Welcome to the Third Annual IEEE Lego Robot Competition. In this document you will find the rules and regulations for the events for the Winter 2007/2008 competition. This competition will take place in the Bossone Atrium on Friday February 22nd at 3:00pm.

Overview:

The competition will consist of three parts, two antonymous and once manual control. These three parts will be referred to as Maze, Race, and Sumo. Each team will be given on Lego Mindstorm RCX v1.0 kit that they will use, with no other parts, to construct a robot to complete the Maze, Race, and Sumo events. Each event the robot will be able to have it's body reconfigured and its microcontroller reprogrammed. Each team will be given a minimum of five minutes between events reconfigure and reprogram their robots. We recommend showing up early so you can calibrate your sensors to the tables that are going to be used. Please note that at no time may the robot endanger damaging a contestant or spectator; it also must not risk physical damage on any parts of the robot.

Scoring:

Each team will attempt to get a total of 100 points by competing in the Maze, Race, and Sumo events. The point break down can be found in each of the events corresponding rules below. Some events will have size restrictions which must be followed or the received score for that event will be cut in half for that team. In the event of a tie, after all events have been completed, the teams that have tied will face off in a short bracket of Sumo. The winner of this short bracket will be the over all winner.

Software:

For the software and instructions for programming the Lego Mindstorms RCX v1.0 robots please visit this events home page at
http://www.pages.drexel.edu/~dml46/IEEE/Events/IEEE_Lego_Robot_Winter_2007_2008.html

Measurements:

The Maze and Sumo field measurements are made to the tolerance of 1/2". The Race Measurements are made with in 4". All robot measurements will be made within a tolerance of 1/10".

What to bring to the event:

Please bring your robot to the event along with the white cardboard box and green box that contains the extra Legos to the event. Install new batteries **before** the competition and confirm your robot still functions properly. It is important to have fresh batteries for the event. I am sorry but we do not have any extra batteries to lone you if yours run out. We will have a single laptop computer with all the software that you need to load your programs on to it. Because this will be a community computer you will be limited with the amount of time you are able to use it and thus we recommend that you bring your own computer if you have one.

Maze (35 Points):

The first event will be the Maze event. The Maze event will consist of a 6x6 square maze with both of the entrances and exits on the out side of the maze. The entrance will be on the bottom right square of the maze and the exit will be on the top left, see Figure 1 below. The exit will have each of it's non-walled sides denoted with 3/4" thick black electrical tape. Each block has a dimension of about 9.5", with each wall measuring 2" high and slightly more than 0.5" thick. The bottom of the maze is metal as well are the sides, please see Figure 2 below. If you would like to practice on this maze before hand, the maze is located in Bossone 214. Please note that the configuration of the maze will change for the competition but the entrance and exit will stay in the same location.

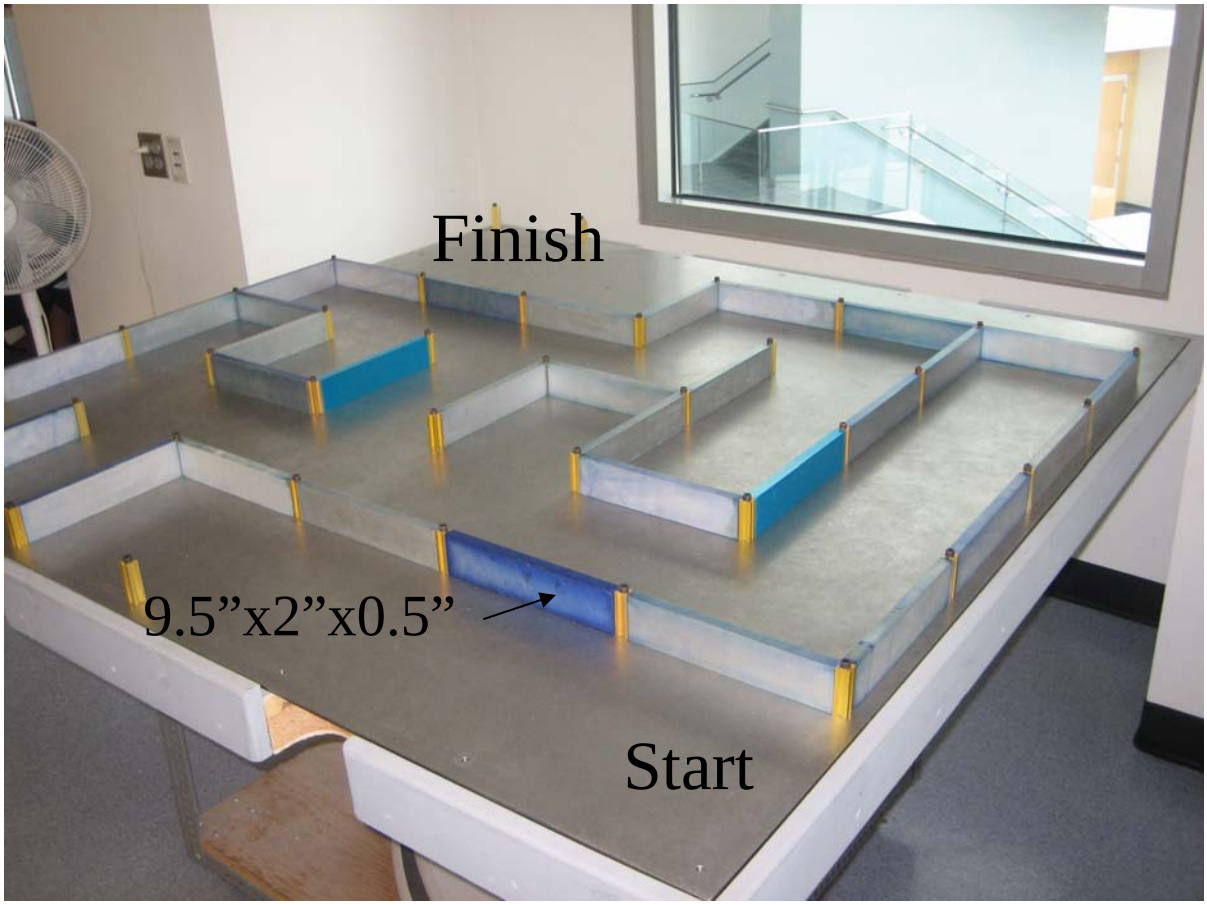

Figure 1

The goal of this event is to have your robot start in the block labeled start and autonomously find it's way to the end of the maze. Who ever runs the maze fastest will get the most points. The timer is stopped as soon as the robot crosses the 3/4" black line. A five (5) point bonus will be given to any team that when their robot finishes it automatically stops and plays the theme from the video game Tetris, namely Tetris B. Each team will get the option of running the maze twice. If a team wants to try the maze a second time, their first score will be erased and the score for their second run, no matter if it is better or worse, will be their score for the event. Each team will be required to

give a short explanation of what their exit strategy is directly before the event. Please see Table 1 below for the scoring breakdown for this event.

Please Note that the robot must stay within the dimensions of 1.5'x1.5'x1.5' at all times for this event. In this event the robot must be completely antonymous.

Time	Points		
Top 30%	30	Bonus =	+5 Points Extra
Middle 50%	20		
Bottom 20%	10		
Did Not Finish	0		

Table 1

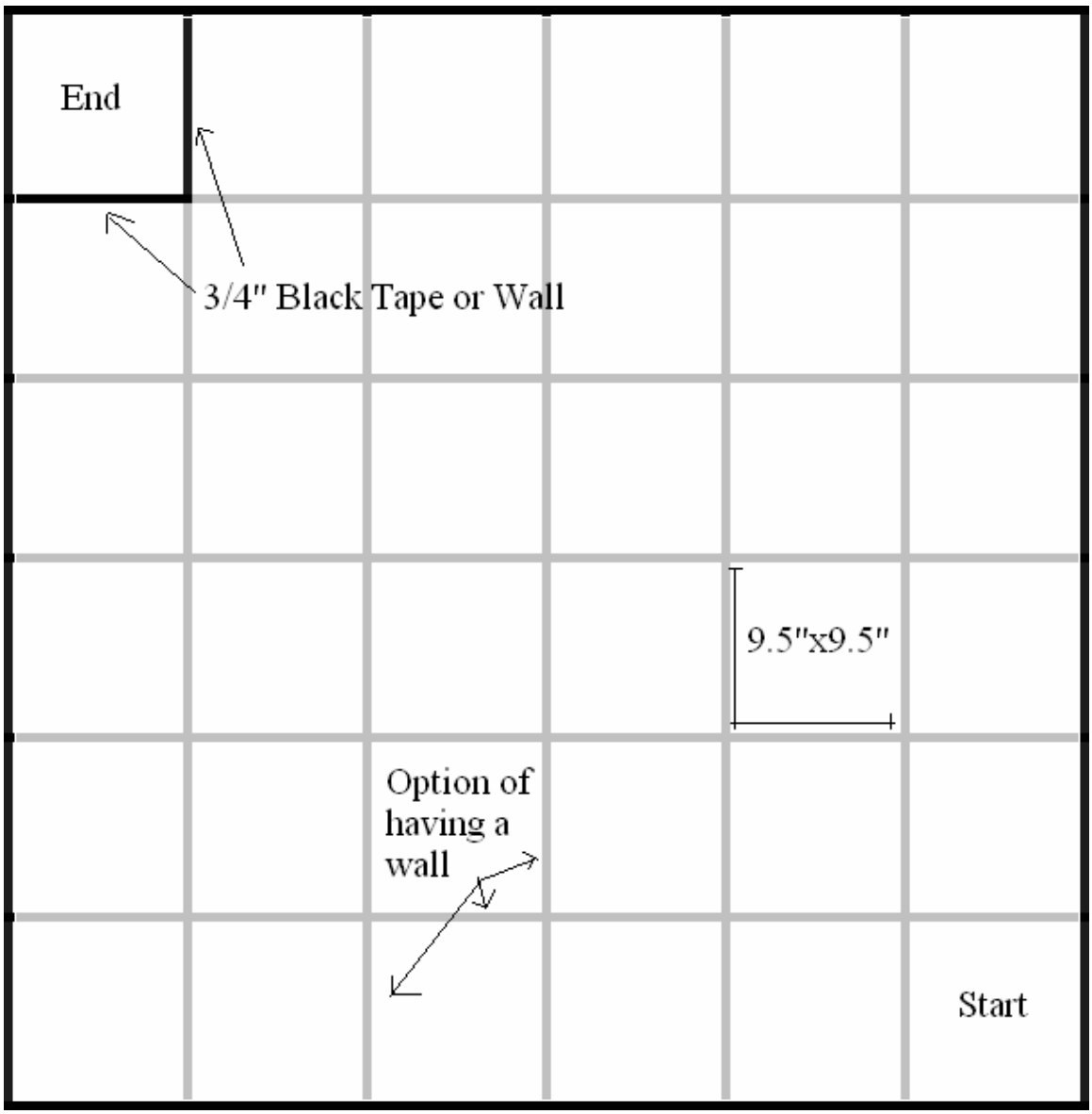

Figure 2

Race (35 Points):

The objective of the event Race is to antonymously travel to one end of a linear track and back before your opponent does. This event is a bracketed event where two robots will race against each other in a best of three matches with one chance to reprogram between the first and second race of each round. The track will be between 12’ and 30’ long and between 1’ and 3’ wide for each robot. The bottom of the track will be the white tile floor of Bossone with black electrical tape as the border. The entire robot will be required to pass the “turn around line” denoted by the “turn around marker" and then return past the start position. Both robots will be released at the same time. The first robot to cross the finish line is the winner. The turn around line will be place between 12’ and 30’ and will very between each bracket. The far end of the track will have 3/4” black tape as well as a solid wall no shorter than 1’ tall. Please see the figure below for the outline of what the track will look like. First place will receive 30 points towards their final score. Any robot that automatically dances, at least once in each bracket, after it finishes the race will receive 5 bonus points.

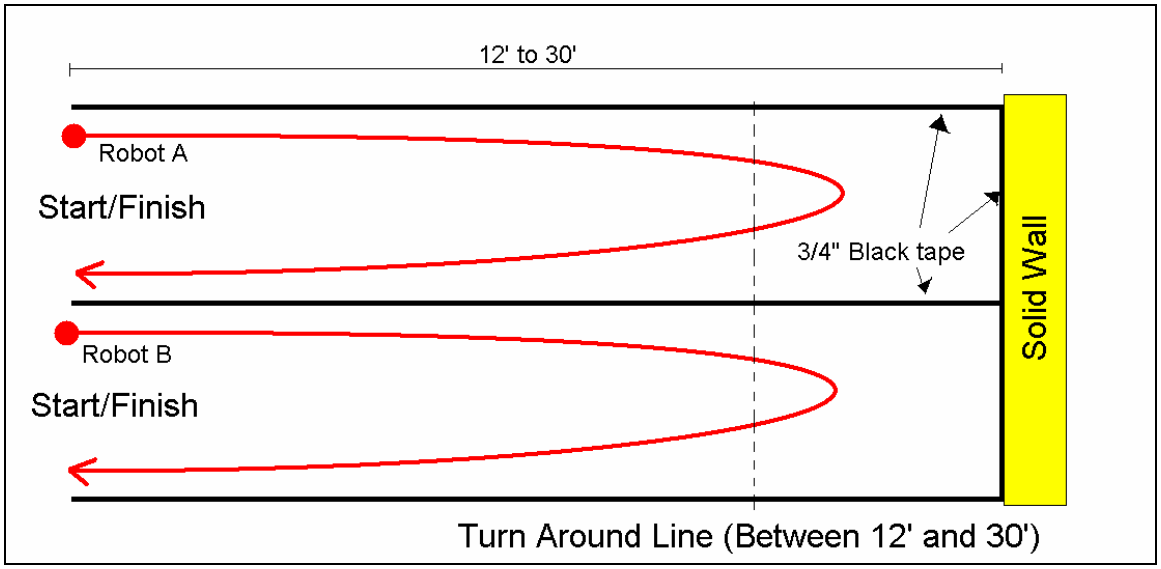

Figure 3: Track for the Race event

Sumo (30 Points):

This event will be a manually controlled robot sumo event. The goal of this event is to push the other robot out of the ring. A robot is pushed out of the ring once the whole of the robot is outside of the right. The ring will be on a table and outlined with 3/4” black electrical tape. The ring will have an internal area of no less than 7 ft^2.

Each round will last no longer than 2 minutes. If no robot is pushed out of the ring the winner will be determined by the referee who will take into account which robot based on effectiveness of the robots push out attempts and how many times each robot was “in

control" of the sumo and how much damage the robot inflicted and took during the match. The referee's judgment is final.

The event will be an bracketed event, where the winner goes on to the next bracket. The placement of the teams in the bracket will be determined randomly by the referee. The scoring will consist of the first place will get 30 points, second place 25 points, the next bracket down gets 20 points, the next bracket down 15 points and so on.

In the event of there being three left in a bracket, the first two robots will face off against each other. The loosing robot will play the next robot. When a robot looses two games the robot is then disqualified. The winning robot of this "round robin" will go to the next round. If there is a round robin for the final round then the first one out will be third place, second one out will be second place and third one out will be third place.

Please note that this event does have a starting size restriction. No robot can have a length longer than 9" and a width wider than 9". Length is defined by the direction that is parallel with the primary direction of movement of the robot. Width is the direction that is perpendicular to the length and is no vertical. The height has no restrictions

In order to control the robot you will be given, at the event, a controller that hooks up to the 1,2, and 3 sensor inputs on your robot. The controller will consist of three buttons, one for each of the sensor inputs. The buttons will act as a touch sensor and will be normally open. The order of the buttons on the controller will be 1,2,3. Please see Figure 5 below for a diagram of what the controller will look like. Please note that this will be a wired and not wireless controller. Two controllers will be made and able to be used the week of November 5th by appointment.

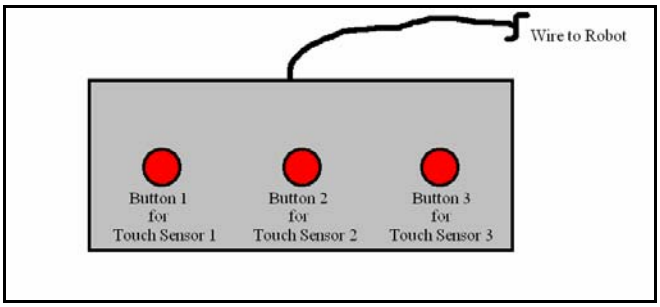

Figure 4

Note:

Please stay within the spirit of the rules for all three events. If you have any questions, concerns, or have any questions feel free to contact Daniel Lofaro at dml46@dresel.edu.