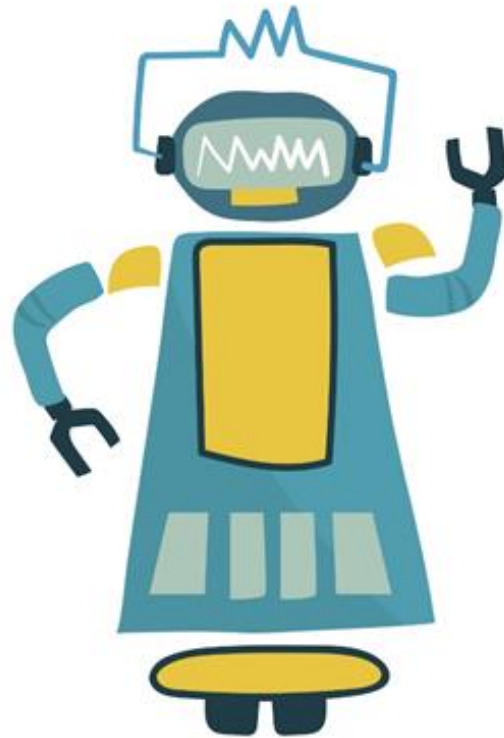




ROBO. JUNIOR

APRIL
23
AVRIL
2021



UN PROGRAMME DE
A PROGRAM OF

AEST EAST

ALLIANCE POUR L'ENSEIGNEMENT DE LA SCIENCE ET DE LA TECHNOLOGIE
EDUCATIONAL ALLIANCE FOR SCIENCE AND TECHNOLOGY



Hi everybody,

Welcome to the 18th edition of Robo-Junior. This competition is produced by EAST, the Alliance for Science and Technology Education, a non-profit organization whose mission is to encourage, inspire and improve the learning of young people in the field of science and technology.

Due to the circumstances, we are trying a new competition format for this year. The event will be completely virtual. The competition will end on April 23rd. By then, you will have to assemble up to 3 robots and create video clips to present them to the judges. The video clips will be viewed only by our committee and no content will be available to the public. This document includes all the rules necessary for you to wow the judges!

The competition includes 3 challenges. Each team is invited to participate in all challenges, but you can decide to participate in only 1 or 2 challenges. Each participant will receive a medal (gold, silver or bronze). You can also order a participation plaque for your school.

If you have any questions, please do not hesitate to contact me.

Fanny Beauchemin

Coordonnatrice de Robo-Junior

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General rules

The main objective of the challenges is to build a robot that performs tasks by challenging your skills in using sensors and motors. The challenges are designed to test these skills either individually or in harmony with other sensors. Unless otherwise stated in the specific challenge, the general rules include the following limits:

- a. The maximum power supply voltage is: 10 volts.
- b. The robot's size must not exceed 32 cm in height and must fit in a cylinder with a diameter of 32 cm (with parts fully extended)
- c. There is no limit to the number of wheels.
- d. The robots must be built entirely from Lego Mindstorm EV3, NXT or EV4.
- e. The results of each division (elementary and secondary) and each event will be compiled, the team with the highest overall standing will win the competition.
- f. The challenges can be done one after the other, or in parallel, if you have the necessary resources.
- g. You can use the same robot, a modified version or a completely different one for each challenge.
- h. If you have multiple teams competing, you cannot use the same bots for different teams.
- i. All video clips must be submitted no later than April 23, 2021 before 11:59 p.m.
- j. It is important that the spirit of these rules is followed. If there are any questions regarding the changes to the event, please do not hesitate to contact the coordinator, Fanny Beauchemin (fanny.beauchemin@sciencetech.ca). If during the viewing of the video, a judge has a doubt that the spirit of the competition is not being respected, the judge reserves the right to disqualify the team.

Points

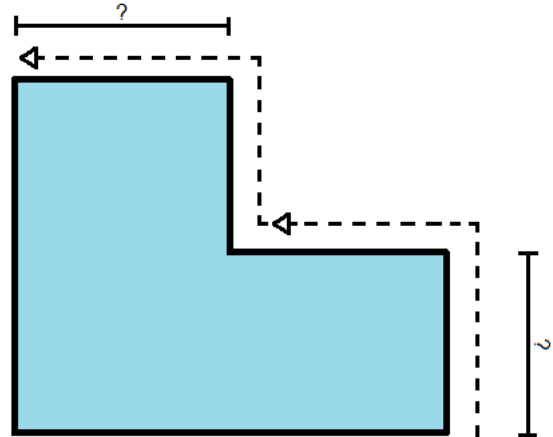
The winner of the competition will be the team with the best overall design and performance over the 3 challenges. The design and presentation of the robot in the videos will be important during the judgment. Teams that have participated in 1 or 2 challenge(s) will be judged in separate categories. Here is an example of the distribution of points:

1 st place	3 challenges	30
2 nd place	3 challenges	24
3 rd place	3 challenges	18
4 th place	3 challenges	14
5 th place	3 challenges	12
1 st place	2 challenges	11
2 nd place	2 challenges	10
3 rd place	2 challenges	8
1 st place	1 challenge	7
2 nd place	1 challenge	6

Stair climber

Climb two stairs with closed risers as fast as possible.

Challenge: test design, understanding of frictional force, balance, and power.



Rules and Specifications

1. Each step must have a closed riser. You must absolutely provide us with the length of the step and the riser to compare the speed with other teams.
2. The robot's speed will be calculated based on the time it takes to climb the first two steps. Changing the speed of the video is prohibited.
3. Robots must have a button (**not the buttons on the EV3/nxt brick**) that will allow the robot to start moving.
4. Your robot must climb the stairs in the shortest time possible and must be able to climb a minimum of 2 stairs.
5. The robot may only be in contact with the stair or the floor to perform the climb.
6. The robot must be presented to the judges by a video clip. Your video will be evaluated according to the criteria below:

Robot performance (speed) Robot demonstration	4
Explanation of the design and construction of the robot	4
Code presentation	1
The presentation of information is clear, concise, and dynamic	1
Total	10

Line follower

Use sensors to follow a line drawn on the floor using tape (electrical tape is recommended). The path is improvised by the teacher.



Challenge: Test programming skills, focusing on robot speed, using sensors and their ability to recognize color.

Rules and Specifications

1. Some points will be awarded according to the complexity of the path. For example, a path with intersections or steep turns will give more points than a path with only a straight line. The robot must use at least one color sensor to follow the line on the ground.
2. Points will be deducted if the robot deviates from the line.
3. Robots must have a button (not the buttons on the EV3 / NXT Brick) that will allow the robot to start moving.
4. The robot should stop if it no longer detects a line.
5. The robot must be presented to the judges by a video clip. Your video will be evaluated according to the criteria below:

Robot performance (speed) Robot demonstration	2
Complexity of the path	2
Explanation of the design and construction of the robot	3
Code presentation	2
The presentation of information is clear, concise, and dynamic	1
Total	10

Go and throw

Starting in the starting zone, move 1 meter as precisely as possible, until you reach a throwing zone. When you are in position, throw an object as far as possible.



Challenge: Test programming and mechanical design skills, use of light, color, sound, or other sensors to stop at a specific location.

Rules and Specifications

1. You can use any sensor you like, except the button, to stop at the throwing area. You can add an obstacle to allow detection.
2. You will be judged on the accuracy of the distance traveled and the distance traveled by the thrown object before it hits the ground and immobilize.
3. The object to be thrown is a six-sided dice of standard size.
4. The robot must be on the ground during its path, and the object must land on the ground after being thrown.
5. The projectile may slide or bounce. The distance traveled is the total distance between the throwing zone and the projectile at the end of its course.
6. The video capsule must include the actual measured distance between the start and the throw.
7. The video capsule must include the distance between the throwing area and the final landing point of the projectile.
8. The final robot must be presented to the judges by a video clip. Your video will be evaluated according to the criteria below:

Distance traveled Robot demonstration	2
Throwing distance Robot demonstration	2
Explanation of the design and construction of the robot (choice of sensor, propulsion method)	3
Code presentation	2
The presentation of information is clear, concise, and dynamic	1
Total	10

Bonus

Use LEGO® Digital Designer to design one of your robots. 5 points will be added to your overall score if you send a virtual version of one of the robots you use for the challenges.

Awards

- a. The team with the highest score for each challenge will receive an award.
- b. The team with the best overall ranking will receive an award.
- c. Each participant will receive a medal (gold, silver, or bronze).
- d. Each participating team can purchase a participation plaque.