

Robots' Intellect 2023

The Hunt of Artifacts

1. The task

An autonomous robot must find the given spatial figures in an area from the starting position, transport them to a designated area and stack the figures on top of each other (as a tower).

2. General rules

1. It is strictly forbidden for the robot to injure any participants or viewers.
2. It is forbidden for the robot to damage the course, obstacles or any other items of the organiser's inventory, unless it is explicitly a part of the competition.
3. The robot must be fully autonomous. During the match persons' input isn't allowed, unless it's specifically allowed by competition.
4. It is forbidden to intentionally cause any harm to other participants or robots.
5. The robot must be registered until the organiser's specified date. One robot can participate in only one competition.
6. The robot must pass qualification before participation. Robots that are late for qualification must get the competition coordinator's permission to pass qualification after official qualification time.
7. During qualification, each robot will be assigned a unique number, which must be put on the robot, in a clearly visible location.
8. The competition coordinator has final say on all questions and problems during the competition.
9. The organisers keep the right to alter/edit the rules, accordingly informing the participants about it.
10. Violation of the rules above will result in disqualification or criminal liability.

3. Requirements for the robot

1. The robot's weight is not limited.
2. Maximum robot size: 1x1x1 m (length, width, height).
3. Can only move within the course perimeter.
4. Can't fly.
5. Must be resistant to rain.
6. The power supply must be easily disconnected for safety reasons. It would be best to have a kill switch.
7. Highest allowable voltage – 51 V.

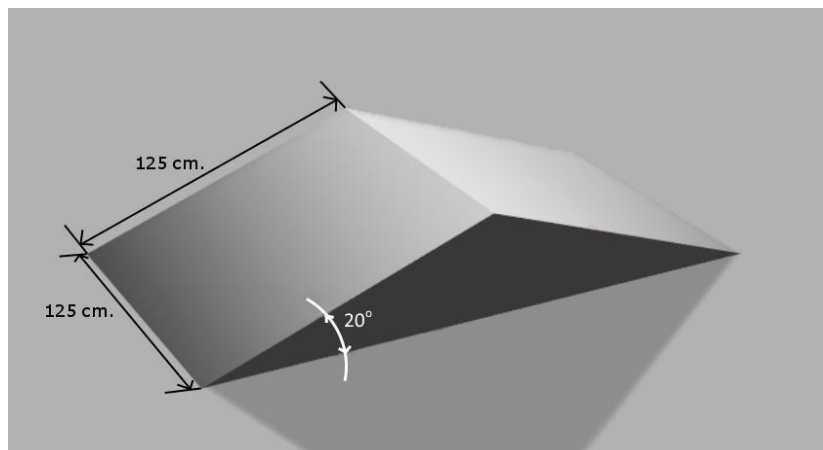
4. Team

1. The team cannot have more than 3 people.
2. The number of robots presented by a team is unlimited.

3. The participant must pay a deposit of 10 euros at the time of registration. If a participant arrives at the event and participates there with the robot, the amount is returned. The bank account that will be used to transfer the money to the organisers will be indicated on the registration form.
4. If the winner of last year's event decides to take part in this year's main event, she/he/they can only do so with another robot. Another robot is treated as a robot that must be different from the winning robot on a chassis basis. Also, use a different search algorithm (e.g. a different type of machine learning).

5. Competition field

1. The perimeter of the track is fenced with PVC foam board fences (or other material) that are up to 1 m high.
2. The track is announced no later than 30 calendar days before the event.
3. There may be obstacles installed by the organisers or naturally occurring on the track (e.g.: tunnel, debris, wet road surface, etc.). The number of obstacles is not limited.
4. If there are tunnels in the field, their width is not smaller than 2 metres. The entrance of the tunnel has to have a radius of at least 2 metres.
5. If there is a ramp in the track, its incline is not bigger than 20 degrees. Its sides are painted in a bright colour. Before the ramp, the track narrows up to 125 cm in width, after the ramp it widens without a limit.



1 pav. Ramp

6. There is a designated space in the track where the figures have to be stacked. It is marked with a white panel. Its dimensions are not smaller than 0.5x0.5 m.
7. The designated area for the figures does not match the starting position of the robot.
8. The robot's starting position and the designated area for the figures' coordinates can be set up an hour before the first attempt, but not less than 15 minutes before the start.

9. The figures do not have to be at ground level. Their height of the ground can be up to 0.5 metres. If the cubes are not at ground level, their surrounding space is empty for at least 1.5 metres.

6. Figures

1. Their weight is up to 1 ± 0.05 kg.
2. Their dimensions do not exceed $0.3 \times 0.3 \times 0.3$ m., though do not go under $0.1 \times 0.1 \times 0.1$ m.
3. All figures are different, their size differentiates by at least 0.05 m (for every side).
4. The figures are made either from plastic or plywood.
5. Figures are cubes. Their colours can differ, the colours are announced no later than 30 calendar days before the event.
 - 5.1. Cubes' colours differ greatly from their surroundings.
6. Before every attempt, the place of the cubes can be changed, to avoid exact coordinate establishment beforehand.
7. There are as many cubes in the area as how big the tower has to be.
 - 7.1. Full tower height does not exceed the robot's maximum height (up to 1 metre).
 - 7.2. How many cubes will be in the track will be announced no later than 30 calendar days before the event
 - 7.3. Spatial figures can be stored in the robot's own capacitive container, if the robot has such. It is allowed to transport all figures at one time.

7. Competition progress

7.1. General rules

1. There will be three attempts and an additional attempt with the permission of judges will be allowed for the robots that run the track in a technically orderly manner without any recurring failures. The attempts will have 30 minutes between each of them, with a 10-minute interval between participants. The competition schedule will be announced for the participants after the registration has ended, no later than a day before the competition. During the competition, the schedule will be visible for everyone.
 - 1.1. **Note:** if there are many participants, only the list of attempts may be published, without specific times for each robot. If one robot's attempt takes less than 30 min, the other robot may start its attempt immediately (with the permission of a judge).
2. Each robot during its attempt must complete the task in less than 30min. In case of a robot failure, the participant has time until his/her next attempt to adjust / eliminate faults. Exceeding this time, the participant loses the opportunity for an additional attempt.
3. If the robot drops a figure, its attempt continues without any human interference.

7.2. Qualification

1. One week before the event, the participant must answer the questions in the form provided by the organisers and send the answers back to the organisers. The question form is provided to the participant during registration time by email.
2. During the qualification at the event, the organisers ask participants the same form of questions.
3. The commission, which will check the suitability of the robots for participation in the event, consists of three main competition judges.

7.3. The start

1. Prior to the start, an independent jury will check each robot.
2. At the start of the competition, all robots must be lined up at the starting line (the starting positions for each robot will be randomly decided before the beginning of the competition).
3. The first attempt is obligatory.
4. If the technical difficulties will not be solved after the first attempt, the robot will be disqualified.

7.4. Deciding the winner

1. If no team completes the objective, the main prize will be returned to the contest prize pool.
2. If no robot completes the entire track, a part of the main prize will be awarded to the team whose robot finished the most significant part of the course (stacked the highest tower).
3. If a contestant wins the event, they must submit the robot's code to be checked for cheating.
4. The winning robot is re-examined by the same commission present at the time of qualification.
5. Participants must leave the robot software code to the organisers after signing a bilateral agreement that the code will not be used or shown to other persons, although at least this will be provided for in the agreement.
6. The organisers undertake to pay the cash prize within 30 working days (unless the organisers inform about it).
7. The amount of the advertised prize is before taxes.

7.5. Comments

1. Any offence to the rules will result in a failed attempt.
2. It is strictly forbidden to start any testing of the track or the robot before the competition has started.
3. The organisers keep their right to change the rules. In case of an argument, it is resolved by the coordinator of the competition. If the participant strictly disagrees

with the judgement of the coordinator, they can appeal it to the competition organiser.