

CS 491/691X – Topics: Introduction to Robotics

Instructor: Monica Nicolescu

Final Contest

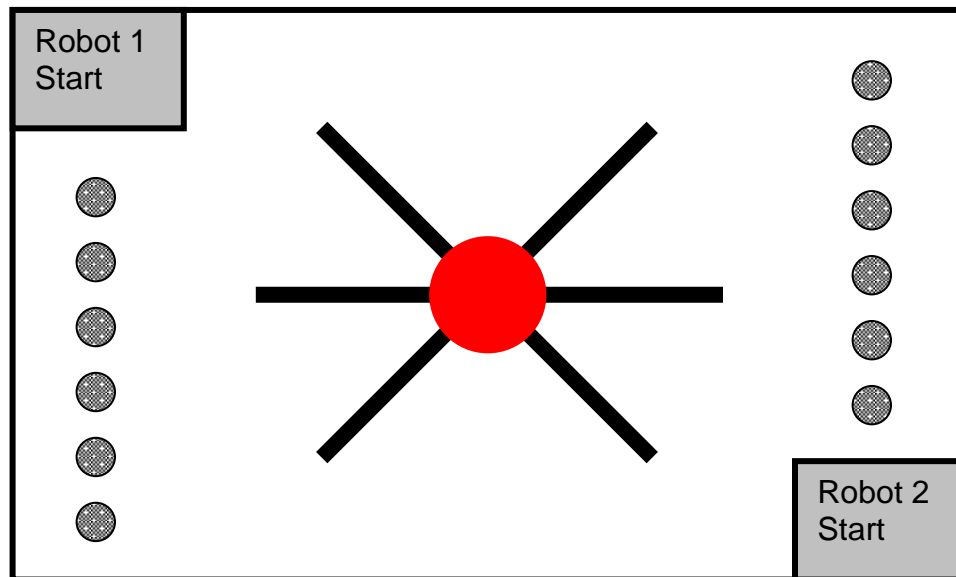
ROBO GOLF

The final competition is a "robot golf" game, a variation of miniature golf adapted for play by robots. This is a two robot challenge. Robots will perform on a flat, white playing field. 12 golf balls, 6 on each side of the arena, are pre-placed at the locations indicated below. The goal of each robot is to collect golf balls and deposit them into a "ball well" (hole), marked as a red circular area in the middle of the arena.

Pairs of robots play against each other in a *double elimination* format competition in games that last 2 1/2 minutes.

Golf table

The figure below shows the playing table.



Competition Format

The competition is of a double elimination format. That is to say, a robot is not out of the competition until it loses twice.

Initially the robots are paired and each play one game. Consequently, each robot is then assigned to either the "winners bracket" or the "losers bracket". Games then continue to be played with winners playing winners and losers playing losers. When a robot playing in the winners bracket

loses a game, it is sent down to the losers bracket. When a robot playing in the losers bracket loses a game, it is out of the competition (because it is the second time that it lost a game).

Eventually there is only one robot left in each of the two brackets and they then play off against each other in the final. If the robot from the losers bracket loses this game, then it its second loss and the competition is over. But if it wins this game then an additional final game is necessary because at this point the robot from the winners bracket has only lost one game.

Rules (subject to minor changes)

1. Each game will last 2 1/2 minutes and losing robots will be eliminated using the "double elimination" scheme
2. The robots will start in a home location at opposite corners of the arena. Each robot will be turned to one of four ninety-degree rotations, randomly chosen by the referee before each contest run begins. Both robots will be turned to the symmetrically same rotation before each round. E.g. if one robot is turned toward its balls, the other will be also. Contestants must have a marker on their robots to indicate which direction is the robot's front.
3. A robot must be properly positioned in its starting area and be ready to play within one minute of its game being announced, or the referee may declare the robot to have forfeited the game
4. Each game is started by the referee and the robots should be able to begin playing at the touch of the HandyBoard Start button
5. The robots are awarded a point for each ball that they deposit. Whichever robot ends up with more balls in the hole (i.e., points) at the end of the round is the winner.
6. A ball is considered "IN" if its center is within the circle described by the ball well. The robot should deliver the balls through its own means. After delivery *and robot's departure from the center area* the balls will be removed from the field by the referee.
7. Robots should not go over the red area, since that would mean falling into the well. One point will be deducted each time the robot falls into the well. [OUT]
8. In the event of a tie the game will be played over. In the event of a tie in the "play over" game, the robots will continue the run until one of them will collect another golf ball. The first robot that collects the ball after the regular time of this round is declared the winner.
9. Neither the robot's hardware nor its software may be changed in any way once the competition has begun, except for the replacement of failed or detached components
10. Robots that engage in behavior that the referee considers likely to damage their opponent will suffer expulsion from that game and be awarded zero points for that game
11. No adhesive of any form may be used for any purpose except the attachment of non-structural decoration. Violators will be removed from the playing surface and will receive zero points for the game
12. Robots should completely fit into the gray starting area

13. **Robots will at all times refrain from unsportsmanlike conduct.** This includes ramming, spearing, kicking, biting, swearing, and spitting. Any robot that engages in unsportsmanlike conduct will be removed from the playing surface and will receive zero points for the game
14. Robots that get stuck in any way that, in the opinion of the referee, prevents a competing robot that is trying to gain access to the “hole” from actually gaining access to the “hole” will be translated into its home area by the referee. "Translated" means to be lifted, moved without rotation, and then placed - unrotated - generally in the home area. Power will not be cycled. No form of reset will be permitted. Note that "stuck" includes both the case where the robot is not moving and also the case where the robot is moving but fails to grant access to the hole to the other robot within a time that the referee considers reasonable
15. One robot may not "hold" another. Holding occurs when one robot is applying pressure to another robot that is in contact with anything else and fails to cease that application of pressure within a time that the referee considers reasonable. A violating robot will be translated to its own home base, or to its opponents home base if its own home base is obstructed by its opponent
16. Once a game has started, the robots may not be touched, except for separation, expulsion and translation by the referee, except that a team may request the referee to remove its robot from the field of play to prevent additional damage to it and a team may request the referee to power down their robot (to conserve its batteries) if it has become non-functional and is stationary
17. The referee may declare a game void for any reason (but not for no reason!) providing that the game's score has not been officially posted
18. The two teams may simply agree between themselves which robot starts at which end, or either team may request a coin toss. In the event that a coin toss is requested, the referee will designate one of the teams to make a heads/tails call while the coin is in the air and the winner of the coin toss then has the choice of starting end.
19. Robots may be decorated with additional Lego mini-figures, as long as the decoration is completely non-functional.
20. All of the referee's decisions are both right and final!