

**World Educational Robot Contest (WER)  
Innovation Contest**

**General Rules**

**Federation of World Educational Robot**

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## Update:

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# 1. Missions

- To be the Most Popular Robot Contest.

WER offers an opportunity for the majority of teenagers in the world to access educational robots, and makes them available for non-wealthy people or those who are not yet good at robotics. The ultimate missions for WER is to bring equal opportunities for teenagers around the world to get technology education and to improve their technological accomplishment, which prepare our future global citizen to understand, apply and manage technology. Teenagers that have good grasp of technology are vital for the world's future development.

- To be a Platform for Showing Teenagers' Achievements and Exchanging Ideas.

Not only does WER cultivate technology ability, but also is a platform for showing hands-on ability, creativity, teamwork and progressiveness. Besides being just a contest, WER is also a stage for showing teenagers' achievements and exchanging ideas.

- To be the World's Most Watchable, Challenging, Creative and Fun Robot Contest.

WER shoulders a great mission of spreading technology education, but it's not easy. In the future, WER will contain contests in different robot forms, like Creative Bricks robot, Humanoid robot, Mobile robot, Areo-robot etc. The rule-designers of WER have created contest tasks that are starter-friendly, challenging and creative.

## 2. Eligibility and Teams

### 2.1 Eligibility

All primary and middle school students, aged from 6 to 18, can sign up for WER.

### 2.2 Team

WER encourages participants to work in a team. However, it is requested for the participants who want to form a team to sign up as one. Only 2-10 persons can form a team.

## 3. Contest Structure

The whole contest contains Arena Tasks Competition, Extension Task Competition and Interview.

## 3.1 Sequence

There will be a drawing lots session before the contest starts, and the result of which cannot be undone. The robot needs to follow the sequence determined by drawing lots strictly.

In the contest, when a team starts, the following one will be notified to get ready. The robot will lose its chance in this round if it's not ready within the time provided, but it won't affect the next round.

## 3.2 Debugging

Before each round of the arena tasks and extra tasks, time will be provided for closed debugging and from which, the participants calculate essential parameters based on arena environment and maintain their robots. After the closed debugging, the robot will be sealed by the judge (battery will not be sealed). Participants shouldn't contact with the robot without permission; otherwise, their qualification will be removed.

Participants need to wait in lines to test their robots. Teams that don't follow the order could be no longer qualified for the contest.

## 3.3 Arena Tasks Competition

Content of the Arena Tasks Competition depends on the main theme each year. Participants will be challenged by a number of ingenious and fun tasks which aim to test their robotic skills, creative ability, strategic planning, teamwork etc. The result of Arena Tasks Competition will affect each team's final score directly.

Number, structure and score system of the arena tasks vary each year, please read "Task Rules" released each year for more information.

### 3.3.1 Accuracy of Task Position

Task position on the arena isn't fixed. The accurate position will only be known when the first-round closed debugging starts. Even so, committee of the contest will release the approximate position of every task model in the "Task Rules".

Position change of the arena task models can be concluded into few types:

- (1) Rotation: Position of the task model doesn't change, but its orientation changes.
- (2) Move in the same area: Task models moves around the position where it is set according to the "Task Rules", but its orientation remains.
- (3) Move on the same floor: Position of the task model changes on the same floor, but its orientation remains.
- (4) Move on the same floor and rotate: Position of the task model changes on the same floor and its orientation changes too.

### 3.3.2 Extra Task

There may be no extra tasks in some regional contest. If there is, when the first round of the debugging kicks off, the extra task will be released along with arena task variables. The extra task is optional task, namely teams can decide to do or not depending on their own conditions. No matter whether the team will choose the extra task, its model will be placed in the appointed position.

### 3.3.3 Time for Arena Tasks

The arena tasks are divided into 2 rounds, each round contains 3 minutes which are started as the judge whistles and ended as the judge whistles again. If the participant chooses the extra task, time for completing it will be included in the 3 minutes.

### 3.3.4 Instruction and Specification of Arena Tasks Competition

#### 3.3.4.1 Material and Dimensions of the Arena

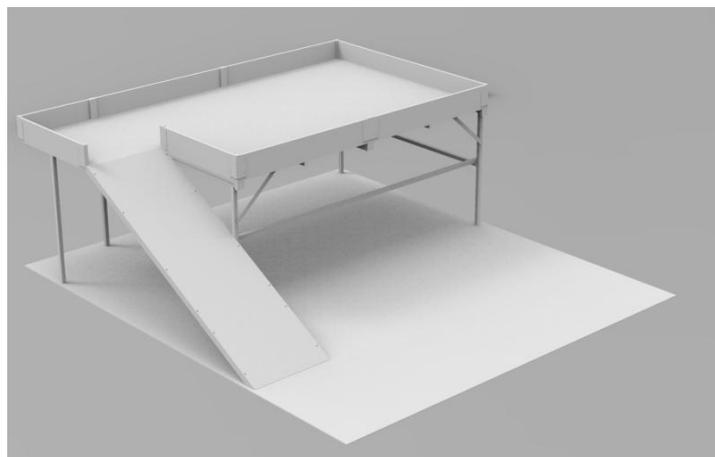


Figure 1 Illustration of the arena.

The arena is divided into two floors (see figure 1). The first floor is called “Ground Arena”, with size at 240\*210cm (length\*width), whose material is flex banner, and images on which vary on annual theme. The edge of the flex banner defines where the boundary of the ground arena is. The second floor is called “Second-floor Arena”, with size at 204\*116cm (length\*width), and supported by metal sticks (section 2\*2cm). Its floor is made of wood or PMMA, covered by colored flex banner, the images on which also vary on annual theme. The area confined by the wood fence is the second floor arena.

Two floors are connected by the “Slope”, and the angle formed by the slope and the ground is 30 degree ( $\pm 1$  degree). The slope is a 42\*140cm (length\*width) wood plate, covered with a colored flex banner, whose images are theme-related, and supported by metal sticks (section 2\*2cm).

### 3.3.4.2 Arena Environment Standard

- The boundary of the arena extends no less than 50cm.
- Arena drawing should be flat and smooth.
- Arena fence should be firm and steady.
- The relative position between arena fence and drawing should be stable.
- The guide line on the slope and that on the first and second floor should be coherent.
- The flex banner and fence should be clean and tidy.

### 3.3.5 Penalty

- Contact the robot outside of the base. After the robot leaving the base, participants can no longer contact the robot; otherwise, it'll lead to 20 points deduction from the final score (-20 points per time) and the robot will be requested to reboot from the base. Timekeeping won't stop during it. Any change of the arena that has been made by contacting the robot outside of the base will be left in that way, however, points made from the task model that the robot carries will be invalid and kept by the judge until the end of this round of contest. Note: If total score is below 0 point after deduction, the final score will be 0 when recorded into system.
- Contact the task models outside of the base. During the contest, participants cannot contact any task model on the arena, except in the base; otherwise, the robot will be requested to restart. Timekeeping won't stop during it and points made by contacting the models will be invalid.
- After the robot being set off, participants cannot assist or navigate the robot to finish the task in any way; otherwise, the robot will be requested to restart. Timekeeping won't stop during it and points made by participants assist will be invalid.
- Detach "strategic object" from the robot. All models that aren't provided on the arena will be defined as robot's component. While completing the tasks, the robot cannot drop any "strategic object" on the arena. Points that are made by dropping objects intentionally will be invalid. The robot or participant can pick up the component when the judge consents. After the contest is completed, the components cannot contact with models outside of the base; otherwise, it'll be seen as intentionally breaking the rules and the points made by dropping components will be invalid.

## 3.4 Extension Task Competition

The extension task is determined by the annual theme of the contest and originates from one of the arena tasks. It aims to test participants' robotic skills and creative ability. Sore of the

extension task will affect the final result.

The extension task, score system and competition arena will be released before debugging.

Extension task is a one-round competition. It lasts for one minute which starts as the judge whistles and ends as the judge whistles again. Timekeeping does not begin as the robot starts.

Extra tasks may not be set in some regional contests; if there is, competition organizers will set a new round for debugging, and before that the task rules and corresponding points for extra task will be released.

### 3.5 Interview

Questions of the interview could be about main themes of the WER, innovative technologies, knowledge about culture, technology, robotics etc. that are related to the arena tasks. Knowledge base of the team members will affect performance of the interview, and in turn, affect the final result of each team.

There's only one round for the interview which lasts for 5-10 minutes. The total score is 100.

The interviewers own the right to cancel the participants' qualification if they're late. The interviewers own the right to end the overdue interview.

Interview may not appear in some regional contests; if there is, organizers will announce the date and location when participants are checking in.

## 4. Robot

### 4.1 Dimensions and Materials

- **Dimensions:** Before setting off, robot should be no larger than 30\*30\*30cm (length\*width\*height). After leaving the base, the dimensions of the robot can be expanded.
- **Controller:** Only one controller is allowed to use on one robot.
- **Actuator:** At most 1 bus-based motor and 3 other motors (either DC or closed-loop) are allowed to use in one robot. When the motor is used for driving wheels, one motor corresponds to one wheel on the ground.
- **Sensor:** The sensor type and number that can be used on robot is unlimited, while integrated sensor that made by multiple same or different sensor probes is not allowed to use.
- **Structure:** The robot can only be built by attaching and plugging with plastic materials. No ribbons, screws, rivets, glues, tapes etc. are allowed to be used for connecting.
- **Power:** The robot is powered by its dedicated battery only. External power is not allowed. Voltage of the battery should be no more than 9V. External circuit board (for step up/ step down/ stabilize voltage) is also not allowed here.

## **4.2 Screening**

In order to keep the contest fair, the robot from every team will be taken to screening. Any robot that violates the rules above can return to the arena after being changed as the rules request.

If the robot is found not qualified after being putting into the base, its qualification will be removed.

## **4.3 Running**

Arena Tasks Competition: After being put into the base by participants, the robot can be activated under the judge's instructions. Once activated, the robot needs to run on its own. Any kind of guidance, navigation, assistance from the team member is forbidden. After being set off from the base, the robot can be no longer contacted; otherwise, it'll be penalized on "Outside Arena Robot Contact Penalty".

Rules for robot running of extension task competition will be released before debugging.

In the process of interview, the robot is allowed to be run in the purpose of demonstration or explanation.

## **4.4 Maintenance**

Controller is not allowed to change in the single round competition (3 min).

## **5. Score System**

The score for one round will result from the combination of the score earned from the completed tasks in the round and the score deducted from penalty.

The final score for each team results from the score combination of two-round arena tasks competition, extension task competition and interview.

## **6. Ranking**

The higher score one team gets, the higher its rank will be.

When two teams' final scores are the same, the one with less robot contact outside the arena will rank higher.

When times of contacting robot outside the arena are the same, the team spending less time in two rounds will rank higher.

## 7. Arena Environment

### 7.1 Power Source

There are local power source around the arena. Participants need to prepare voltage or frequency convertor on their own. Please prepare long electronic cable as there will be some practice desks that are far from the power sockets. At last, please stabilize the plug and watch out while using the electricity.

### 7.2 Light

Natural light will be on the arena. Before the contest starts, there will be time for participants to adjust the sensors.

However, light on the arena will change as time goes by. Flashlight from camera or other unknown light sources could be appeared in the contest. Participants need to take this into consideration.

## 8. Terms

- **Arena:** Including arena frames, arena paper, arena models and task models.
- **Base:** The area is for setting the robot off and repairing it. There could be bases on both floors. Please read “Task Rules” of each year to know the dimensions, shape and location of the base.
- **Exceed the Boundary (Task Models):** Vertical projection of the object is out of the boundary or crosses the boundary will be seen as exceeding the boundary. Vertical projection of the object overlaps or is contained within the boundary will not be seen as exceeding the boundary.



- **Set-off:** Leaving the base will be seen as being set off.
- **Return to the Base:** The robot will be seen as returning to the base if any part of vertical projection of it contacts with the base.
- **Restart:** During the contest, participant takes the robot away from outside of the base and restarts the robot from the base.
- **Contest Terminated:**
  - (1) During the contest, the judge will terminate one’s contest if the robot or participant demolishes the arena or interrupts the contest or judge’s work. However, the points made before and it won’t affect the next round.

- (2) During the contest, participant can apply to terminate the contest at any time. Points made before are valid and it won't affect the next round of contest.

## **9. Contacts and Interpretation**

Please contact Federation of World Educational Robot (FWER) if you have any doubt or suggestion to this rule.

Email: [rules@wercontest.org](mailto:rules@wercontest.org)

Federation of WER reserves all the right for final explanation.