



Junior Robotics Competition 2018 RoboJunior Triathlon Rules



Preface:

The main goal is to construct a single robot to perform tasks that challenge motor and sensor skills. The challenges are designed to test these skills either individually or in harmony with other sensors. Unless otherwise stated in the specific game, the general global rules include the following limits:

- a. The maximum power supply voltage is: 10 volts.
- b. The maximum weight for a robot is 2 kg.
- c. The robot size must not exceed 32 cm in height and must fit in a cylinder with a diameter of 32 cm (with parts fully extended)
- d. A single robot must compete in all 3 events. Changes may be made to the robot between rounds (keep in mind that teams may only have 10 minutes to make modifications between events)
- e. The drivetrain (motors and wheels) and processing unit must retain their original design throughout the competition.
- f. There is no limit to the number of wheels; however the robot must have the same wheels/points of contact with the ground for all 3 events.
- g. On the first day of the competition, the chief judge will inspect and photograph your robot and place a sticker over the drivetrain/processing unit. This sticker must remain untouched for the duration of the competition. If changes are made and the sticker is removed, it must first be cleared with the head judge, any previous results will not be counted.
- h. The results each division (elementary and secondary) and each event will be compiled, the team with the highest overall standing will win the triathlon.
- i. It is important that the spirit of these rules be followed. If there are any questions regarding the changes to the event, please do not hesitate to contact with the chief judge, Akim Munro (asamunro@gmail.com). If during the competition, a judge has a doubt that the spirit of the competition is not being respected, the chief judge reserves the right to disqualify the team.

Rules and Regulations:

The Robots are required to have full autonomy. The students competing in the event must do the construction and programming of their robots without any help or interference from their teachers or mentors.

The Judge will apply all the rules fairly and without prejudice. All decisions made by the Judge during the games are final. Any argument by a team member with the judges will result in a warning. Continued or repeated arguments will result in immediate disqualification of the team. At the conclusion of each game, the Judge will ask the captains to sign the score sheet. By signing the score sheet the captains accept the final score on behalf of the entire team.

Lawn Distance – Elementary schools only

The Task

You will be placed on a black surface. In front of your robot will be a patch of green cardboard. Your task is to measure the length of the green patch in centimeters. The robot that measures the length most accurately wins, in the event of a tie, the fastest robot wins.

The Challenge

This challenge tests programming skills, data manipulation, using light sensors and their ability to recognize the colour and making precise measurements.



The Rules and Specifications

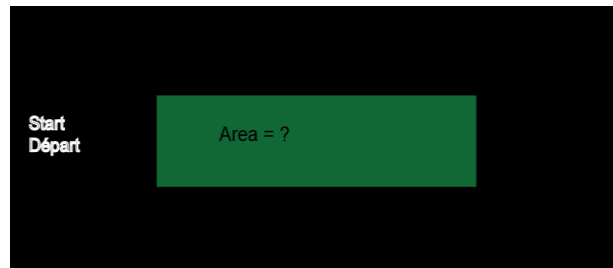
1. The field will be black with a green cardboard rectangle affixed. The maximum length of the rectangle is 2m
2. At the beginning of the round, the judge will place your robot at an unknown distance in front of (and facing) a green rectangle.
3. When the trial begins, your robot must advance to the green rectangle, and begin measuring.
4. When your robot reaches the end of the rectangle, it must clearly display the length of the rectangle in centimeters on the EV3/NXT 's display panel.
5. The accuracy of your measurement will be important; your measurement may include decimal places.
6. There will be 3 rounds; each will have a rectangle of a different length.
7. The winner of the competition will be the robot that most accurately measures a rectangle (percent error will be used). In the case of a tie, the robot that takes the measurements with the most speed wins.
8. The maximum time allowed is 2 minutes, if your robot does not complete the measurement in that time, you will forfeit the round.

Unless specifically stated here, the restrictions described in the General Rules will apply to this challenge.

Lawn Area – Secondary schools only

The Task

You will be placed on a black surface. In front of your robot will be a patch of green cardboard. Your task is to measure the area of the green patch in square centimeters. The robot that measures the area most accurately wins, in the event of a tie, the fastest robot wins.



The challenge

This challenge tests programming skills, data manipulation, using light sensors and their ability to recognize the colour and making precise measurements.

The Rules and Specifications

1. The field will be black with a green cardboard rectangle affixed. The maximum size of the rectangle is 2m by 1m
2. At the beginning of the round, the judge will place your robot at an unknown distance in front of (and facing) a green rectangle.
3. When the trial begins, your robot must advance to the green rectangle, and begin measuring.
4. When your robot completes its measurements, it must clearly display the area of the rectangle in square centimeters on the EV3/NXT 's display panel.
5. The accuracy of your measurement will be important, your measurement may include decimal places.
6. There will be 3 rounds, each will have a rectangle of different dimensions.
7. The winner of the competition will be the robot that most accurately measures a rectangle (percent error will be used). In the case of a tie, the robot that takes the measurements with the most speed wins.
8. The maximum time allowed is 2 minutes, if your robot does not complete the measurement in that time, you will forfeit the round.

Unless specifically stated here, the restrictions described in the General Rules will apply to this challenge.



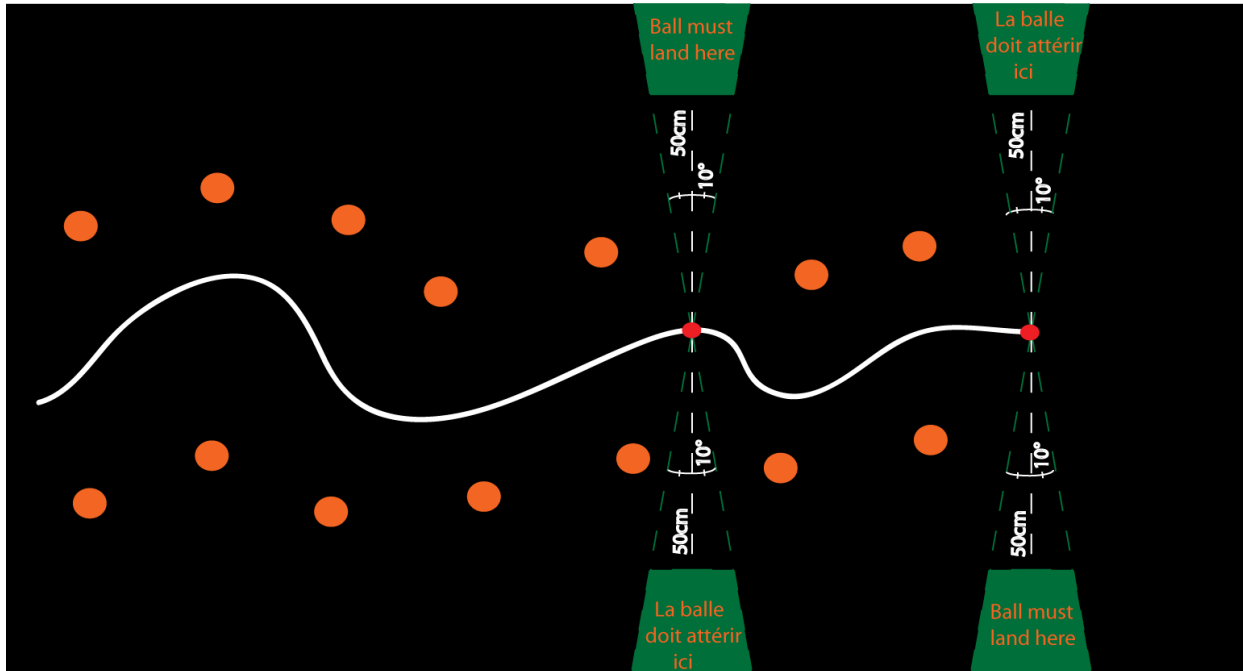
Quick Draw

The Task

There will be a white line placed on a black field. The task is to get your car to follow the white line and to launch two ping pong balls at specified places. The car that makes it to the end of the line in the shortest time wins. Beware; leaving the white line or not properly launching the balls will penalize you.

The challenge

This challenge tests programming skills, building a ball launcher, focusing on the robot's speed, using light sensors and their ability to recognize the colour.



The Rules and Specifications

1. Both balls must be loaded in the robot at the beginning (at the moment of activation)
2. The balls will be standard ping pong balls, the ball has a diameter of 40mm and a weight of 2.7g
3. The Road surface will be black.
4. The line will be 2cm white line. The shape of the line may change at any moment (though the total length will remain unchanged)
5. There will be small obstacles 10 cm in height on either side of the line (never closer than 20cm from the line). If one is touched, a 10 second penalty is added to the time.
6. Approximately halfway through the course, there will be a red dot on the white line. At this point, the robot must stop and launch a ball at a 90 degree angle (give or take 10 degrees). The ball must land at least 50cm away. A 20 second penalty will be added if the ball does not reach 50 cm. A 1 minute penalty will be added if the robot fails to stop or launch a ball.
7. Once the first ball has been launched, the robot will continue following the white line.
8. At the end of the course, there will be a second red dot. When the robot reaches this point, it will launch a second ball (again at a 90 degree angle. The ball must land at least 50 cm away. A 20 second penalty will be added if the ball does not reach 50 cm. A 1 minute penalty will be added if the robot fails to stop or launch a ball.
9. The mechanism for launching the ball cannot be a pre-fabricated component. You must **build** your launcher.



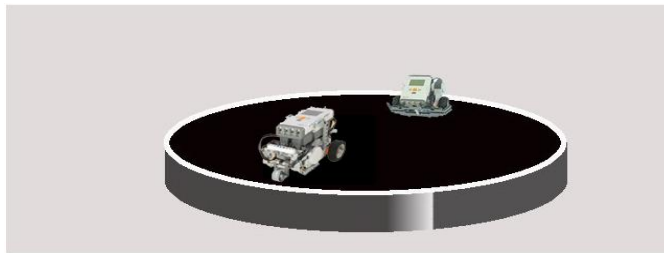
10. Teams are allowed three practice sessions (not necessarily consecutive) in the presence of a judge during the specified time interval before the actual competition. In between each of these runs the team can modify their robots build and programming, as long as these modifications are in accordance with the general rules.
11. After the practice rounds, each team will have at least one attempt.
12. The robot with the shortest completion time will be declared winner.
13. If after 3 minutes, the robot has not successfully completed the course, the match will end.

Note: If the judge believes that the robot has been programmed to follow a path (as opposed to recognizing the colours on the field) he may ask the team to display the program's colour recognizing features.

Sumo

Task

In this Sumo wrestling-like challenge, competing robots will attempt to push their opponent out of the "ring". The ring is a raised circular platform with a 1 meter diameter. The ring will be black and bordered by a 2cm white line. The ring is raised so as to avoid arguments about how much a given robot was pushed out or which one went out first. Due to the height of the platform, the loser will "tumble" over the edge.



The challenge

The challenge tests design, strength and speed of construction. Programming: Strategy and tactical maneuvering.

The Rules and Procedures

1. The referee will place the robots in the ring so that they are facing each other in their predetermined starting positions. These positions will be marked by two green lines 10cm apart.
2. When the referee gives the signal, the captain from each team will start their respective robot.
3. The matches will last a maximum of 2 minutes each.
4. The first robot to leave the ring loses the match (this for situations that both bots leave the ring in succession)
5. If parts become dislodged during the match, the game time will be paused and the referee will remove that part from the ring. If that particular part is essential for the robots mobility, or sensory input, the team will have 20 seconds to put it back on. No changes from the original design will be allowed. No programming changes will be tolerated during a match.
6. Excepting the parts of the robot used for motion, i.e. the wheels and the drive system, no other movable parts will be tolerated.
7. If the judge considers that a robot has no chance of getting back on the field, it will be considered as off the field.
8. If, after 2 minutes, both robots remain in the ring, the robot weighing the least will be declared the winner.
9. Winners from Round 1 will move on to the next round. This particular group of Robots will be called Stream A. Those who lost in the first Round will compete against each other in Round 2 of Stream B.
10. Modifications in programming and structure are permitted between matches - this with the limits specified in the Triathlon rules.
11. The eventual winners from Stream A and Stream B will compete against each other for first place over-all.

Unless specifically stated here, the restrictions described in the General Rules will apply to this challenge.

