2011 Alabama Robotics Competition Challenge Descriptions

General Introduction

The three challenges representing this contest are inspired from the Winter Olympic Games, representing themes from the Slalom, Biathlon, and Curling events. The following provides a description of each event and an overview of how points are scored for each event. The overall ranking for the awards ceremony is determined by the total of all three events. A tie-breaker will occur at the end of the contest, if needed.

General Scorekeeping Rules

1. The contest will consist of 3 obstacle courses and challenges that the students must consider over a 3-hour period.
2. The set of obstacles will span various levels of difficulty.
3. The obstacle courses and project challenges will not be revealed until the beginning of the contest.
4. Teams may work on any problem in any order. It should be noted that a line may form for specific obstacle courses and challenges, such that the wait time to get onto the playing field is a factor that should be considered as a strategy.
5. Ranking will be based on the overall combined score from the individual challenges.
6. Some obstacle courses or challenges may have penalty points assessed (e.g., knocking down or touching a forbidden obstacle). The overall score will be counted as the number of positive points minus the deducted penalty points.
7. A team may try each obstacle and challenge multiple times, but must start at the back of the line for each new attempt.
8. When multiple attempts are made for a specific obstacle course, the best score of all attempts will be used in computing the overall score. It is possible for teams to go back to their computers and modify their programs (but not their robots) and make additional attempts at a specific obstacle course to improve their score.
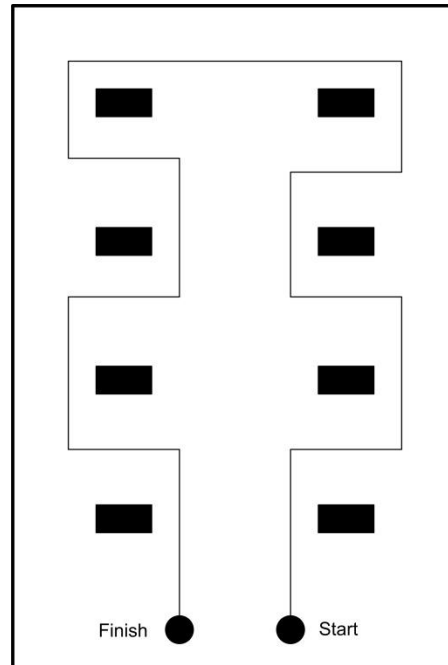
Slalom

In this challenge, 8 bricks are placed equidistant apart in two columns. The robot should be placed in the start position. The robot should approach the first column of bricks and weave between the bricks using the path shown in the "Slalom Event Challenge" figure. After the robot finishes the first column, the robot should approach the second column and weave between those bricks. Finally, the robot should pass to the finish line.

Time: There is a 120 second time limit on this event.

Scoring: Weaving through each brick correctly is worth 10 points. The number of bricks that have been completed at the end of the allotted time will be used to compute the score. Furthermore, if a robot reaches the finish line before time is up, and has successfully weaved through all bricks, a point will be rewarded for each second under the limit. For example, if a robot correctly weaves through all 8 bricks, and passes the finish line in 110 seconds, the overall score would be 90 points (8 * 10 + (120-110)). Time points are not allotted to a robot that missed any of its weaves (e.g., a robot that reaches the finish line early, but only weaved 6 bricks successfully, will be allotted only 60 points).

Penalty: There are no penalty points for this event. A robot may touch the bricks as long as the robot eventually completes the weave pattern noted in the figure below.

Slalom Event Challenge

Biathlon

The Winter Olympics Biathlon is a combination of cross country skiing and rifle shooting. In this simulated biathlon challenge, a robot must move to 8 different stations and determine if the marker in front of it is a "good guy" or a "bad guy." Each bad guy will have a black dot in front of it. The robot should knock over each "bad guy" marker, but should <u>not</u> knock over a "good guy."

The stations will be at the same location on the contest field for each game. However, the black dots that determine if a target is a "bad guy" or "good guy" will be randomly placed for each new game.

The robot should be placed at the start position. From here, the robot should navigate to each station. If a black marker is at the station, the robot should knock over the character. If there is no black marker, the robot should continue on its path without knocking over the character. The time is complete whenever the robots has visited and reacted to all 8 stations. To receive points, the robot must completely knock over the "bad guy" (i.e., simply touching the marker, but leaving it upstanding, will not be awarded points).

Time: There is a 120 second time limit on this event.

Scoring: Each "bad guy" that is knocked down will receive 20 points. Similar to the Slalom, if the robot finishes the last station before time is expired, an extra point for each second under the limit will be rewarded. The time points are only possible if a robot has knocked down all 4 "bad guys" and did not knock over any "good guys."

Penalty: Each "good guy" that is knocked down will receive -10 points.
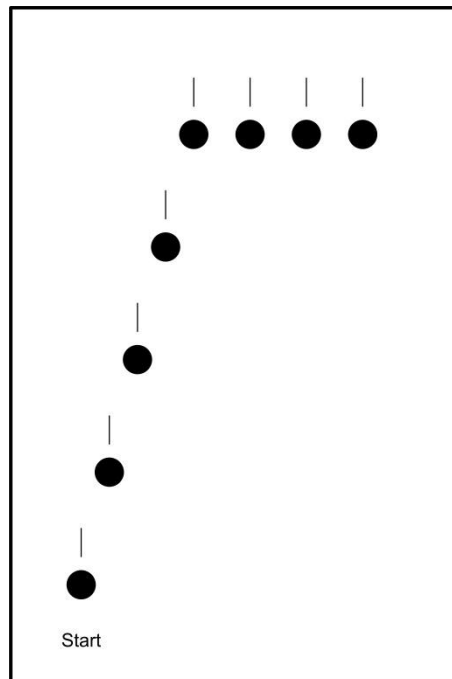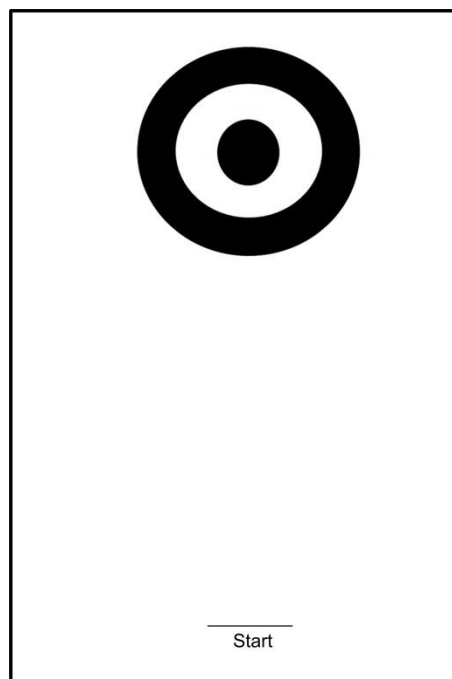

Biathlon Event Challenge

Curling

The curling event is similar to the game of shuffleboard, but played on ice. In this event, the robot must begin at the starting line and push a ball down the playing surface toward a bullseye that is worth different points. The point value will be determined by the final resting place of the ball. Each contestant may select either a tennis ball or racquet ball for each game.

Time: There is a 60 second time limit on this event. Wherever the ball is resting at the point of the time limit will determine the score.

Scoring: The ball must lie in a resting state for 3 seconds to determine its final position. If any part of the ball is touching the inner black circle, 100 points will be awarded. The inner white circle is worth 80 points, and the outer black circle is worth 60 points (any ball touching both the inner white and outer black circle will be awarded 80 points).

Penalty: There are no penalty points for this event. The worst that a robot can do is receive 0 points for not placing the ball anywhere within the bullseye.

Curling Event Challenge