IEEE REGION 5
2003 ANNUAL TECHNICAL CONFERENCE
ROBOTICS CONTEST

RULES AND REGULATIONS

Objective:
To design and build a mobile device that will follow an optical path on a track in the shortest amount of time

Introduction:
Each school will be allowed to enter up to 3 teams in the contest. Each car must be self-contained and self propelled. The order of the contestants will be determined at random before the event begins. There will be one track and each team will race on the same track against the clock. There will be an initial qualification round where each team will have 2 chances to finish the course. A team must finish the course in the qualification round in order to move into the competitive heats. After the first competitive heat, teams will be ranked according to their times. By the last heat, the winner will be determined by the car with the fastest time.

The Course:
The course will be a single track between 30 and 40 ft. long. It will be constructed of smooth painted wood and be at least 2 inches above the floor. It will consist of both straight and curved sections. The minimum radius of curvature of the optical path to be tracked will be 2 feet. The track will be no narrower than 2 feet and no wider than 4 feet.

Throughout the course, the car must follow a black line painted on a white background. The black line will be ½ inch wide. There will be several junctures where another path can be taken. It will be up to the car to recognize a predetermined image to choose the correct path. The images are shown in appendix A, and will precede the junctures by approximately 12". They will all be flat black paint on a white background. If the correct path is not chosen, the car will have to traverse a longer path to the finish line. All paths will lead to the finish line.

There will be no walls to track or use for guidance.

Throughout the course there may be one or more of each of the two obstacles shown in Appendix B. The two obstacles are: a ramp, and a section of straight track in which the black stripe will disappear for approximately 7".

The Starting Line:
The starting area will consist of a 12" by 12" square, painted white, with the black "tracking" line painted through. The car must fit into this area and no part of the car will be allowed to overhang this area. Only 2 team members will be allowed to set up the car. When the team is ready, the car can be started. When it crosses the start line, an optical sensor will start the electronic clock.

The Finish Line:

The finish line will not be marked directly on the track. There will however be two vertical poles on each side of the track. These poles will hold an optical sensor to stop the clock. The horizontal line of sight of the finish sensor will be between 1" and 1.25" above the surface of the track. This will also be the height of the sensor arrangement at the starting line. However, the car must keep going and stop only when it drives over and detects a black octagon painted on the track, similar to the previous symbols. See appendix A for the exact dimensions of the black octagon. If the car does not stop within two feet of detecting the octagon, a 5 second penalty will be assessed.

The Competition:

The order of the contestants will be chosen at random in advance. Before the race, each team will choose two members for the starting team and one member for the finish line. The teams will have 3 minutes to set up their car. When they are ready they shall signal the officials. The officials will then give them the "go ahead" to start their car. Each car will have 4 minutes to finish the course. If the car cannot finish in 4 minutes, the car will be eliminated. The top X % will move on to the next heat. The actual percentage of winners to move from heat to heat cannot be finalized until the total number of teams participating is set. If time permits, each team will get two runs per heat, and only the fastest time of the two runs will be kept.

Five foot sections of test track, separate from the competition track, will be available for teams to check their car's ability to track the line and recognize symbols. There will be a test track section for each of the required symbols and the two obstacles (Appendix A and Appendix B) that a car may come across on the competition track. The test tracks will be available to all teams while the competition area is open.

The track will be reconfigurable and will be changed from heat to heat. Furthermore, the final configuration for the championship heat will come from one of 5 sealed envelopes and will be chosen by an out of state team. The championship heat will contain the top 5 fastest cars. The five final cars will be handed to the judges for quarantine before the final track is chosen. The quarantine will last for one hour before the final race.

Elimination from the Race:

Your car will be eliminated from the heat if any of the following situations occur:

1. A combustion engine of any type is used
2. The vehicle is humanly controlled
3. The vehicle emits jamming signals.
4. Willful destruction of an opponents car
5. Willful destruction of the course
6. Leaving the course (going off the edge)
7. Team members touching the car at any time during the actual running of the course
8. Willfully leaving any part of the car on the track during the course run.
9. Failure to finish in 4 minutes.

Appendix A – Path Symbols

Right Path Symbol -

Symbol for "take the right most path" at a track juncture. Triangle is equilateral and 4" on each side. Stripe is 1/2 " and centered within triangle.

NOT TO SCALE

Left Path Symbol -

Symbol for "take the left most path"

NOT TO SCALE

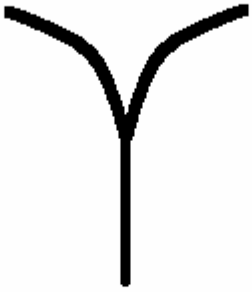
End of Course Symbol –

Symbol for octagon at end of course. Octogon is symmetrical and 4" across between any two parallel sides. It is centered within the black stripe.

Path Examples -

EXAMPLES OF "TAKE THE RIGHT MOST PATH"

In this case, go straight



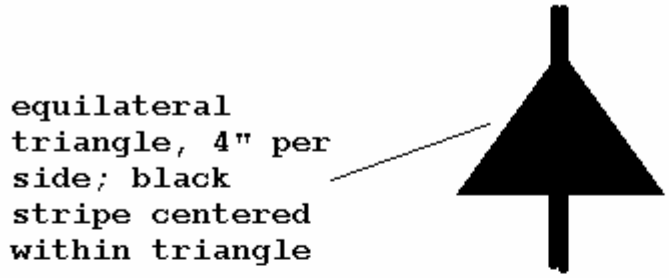
In this case, go right

In this case, go right

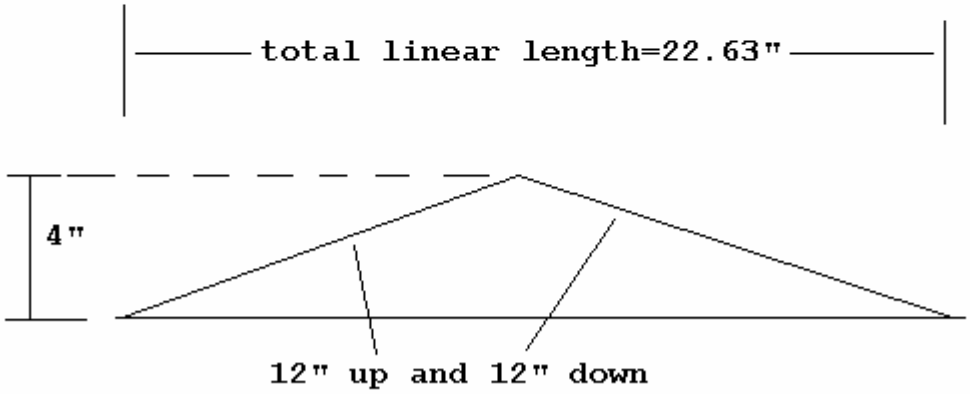
These examples would be the opposite for a "TAKE THE LEFT MOST PATH" symbol.

Appendix B – Obstacles

Ramp Obstacle -



SYMBOL FOR "RAMP AHEAD"



DIMENSIONS OF RAMP OBSTACLE

Stripe Obstacle -

Example of 7" gap in straight track