World Robot Olympiad 2018

ADVANCED ROBOTICS CHALLENGE RULES

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Introduction

Robotics is a wonderful platform for learning 21st century skills. Solving robotic challenges encourages innovation and develops creativity and problem-solving skills in students. Because robotics crosses multiple curricular subjects, students must learn and apply their knowledge of science, technology, engineering, math, and computer programming.

The most rewarding part of designing robots is that students have fun. They work together as a team, discovering their own solutions. Coaches guide them along the way, then step back to allow them their own victories and losses. Students thrive in this supportive and immersive environment, and learning occurs as naturally as breathing air.

At the end of the day, at the end of a fair competition, students can say they did their best, they learned, and they had fun.

Important changes for WRO 2018

Rule	Change
1.1, 1.2 and others	Removed all references to EV3 and LEGO. Starting 2018, EV3 is no longer allowed as controller in this category.
1.2	Added elastic bands and cable wraps as possible materials for holding cables.
6.	Included a new paragraph about consequences of rule violation.
7.	Included a new paragraph about the use of too similar (online) solutions.

Advanced Robotics Challenge Rules

The rules of competition are constituted by World Robot Olympiad Association (WRO).

1. Materials

1.1.   <u>The controller USED for the robot must be from NI (National Instruments) MyRIO or KNR (MyRIO based).</u>
- The main decision maker must be on this controller
- Arduino, Raspberry Pi and other System-on-boards are not allowed

	MyRIO
	KNR (MyRIO based)

1.2.   The Robot can only be built using the MATRIX and TETRIX building system.
- Electrical tape, elastic bands, cable wraps and nylon ties (tie wraps) are allowed only to hold cables.
- It is not permitted to make alterations to any materials from Matrix or TETRIX. However, it is permitted to cut or drill in an element if that is necessary to fix a motor or sensor to the robot.
- 3d printed elements or elements cut from acryl/wood are not allowed, except when they are a casing for a sensor or motor, allowing to fix the sensor/motor on a MATRIX/TETRIX element.

	MATRIX
	TETRIX

1.3.   Control software must be written in LabVIEW from National Instruments or any text-based language (like C, C++, C#, RobotC, Java, Python etc).

1.4.   Teams can use any sensors of their choice – there are no restrictions on brand, function or number of sensors used. Cameras are considered sensors.

1.5.   Teams can use any electrical motors and servos of their choice – there are no restrictions on brand or number of motors and servos used.

1.6.   Teams can use any battery of their choice – there are no restrictions on brand, function or number of batteries used.

1.7.   Teams may use only <u>one</u> controller

1.8.   Teams cannot use any hydraulic pressure or barometric pressure

1.9.   Teams should prepare and bring all the equipment, software and portable computers, they need during the tournament.

1.10.   Teams should bring enough spare parts. Even in the case of any accidents or equipment malfunction, WRO (and/or organizing committee) is not responsible for their maintenance or replacement.

1.11.   Coaches are not allowed to enter the court to provide any instructions and guidance during the competition.

1.12.   Robots may be assembled before the tournament.

1.13.   Contestants may make the program beforehand.

1.14.   Safety Glasses must be worn in the Competition Area at all times.

2. Regulations about the robot

2.1.   The maximum dimensions of the robot before it starts the "mission" must be within 450mm × 450mm × 450mm. After the robot starts, the dimensions of the robot are not restricted.

2.2.   Robots are autonomous. Participants are not allowed to interfere or assist the robot while it is running (performing the "mission"). This includes entering data to a program by giving visual, audio or any other signals to the robot during the match. Teams that violate this rule will be disqualified at that match.

2.3.   A robot must be autonomous and finish the "missions" by itself. Any radio communication, remote control and wired control systems are not allowed while the robot is running. Teams in violation of this rule will be disqualified.

2.4.   Any Bluetooth or Wi-Fi function on the controller must be switched off at all times.

3. Competition

3.1.   Each team must prepare for the match in their specified place until the "check Time", when the team's robot must be placed in a designated area.

3.2.   On the day of the competition, there will be a minimum of 60 minutes of practice time before the start of the first round.

3.3.   The contestants may use this time to perform Practices in their places, or may queue with their robots to have one practice game, or may take measurements in the competition site in so far as this does not interfere with other teams' practice.

3.4.   Teams cannot touch the designated competition areas before the start of the practice time is announced

3.5.   All robots must be placed on the reviewing table for preparatory review after the end of the Practice period. No mechanisms or programs may be modified after this time.

3.6.   Robots may take part in the competition only after they have passed review by the judges.

3.7.   If the robot does not pass the review by the judges, the robot may not be used in the competition

3.8.   The competition consists of a number of rounds and testing time.

3.9.   Preparation time before each game may not exceed 90 seconds, and, once started, individual games may not exceed the match time specified in the Game Rules.

3.10. The robot will have the amount of time to complete the challenge that is mentioned in the Game Rules. Time begins when the judge gives the signal to start. The robot must be placed in the starting area so the projection of the robot on the game mat is completely within the start area. The robot is switched off. The participants are allowed to make physical adjustments to the robot in the starting area. However, it is **not allowed** to enter data to a program by changing positions or orientation of the robot parts **or to make any sensor calibrations of the robot**. If a judge identifies this, the team could be disqualified from the competition.

3.11. Once physical adjustments have been made to the satisfaction of the participants, the judge will ask the team about the way to run the robot. There are two possible cases:
   a.   the robot starts moving immediately after turning on the power;
   b.   if the robot starts moving after pressing a button on the controller.
   If option a.) is used the judge provides a signal to start and the team member switches on the robot. If option b.) is used the team member is allowed to turn on the power for the main controller and motor drivers. No changes in position of the robot or its parts are allowed. Then the judge provides the signal to start as well and the team member presses the button to start the robot.

3.12. If there is any uncertainty during the task, the judge makes the final decision. They will bias their decision to the worst outcome available for the context of the situation.

3.13. The match will end as described in the Game Rules.

3.14. The score calculation is done by the judges at the conclusion of each round. The team must verify and sign the score sheet after the round, if they have no fair complaints.

3.15. The ranking of a team is decided depending on the overall competition format as described in the Game Rules. If teams still remain tied, ranking will be determined by consistency of performance by examining which team achieved the next highest score during previous rounds.

4. Court

4.1.

4.2. People, other than competing students are not allowed to enter the competition area, apart from authorized WRO Organizing Committee staff and special personnel.

4.3. The standard of all competition materials and courts are according to what are provided by the committee on the competition days.

5. Prohibited matters

5.1. Destruction or tampering with competition courts/tables, materials or robots of other teams.

5.2. Use of dangerous items or behaviors that may create or cause interference with the competition.

5.3. Inappropriate words and/or behavior toward other team members, other teams, audience, judges or staff.

5.4. Bringing a cellular/mobile phone or a medium of wire/wireless communication into the designated competition area.

5.5. Bringing food or drink into the designated competition area.

5.6. Competitors using any communication devices and methods while the competition is in process. Anyone outside the competition area is also banned from talking to or communicating with competing students. Teams violating this rule will be considered as disqualified and should quit the competition immediately. If communication is necessary, the committee may allow team members to communicate with others under supervision by tournament staff or by exchanging a note under permission by judges.

5.7. Any other situation which judges might consider as interference or violation of the spirit of the competition.

6. Fairness

6.1.   If any of the rules mentioned in this document are broken or violated, the referees can decide on one or more of the following consequences:
- A team may not be allowed to participate in one or more runs.
- A team may get up to a 50% reduced score in one or more runs.
- A team may not qualify for the next round (e.g. in case you have a competition mode with TOP 16, TOP 8 etc.).
- A team may not qualify for the international final.
- A team may be disqualified completely from the competition.

7. Internet solutions / Duplicate models and programs

7.1.   If a team is identified as having a solution that is too similar to solutions sold or posted online, and clearly not their own, the team will be subject for investigation and possible disqualification.

7.2.   If a team is identified as having a solution that is too similar to another solution at the competition, and clearly not their own, the team will be subject for investigation and possible disqualification.