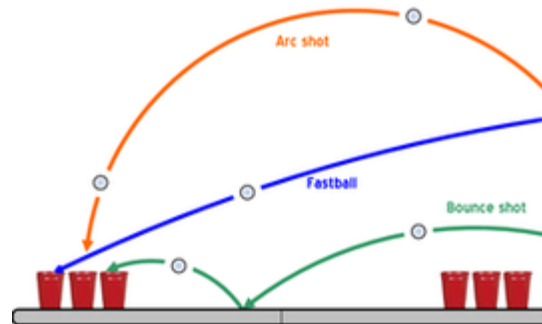


16-311 RoboPong

Challenge Statement

Make a robot play RoboPong and beat all other teams for ultimate glory.

Lab Description



In this lab you are trying to get a robot to throw a ping pong ball into a group of cups shaped in a triangle. For this challenge, the cups will be removed as you make them. The cups will also have point value. The cups will be set up as shown below, and it is also the view your robot will get.



The front cup will be valued at 1 point, the second row valued at 2 points, the third row valued at 3 points, and the back row will be valued at 4 points. You are permitted to bounce the ball into the cup for double the points.

If you haven't figured it out yet...you'll be going head-to-head against other teams.

Robot Specifications

The major constraints are that your robot can not be more than 2 feet in height and the robot must be in a fixed location on start up. Basically this means that your robot may need to pan and tilt to shoot at the cups. You can manually load the ball, but the robot must set the strength. Also, the robot may autonomously decide which cup it should aim at, or the team can manually input the cup to shoot at using inputs. For manual input, you must use mechanisms contained on the robot (aka the buttons). You cannot re-download code before every shot. To initiate the run, the user can press a button to start.

Game Board Specs

Two 10 cup triangles will be facing each other. The distance between the first cup in either triangle will be 2 feet. Your robot must fling the ball a total distance of 2 feet + the length of triangle. You may place the robot any distance behind the cups, within reason. The cups will be the standard red SOLO cups, and the edges of each cup will touch. You will not have to worry about the balls bouncing out of the cups because they will be filled with a liquid.

Game Time

Teams will undergo a Seeding Round where they will shoot by themselves and try to sink as many cups as possible in 10 shots. This score will be used to seed the top 8 scoring teams into a tournament bracket. Cups will be removed as you make them.

If you do not make it past the Seeding Round, then you get 5 shots in a solo round to add to your grade. This is the simulate actually shooting in at least one more round.

2 teams will go head to head in tournament style fashion. A coin will be flipped to see who shoots first. First team to 10 points wins the match. Each team will get the same number of shots. If the team that shot first gets a score greater than or equal to 10 points, then the team that shot second has 1 shot to get a score of 10 or more points. If the team that shot second gets to 10 first, then there is no chance to tie. Both teams will go one at a time to shoot the ball. Teams will be paired up based on how they did in the seeding round.

Tie Breaker

In the event that there is a tie, all 10 cups will be placed back on the table. A coin will be flipped to see who goes first. This is a sudden death match where the team to get 3 or more points wins, there is no chance for a tie.

Game Timing

Matches will last 7 minutes. You will have 30 seconds maximum to reload your robot, so make it streamlined. Taking the maximum time as part of your strategy is unacceptable, intentionally taking longer when winning will result in a 4 point deduction. That is left at the discretion of the judges. Seeding rounds will still get 10 shots.

Extra Parts

Only office supplies are allowed, or anything that holds some sort of potential.

Evaluation

50% - robot can demonstrate the capability to shoot the ball

20% - robot can fling the ball over their own stack of cups

10% - robot can fling the ball over the mid-line of the field

For every point the team scores, 1% is added to the team's grade. Maximum 100 points.

If the team makes it to the second round, it is an automatic 95%.

If the team makes it to the championship, it is an automatic 100%.

The winning team will have the option of not taking the final. They may give this honor to another team if so desired.

Simple, yet effective suggestions

1. Make a robot that can consistently fling the ball into a certain location. Scoring consistently can score you major points.
2. Bouncing will be a challenge, but it will pay off if successful.
3. Have one motor for panning, one for tilting, and one for firing the ball.

Leftovers

Cups will be in the lab. Ping pong balls will be given out, two per team. Don't break them!

Help

http://ffden-2.phys.uaf.edu/211_fall2010.web.dir/Peter_Aumau/physics.html

Lab Gurus

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Diagrams

