



# Regular Category

# General Rules

The rules of competition at **INDONESIAN ROBOTIC OLYMPIAD 2019** are constituted by the **INDONESIAN ROBOTIC OLYMPIAD** committee ("the committee" in the following paragraphs).

- Additional surprise rule(s) might be applied, and it will be announced prior the competition.

# 1. Qualification for Participation and Team Composition

## 1. Age of participants:

- Elementary (Primary) School age: Date of birth falls on/or after January 1, 2007.
- Junior High (Middle) School age: Date of birth falls in the period January 1, 2004 to December 31, 2006.
- Senior High (Secondary) School age: Date of birth falls in the period January 1, 2001 to December 31, 2003.

### **NOTE:**

- Participants are not confined to school-going students. Anyone can participate in the corresponding age groups.
- Students younger than the age group definition have to obtain permission from the Host Country for participation in the international final and may only be approved if at least one other team member has the correct age.
- If all members of a team are younger than required, then the team must participate in the corresponding category.

## 2. Team composition:

A team consists of one (1) to three (3) students and one (1) coach. However, to compete in WRO a team needs to have at least two (2) students

## 3. Coaches:

- Coaches may work with more than one team; however each team needs to be assisted by a responsible adult. This person may be an assistant coach.

- Coaches may offer students advice and guidance prior to the competition, however during the actual Olympiad competition, all work and preparation must be performed by the student members of the team.

## 2. Material

1. The controller, motors, and sensors used to assemble robots must be from LEGO® MINDSTORMS™ sets (NXT or EV3) and the HiTechnic Color Sensor. Other LEGO branded elements may be used to construct the remaining parts of the robot.
2. The sets used are official LEGO Education sets. The committee will check warranty seal on the controller which indicates the sets are official LEGO Education set. Checking will be done prior to the start of competition and during track-trial before technical meeting. Participants may use **non-Education sets with a penalty fee of Rp 500.000 per team.**
3. Teams should prepare and bring all the equipment, software and portable computers they need during the tournament.
4. Teams should bring enough spare parts. Even in the case of any accidents or equipment malfunction, the committee is not responsible for their maintenance or replacement.
5. All the parts for the robot should be disassembled and in their initial state (not pre-built) when the "assemble" time starts. For example, a tire cannot be put on a wheel until assemble time begins.
6. Teams may not use any instruction sheets/guides whether written, illustrated or pictorial no matter what format they are in (including paper-based and digital).
7. Contestants may make the program beforehand.
8. Robots are not allowed to use screws, glues or tape to fasten any components. Non-compliance with these rules will result in disqualification.
9. Control software must be either NXT®, EV3 software, or LabVIEW. See details on eligible controller/software combinations for WRO Regular Category in this chart:



	NXT Software	EV3 Software	LabVIEW*
NXT	√	√	√
EV3	x	√	√



\*LabVIEW is ONLY permitted in the Senior High School age group

10. Exception on software rules, for Senior Age group, teams may use any software that they want, as long they are used to program the NXT or EV3 brick.

11. The motors and the sensors for the robot are supplied by LEGO® and HiTechnic. Any other products are not allowed. Teams are not allowed to modify any original parts (for example: EV3, NXT, motors, and sensors, etc). A robot made with modified parts will be disqualified at that match. See details on eligible sensors and motors in figure below.

Figure 1. IRO2017 eligible motors and sensors for regular category

	9842 – Interactive Servo Motor		45502 – Large Motor
	9843 – Touch Sensor		45503 – Medium Motor
	9844 – Light Sensor		44504 – Ultrasonic Sensor
	9845 – Sound Sensor		44506 – Color Sensor
	9846 – Ultrasonic Sensor		44507 – Touch Sensor
	HiTechnic NXT Color Sensor V2		44509 – Infrared Sensor

	9694 – NXT Color Sensor		45505 – Gyro Sensor
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11. The battery for the robot are supplied by LEGO® or other brand appointed by the committee, as shown in figure 2. A robot using other type of battery or power source will be disqualified at that match.

Figure 2. IRO2019 eligible battery for regular category

	9798 – NXT Rechargeable Battery		9693 – NXT DC Rechargeable Battery
	45501 – EV3 DC Rechargeable Battery		ABC Alkaline Battery

### 3. Regulations about the Robot

1. The maximum dimensions of the robot before it starts the "mission" must be within 250 mm × 250 mm × 250 mm. After the robot starts, the dimensions of the robot are not restricted.
2. Teams are allowed to use only one controller (NXT or EV3). Teams are allowed to use only one controller (NXT or EV3). **Teams are allowed to bring more than one controller (just in case), but they can only use one controller during practice time or robot runs. Teams have to leave the spare controllers with their coach and contact the judges if they need it (all contents will be deleted on the new controller).**
3. The number of motors and sensors to be used is not restricted.
4. Any actions or movements by the participants are not allowed to interfere or assist the robot while it is running (performing the "mission"). Teams that violate this rule will be disqualified at that match.
5. 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 may be disqualified and must quit the competition immediately.

6. The Bluetooth and Wi-Fi function must be switched off at all times.
7. Use of SD cards to store programs is allowed. SD cards must be inserted before the robot is inspected and may not be removed for the duration of the competition once inspection is completed.

## 4. Prior to Competition

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.
2. Teams cannot touch designated competition courts before the start of the "assemble time" is announced.
3. Judges will check the state of parts before announcing the start of the "assemble time". Teams must show that their parts are separated. Team members cannot touch any parts or computer during this "check time" without judge's permission/instruction.
4. The "assemble time" doesn't begin until officially announced at the event.

## 5. Competition

1. Qualification Stage time allocation is as follows:

Assembly & Testing	120 minutes
1st Qualification rounds	30 minutes
Assembly & Testing	45 minutes
2nd Qualification rounds	30 minutes
Assembly & Testing	30 minutes
3rd Qualification rounds	30 minutes

There are three qualification rounds in total and the best score from the three rounds will be taken as their qualifying score. Top eight teams will proceed to the Final Stage.

2. Final Stage time allocation is as follows:

1st practice final rounds	30 minutes	8 teams
1st final rounds	10 minutes	
2nd practice final rounds	10 minutes	
2nd final rounds	10 minutes	

There are two final rounds in total and the best score from the two rounds will be taken to determine their ranking.

3. In each scoring round (both qualification and final rounds), each team will have a second attempt to get their score. However, in qualification rounds, team may take the second attempt only when the time hasn't passed 5 seconds after the judge give signal to start the mission. In final rounds, team may take the second attempt even if their robot has finished the mission. If teams take the second attempt, the last score will be taken as the final score.
4. Competitors cannot assemble robot outside of specified assembly and testing times.
5. Competitors begin assembly once assembly times are announced at the event and can immediately start the programming and test runs. After each Assembly & Testing time ends, teams must bring their robot to the inspection and quarantine area, after which the judges will assess if the robot conforms to all regulations. Upon successful inspection the robot will be allowed to compete.
6. Before the robot is placed in the quarantine area for inspection the robot must have only one executable program with the name "run2019". If you can create project folders, name it "IRO2019". Other files, e.g. sub programs, are allowed to be in the same directory but are not allowed to be executed.
7. 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.
8. The ranking of a team is decided by their best score of a round. If competing teams acquire the same points, the ranking is decided by the record of time.

- 9 Outside specified assembly and testing times, it is not allowed to modify or exchange the robot. (For example, it is during inspection time teams are not permitted to download programs to robots or change batteries).

## **6. Court**

1. Teams must assemble their robot in an area designated by tournament officials (each team has its own area). People, other than competing students are not allowed to enter the competition area, apart from authorized IRO Organizing Committee staff and special personnel.
2. The standard of all competition materials and courts are according to what are provided by the committee on the competition days.

## **7. Competition Equipment**

1. Participants must wear the official IRO2019 Nametag that has been provided by the committee during the competition. Participants who are not wearing the nametag may not enter the competition arena.
2. Participants must wear the official IRO2019 Uniform that has been provided by the committee during the competition. Participants who are not wearing the uniform may not enter the competition arena.

## **8. Prohibited Matters**

1. Destruction of competition courts/tables, materials or robots of other teams.
2. Use of dangerous items or behaviors that may create or cause interference with the competition.
3. Inappropriate words and/or behavior toward other team members, other teams, audience, judges or staff.
4. Bringing a cellular/mobile phone or a medium of wire/wireless communication into the designated competition area.
5. Bringing food or drink into the designated competition area.
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.

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