

World Educational Robot Contest

General Rules

Federation of World Educational Robot
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1. Mission Statement

The purpose of WER (World Educational Robot Contest) is to cultivate students' creativity and hands-on ability by robot tasks, to offer opportunities for students to solve practical problems with knowledge on science, technology, engineering and mathematics, to transform knowledge from textbooks into a system that is possessed with vitality and to let the students learn how to organize and manage a team while they're working with others.

The contest is not oriented on the results; whereas, the interest of knowledge and science when students tackle the problem, the passion of participating and finding an opponent are what truly matter.

2. Eligibility and Teams

2.1 Eligibility

All primary and middle school students, aged from 9 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

In case that level and experience of participants could be varied, an extra task for increasing the difficulty that contains 100 points will be released at the same time when position of the task model is certain. Its score system will be released as well.

The extra task is optional. Participants can decide to do it or not based on their abilities. Chosen or not, model of the extra task will appear on the arena.

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 Material and Dimensions of the Arena

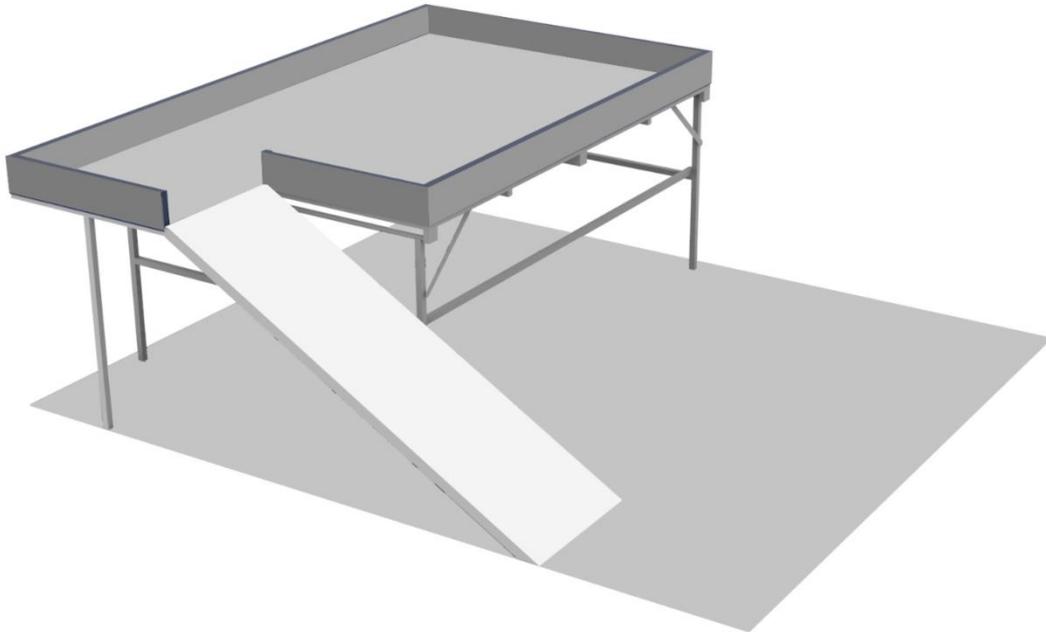


Fig 1 Illustration of the arena.

As the picture shows, the arena is divided into two floors. The first floor is called “Ground Arena”, sized as 240cm*210 cm, the material of which is printed color cloth and the images on which are varied depending on the theme of each year. The edge of the cloth defines where the boundary of the ground arena is.

The second floor is called “Second-floor Arena”, sized as 204cm*116cm and supported by metal sticks. The second floor is also covered with printed color cloth and the images on which are varied depending on the theme of each year. The fence on the second floor is made of wood (10cm height and 1-2cm thickness). The area confined by the fence is the second floor arena.

The angle formed by the slope and the ground floor is 30 degree(± 5 degree).

The slop is a 42cm*140cm wood plate, covered with a printed color cloth which the images in the cloth are varied depending on the theme of each year, and supported by metal sticks (2cm×2cm cross section).

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.
- 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. Some of the extension task will affect the final result.

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

3.4.1 Time for Extension Task

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.

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.

3.5.1 Time for Interview

There's only one round for the interview which lasts for 5-10 minutes. The interviewers own the right to cancel the participants' qualification if they're late. The interviewers own the right to end the overdue interview.

4、 Robot

4.1 Dimensions and Materials

- Dimensions: Before set off, the dimensions of the robot should be no more than 30cm×30cm×30cm (length*width*height). After leaving the base, the dimensions of the robot can be expanded.

Extension Task Competition: Released before the debugging.

Interview: Not requested.

- Controller: Only one controller can be allowed to use on one robot.
- Actuator: Every robot is allowed to be possessed with at most 1 bus-based motor and 3 other motors (either DC or closed-loop).
- Sensors: The robot cannot use integrated sensor that contains multiple sensing modules with same or different functions. However, numbers of

sensors are not limited.

- Structure: No screws, rivets, glues, tapes etc. are allowed to be attached to the robot.
- Power: The robot gets power by a battery only. External power source isn't allowed. Voltage of the battery should be no more than 10V.
- Replacement: During the contest, each team will only be allowed to use one robot. Only with the judge's permission can a team replace their robot. Timekeeping won't stop while the robot being replaced.

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

In Arena Tasks Competition, Extension Task Competition and Interview: After the robot being set off from the base, if it needs maintenance, the participant can ask the judge for it, but the timekeeping won't stop.

During the arena tasks, the robot must return to the base after its maintenance and be penalized on “Outside Arena Robot Contact Penalty”.

If there's any relevant penalty in Arena Task competition, it'll be released before debugging.

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 one team's final score is, the higher its rank will be.

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

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.

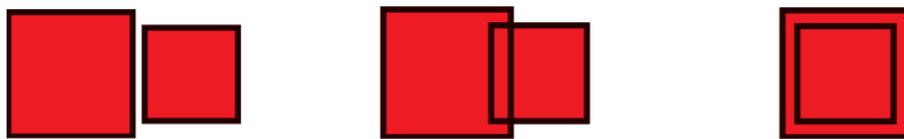
Participants need to take this into consideration.

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.

If you have any doubt or suggestion to the rules, please contact the Federation of WER.

Email : rules@wercontest.org

The right to explain the terms of the rules belongs to the Federation of WER.