

Robots' Intellect 2019

Candy collection challenge

1 The task

An autonomous robot must collect as many candies in an obstacle course and bring them back to the starting area within the time limit.

2 General rules

1. It is strictly forbidden for robots to injure any participants or viewers.
2. It is forbidden for robots to damage the course, obstacles or any other items of organizer's inventory, unless it is explicitly a part of competition.
3. Robots must be autonomous. During the match human input isn't allowed, unless it's specifically allowed by competition.
4. It is forbidden to intentionally cause any harm to other participants or robots.
5. Robots must be registered until organizer's specified date.
6. Robots must pass qualification before participation. Robots that are late for qualification must get competition coordinator's permission to pass qualification after official qualification time.
7. During qualification, each robot will be assigned a unique number, which must be put on the robot, in a clearly visible location.
8. Competition coordinator has final say on all questions and problems during the competition.
9. The organizers keep the right to alter/edit the rules, accordingly informing the participants about it.
10. Violation of the rules above will result in disqualification or criminal liability.

3 The robot must meet these requirements:

1. Fully autonomous. No human inputs or interference is allowed. All of the computations must be done within robot. Robot can only use external beacons if the beacons are placed by itself and within course area;
2. Weight must not exceed 20 kg;
3. No larger than 0.8 x 0.8 x 0.8 m;
4. Cannot break, alter or in any other way damage objects inside the obstacle course;
5. It is preferred that the robot would be started and stopped using remote control;
6. If a robot does not meet these requirements during the inspection, the creator will be asked to modify his robot to meet those requirements. Priority will be given for those who haven't checked in their robots. Failing to meet the requirements until 30 minutes before competition starts, will result in disqualification from competition.

4 The obstacle course

1. Dimensions of the track is 2.5 m x 5 m;
2. Wall height will not be smaller than 0.5m (thick black lines in Fig 1);
3. In each marked area there are 2,5 kg of candies (checked zone in Fig 1);

4. Dimensions of one candy is approximately 3,5 x 1,5 x 1,5 cm;
5. The starting area is marked in red tape (red zone in Fig 1). Red tape is contained in the starting area. Anything over it, is not a starting area.

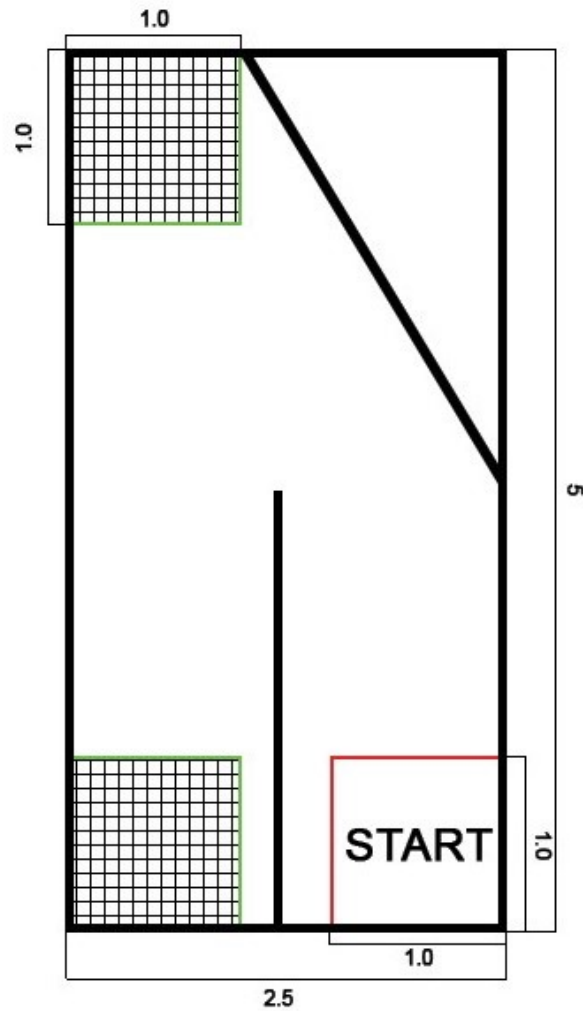


Figure 1: Top view of obstacle course.

5 The team

The team consists of no more than 5 people.

6 The competition process

1. General rules:
 - (a) The participants will have three attempts
 - (b) If robot fails to start moving at the beginning of an attempt, it can be repaired, modified by the team, while the robot is still in starting area and has not left it. Once it leaves the starting area, no other modifications can be made.

- (c) During an attempt, it is allowed to start over from the starting point, but the collected candy will be taken back.
2. The start:
 - (a) The participant will be invited to the competition area.
 - (b) Robot will be placed in the start area by the participant. The referee will inspect if the robot is placed correctly within the starting area.
 - (c) The referee will ask if the participant is ready. And give signal to start.
 - (d) Referee will start a 5 minute countdown timer using computer program.
 3. The time:
 - (a) A single attempt will last for 5 minutes.
 - (b) Between attempts there will be at least a 30 minute break.
 4. The end:
 - (a) After five minutes have passed, the candy that are in the starting zone will be counted.
 - (b) The referee will ask to stop the robot. If the robot is not safely removed from the track within 30 seconds, the attempt will be nullified.
 5. Awarding points:
 - (a) 1 candy is awarded by 1 point.
 - (b) Only candy in the starting zone is counted. The candy that would be on the border line of the starting zone will not be counted.
 - (c) If all of the candies were collected and returned to the start area before the time limit, then that participant will be ranked by time with other participants who managed to achieve this.
 - (d) The candy inside the robot will be counted after time limit, if the robot is fully within the starting area and fully stopped.