"SUMO GRAND"
ROBOTS CONTEST ORDER

Age of participants: 10-14 years.
Team: 2 participants.
Robots: autonomous robots.
Equipment: any platform, any parts of the constructors, including those made by yourself.
Programming language: Labview, Robolab, RobotC
Procedure for the conduct of competitions: in a circular, according to the draw, in parallel on 2 tables.

1. Introduction
The rules of the SUMO GRAND contest have been prepared based on the rules of the European RobotChallenge games.
Main differences from the RobotChallenge rules:
1.1. A match consists of three rounds, 90 sec each (RobotChallenge – 3 min).
1.2. In this contest, a robot does not need to have an IR start system (although not excluded)

2. Robot requirements
2.1. Dimensions (W x L) must not exceed 400x400 mm, with height not regulated at all.
2.2. The robot after the start signal can change its size, but not more than 15 cm. At the same time, it must remain a single whole. The weight of the robot must remain unchanged.
2.3. The weight must not exceed 3 kg.
2.4. Robot wheels must not have a sticky or adhesive surface. A robot placed on a reference sheet of A4 size paper must not pull the sheet with it after it moves.
2.5. A robot must be fully autonomous, with no outside control (by an operator or OS) allowed.
2.6. An operator receives IDR (robot’s identification number) upon registration, which must be placed on a visible part of a robot before a robot is quarantined.
2.7. Additional robot requirements:
2.7.1. It is forbidden to equip a robot with interference sources that may disturb an opponent’s sensors
2.7.2. It is forbidden for a robot design to involve any parts or devices that may damage the ring surface or an opponent's robot/operator.
2.7.3. It is forbidden for a robot design to involve any liquid, gaseous, powder-like and flammable substances.

2.7.4. During the contest, when a robot's hardware incurs damage for reasons complying with the purpose of the competition, the contest shall not stop. In the case of serious damage (where the mass of parts falling out from a robot is more than 500 mg), victory is awarded to an opponent.

2.7.5. The use of devices to increase the downforce (magnets, vacuum devices, etc.) is prohibited.

3. **Battle ring requirements**

3.1. A ring shall be a white matted circle of 150 cm in diameter.

3.2. Along the perimeter, a ring must have a black curb 50 mm wide.

3.3. The center of the ring is marked with 2 yellow cross lines 10 cm long and 5 mm wide.

3.4. A ring may be elevated to a height of 10 cm above the surface of a desk or floor.

4. **Contest rules**

4.1. The purpose, pursuant to the sumo rules, is to push out an opponent robot beyond the ring line using a robot independently built by a team.

4.2. Before the start of the competition, depending on the number of teams declared, participants will be divided into groups / subgroups by means of the draw.

4.3 Before the start of the contest, the operators position robots in the ring according to the order of placement of the robots (paragraph 5).

4.4. Operators activate their robots by command of a judge and leave the ring area within 5 seconds, after which robots must start moving towards each other until they come into contact and they must not disengage until the end of a match.

4.5. The first robot to touch the surface behind the ring or/and to lose contact with an opponent and ability to move (e.g., turns over) shall be considered to have lost the contest, while an opponent shall be awarded 1 score.

4.6. If a robot obviously retreats from the attack line by losing contact with an opponent, it is considered to be defeated (1 score awarded to an opponent). An exception is when contact is lost due to the circumstances of the match.

4.7. If both robots have lost contact and ability to move, the match shall stop.

4.8. After 90 seconds, victory is awarded to a robot that is closer to the center than the other (1 score is awarded).

4.9. A robot loses automatically if an operator touches the robot after a referee’s start signal.

4.10. If a winner cannot be determined at the end of the match, the referee can declare a tie or assign a replay.

4.11. One pair of teams may have no more than 3 duels.
4.12. The team that received the maximum score in their group / subgroup goes to the next round. With an equal number of points, teams may have an additional duel.

4.13. The end of a match is announced by the judge, after which an operator can take a robot from the ring area

5. How to arrange robots in the ring before match
5.1.1. At a judge’s signal, a pair of competing teams must proceed to the ring
5.1.2. The position of each robot in the ring is determined by random draw, after which one of operators places a team’s robot as per the draw (see Fig. 1) in the quadrant determined by a judge.
5.1.3. Robots may be positioned only in opposite quadrants.
5.1.4. After arrangement is completed, an operator may not relocate a robot.

Fig. 1. Position of the robot in the ring

Fig. 2. Examples of robot arrangement

6. Scores
6.1. Scores are awarded to a team by a judge’s decision in accordance with the contest rules (item 4)
6.2. In deciding whom to award a victory, a judge must look at the following factors:

6.2.1. Technical effectiveness of the pattern of robot’s actions
6.2.2. Consistency of a team’s behavior
6.2.3. Whether there are any penalties or scores

6.3. A match is stopped or resumed in the following cases:

6.3.1. if it is impossible to determine a winning side; if robots remain in ineffective technical engagement or both of them avoid an encounter for 5 seconds. Observation of the behavior can be extended to 30 seconds, after which a judge stops the fight and appoints a replay.

6.3.1.1 Avoiding an encounter shall be considered to be taking place if:

- Robots are not attacking each other but are continuing to relocate for 5 seconds.
- If one of the robots has stopped and is at standstill for 5 seconds without showing any attack moves.

6.3.2 If robots simultaneously touch the surface outside the ring, the match is stopped, and a replay is assigned.

6.4. Other cases for stopping a match

6.4.1. A match may be stopped at a request of a participant, if a robot or a participant is damaged/injured. The robot’s team that suffered from damage to the robot (or from a participant’s injury) due to the actions of an opposing team shall be declared a winner. Where it is impossible to identify the perpetrator of an injury or damage, a team that stops the match is declared a loser.

6.4.2. To eliminate the consequences of a participant’s injury or robot’s damage, a decision on restoration shall be made. The contest is suspended, and the time for judges and members of the Steering Committee to make a decision shall be five minutes.

6.4.3. Judges’ decision is not to be discussed, with no objections to be made.

6.4.4. An appeal may be filed with the Steering Committee before the second match ends. In the absence of representatives of the Steering Committee, an appeal may be sent to the judge of the contest

7. Robot operator requirements

7.1. Teams whose composition matches the age category specified in the Provision may participate in the contest.

7.2. Penalties that may be imposed

7.2.1. Expression of disrespect for a judge and/or an opponent stated in writing, verbally or otherwise shall be considered a violation. If team members manifest offensive behavior, they will be given the first warning; for recurrent actions, a referee shall impose a penalty (-1 score, etc.)

7.2.2. Team members’ actions that violate the course of a contest (- 0.5 score):

- 7.2.2.1. An operator is in the ring area without a judge’s permission.
7.2.2.2. An operator or a team leader asks for a match to be stopped without any valid reasons.
7.2.2.2. There are foreign objects in the ring.
7.2.2.3. A robot is prepared for more than 30 seconds before the match start after a judge makes a signal.
7.2.2.4. Robot demonstrates activity earlier than 5 seconds after the start signal.
7.2.2.5. When a judge finds that the team compromises the integrity of a match, an admonishment is produced (-1 score), with such team to be disqualified and removed from the contest after a second admonishment.
7.2.3. Each violation is recorded in the score-sheet; at the end of the match, an opponent of the team that was charged with penalties will get points in the amount of an opponent’s penalty points, after which a winner is announced

**FLEXIBILITY OF THE CONTEST RULES**
1. Flexibility of the rules may be manifested in changes in a number of the contest participants, which may slightly influence the content of the rules, yet the main concepts of the rules must be maintained.
2. Contest organizers may make changes or exceptions to the rules before the start of the contest, whereupon such changes become permanent throughout the contest.
3. Participants must be notified of any changes or cancellations in the contest rules in advance (but at least 15 minutes before) of the contest.
4. Rules as adjusted shall be inalterable during the contest.

**LIABILITY**
1. Teams and participants of the contest shall bear personal responsibility for performance and safety of robots as well as responsibility in accordance with the Legislation of the Republic of Kazakhstan in any accidents caused by the actions of team members or their robots.
2. Contest organizers shall not be liable in a case of an accident or incident caused by actions of team members or their equipment.

**LINKS TO THE RESOURCES USED**

1. www.robofinish.ru
2. www.myROBOT.ru
3. robolymp.ru
4. www.rus-robots.ru