square at the same time, the match will be declared a tie.
7.   At the end of the round the teams will follow the double-elimination structure of the tournament. In the event of a tie, the match will be replayed until RAS leaders can decide which team advances.
8.   At anytime except when contacting another robot, a team may put their robot back into the starting square and the team member may operate any buttons on their robot before it leaves the square, up to three times
9.   At anytime, a team can forfeit the match and end it immediately
10. Robots must not intentionally damage the opponent's robot, penalty is disqualification from the match and an automatic win for the other team
11.   The robot may not damage or alter the field in any permanent way, and the robot and all of it's components must be able to be removed from the field in a timely manner.

Images:

Changelog:

5/14- Add formatting to make it easier to read -Rachel
5/14- Changed "Navigation Tasks" to "Checkpoint" for continuity throughout document and included all checkpoints on the checkpoint value list. -Josh
5/22- Added isometric and top views of field - Josh

6/29- Added suggestion for complicated field - Josh"

7/27- Updates from mid-summer Robotathon meeting - Josh"

7/27- Changed the name! - Christopher

7/27 - Changed the description of field in description from S to "||/||". Also volunteered to put up CAD drawings with measurements if told what measurements are the most important. -Josh

7/28 - Added link to dropbox folder with field renderings of field with and without gap in both Isometric and top-down views.

9/27 - Raised team item cost cap and added line to rule considering parts

9/30 - Moved checkpoint deadlines backwards and added field damage rule

10/12 - Added Outreach Point Values