17th Latvian Robotics Championship
LEGO Sumo Rules 2024

This document defines the official LEGO Sumo competition rules for the 17th Latvian Robotics Championship. Issued by the organisers of the 17th Latvian Robotics Championship, 2024.

1. Robot class

Only autonomous robots can compete in LEGO Sumo

Competition

1.1. Basic Competition Rules

A participant can enter only one of the Lego Sumo categories and register only one robot. A robot can be registered with one operator and several assistants. Only the operator is allowed to drive the robot. All participants must comply with the rules and regulations of the competition to determine the winner of the bout, which takes place in the Dohyo ring using only self-built, autonomous robots. The winner will be announced by the judges.

2.2. Competition Procedure

The organisers shall determine the course of the competition, taking into account the number of participants. If the number of participants is high, sub-groups will be used to determine the final tournament participants. The final tournaments will be played in a double elimination system (group tournament + play-offs). If the number of participants is small, the organiser may use only the group tournament to determine the winner. If the number of participants is large, the organiser may use a double-elimination play-off system until a certain number of robots have been reduced, and then a group tournament to determine the winner

2.3. Sub-groups

The organisers reserve the right to divide robots into sub-categories based on age, skill level or any other characteristic

3. Dohyo Jyonai (Sumo area)

The Dohyo Jyonai (competition area) consists of the Dohyo (ring area) and the Yochi (outer edge of the ring area). The rest of the area is considered the Dohyo Jyogai (area outside the ring). The Dohyo (ring area) is a circular area covered with a black coating. (See Appendix 1 for a picture of the competition area).

Table.1. **Sumo area parameters**

Height	Diameter	Surface material
1-5 cm	77 cm	Wood/Plastic

3.1. Placing the robot on the ring area

Different robot placement rules may apply:

– if the starting cross is placed in the middle of the Sumo ring area, dividing it into four equal sectors. robots must always be placed in two diagonally opposite sectors (see Fig.1a). The robot

must cover the Tawara (white line) at least partially. The referee removes the starting cross when the robots are placed on the square. Once the robots are positioned, they may not be moved.

– If the Sumo ring area (see Fig.1.b). is formed by Shikiri-Sen (starting lines), no part of the robot shall pass over the sector enclosed by the Shikiri-Sen (starting lines). The competitor's robot shall cover the Tawara (white line) at least partially.

– Place an opaque frame (e.g. cardboard) in the centre of the ring, dividing the area into two equal halves (see Fig.1c). The frame obscures the view of the participants during robot placement and prevents them from seeing the robot placement area. The robot may be placed anywhere in the allocated half of the ring. The competitor's robot must cover the Tawara (white line) at least partially.

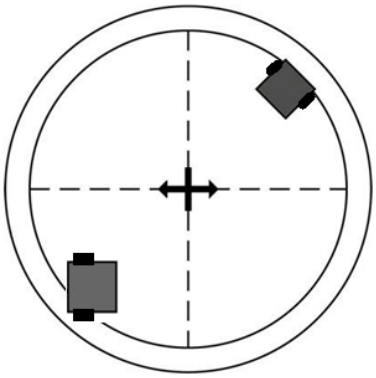


Fig.1.a.Starta krusts

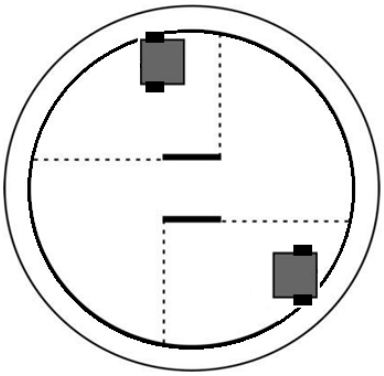


Fig.1.b. Shikiri-Sen (start lines)

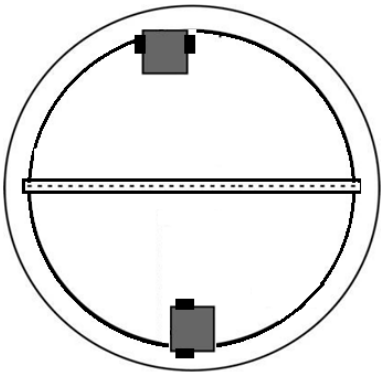


Fig.1.c. Opaque frame

The starting position of the robot in a sector may be the free choice of the competitor (Fig.1a and 1c) or a fixed starting position may be used, as shown in Fig.1b, where the robot wheels are positioned parallel to the Shikiri-Sen (starting lines). The organisers will announce additional information on the Sumo parking rules to be used for a particular event.

3.2. Tawara (white line)

Tawara is the white line along the outer edge of the Dohyo ring. The Tawara line is part of Sen's starting lines in the Dohyo Ring.

Table 2. **Tawara size**

Tawara width
2.5 cm

3.3. Yochi

Yochi is the area around the Dohyo at least 100 cm in diameter. The colour and material of the Yochi may vary, but it must not be white. If the Yochi area is not used for the competition, spectators and competitors must keep a "safe distance" and stay at least 1 m away from the ring.

4. Requirements for robots

4.1. Size and weight

Table 3. **Robot dimensions and weight**

	Weight	Length*	Width*	Height
Younger group (up to 12 years)	1.0 kg	20 cm	20 cm	30 cm
Older group (13 to 18 years)		15 cm	15 cm	20 cm
Pro Group		15 cm	15 cm	20 cm

*Robot may increase in size after the start, up to a maximum of 10 cm from the starting size

*NB: The LEGO robot measuring box has a tolerance of +2 mm.

4.2. Autonomous robots - move starting

Methods of initiation
5-second delayed start (the robot starts 5 seconds after the delayed start is activated). Delayed start can be activated by the robot operator by pressing the button.

4.3. Autonomous robots - stopping motion

Suspension methods
The robot operator stops the robot by pressing a button.

4.3. Autonomous robot movements

An autonomous robot must be sensor-controlled to be able to "sense" the movements of an opponent robot and react/attack accordingly. If there is any doubt as to whether the robot is autonomous, the judges have the right to check the control logic of the robot

4.4. Using remote control devices with autonomous robots

If it is necessary to start the robot with a remote device (remote control), this must be agreed with the referee and the remote control must be handed over to the referee after the robot has been started

4.5. Lego robot components

Lego sumo Junior and Senior groups are only allowed to use certain official and licensed LEGO parts included in the following robotics sets such as NXT Ver1 & Ver2, EV3 Educations & Mindstorms, Spike Prime & Inventer as well as their expansion sets: https://drive.google.com/file/d/1AO8p6sJu71uSiEFZisvFGXBTXgwEBAfq/view?usp=drive_link. Use of parts not included in these kits is prohibited.

Any Lego parts can be used in **the Lego sumo PRO group**, subject to point 4.6.

4.6. The LEGO parts used must be in their original condition and must not be modified (sanded, bent, glued, cut or otherwise altered)

4.7. It is forbidden to turn the tyre upside down (inside out) and/or to put it on top of another tyre already mounted on the wheel.

4.8. The wheels used must be in their original condition (e.g. do not replace the wheel rim with gears or other lego parts).

4.9. In the **Lego sumo Junior group**, only two motors are allowed to drive the robot, two additional motors may be used for other functions (e.g. a lowering mechanism (protective leaf) in front of the robot);

4.10. The robot must use batteries recommended by LEGO®.

5. Match principles

5.1. A match can last up to three rounds. The robot that first wins two bouts is declared the winner of the match. One bout lasts no more than 3 minutes.

5.2. The maximum time between rounds to get the robots in order is 1 minute..

6. Organisation of competitions

6.1. Start of the Match

At the judge's call, one of the team members must arrive with the robot at the ring within 1 minute. Otherwise the robot will be scored a technical forfeit for the round. Following the judge's instructions, the competitor must place the robot in the ring. The robot must cover at least part of the white line at the time of placing. Once in the ring, the robot may not be moved to another position. At the signal from the judge, the operator may switch on the robot and start the programme. The robot must pause for 5 seconds after the start of the program. During this 5 second pause, the competitors must leave the ring.

6.2. End of a Match

The referee signals the end of the match and stops the robots. The match is officially over when the referee gives the appropriate signal. The competitors shall shake each other's hand in respect, take their robot from the Dohyo ring and leave the Dohyi Jyonai ring area.

6.3 Torinaoshi (repeat round)

The round is repeated in the following situations:

- both robots are facing each other and their movements are disturbed or do not occur for more than 15 sec.
- both robots fall simultaneously from the Dohyo ring.
- other situations where it is not possible to determine a winner and a loser.
- if a part detaches from the robot during a fight, it stays on the ring and interferes with the opponent's robot.
- if no winner can be determined after Torinaoshi, the referee shall determine the robot's placement and position, continuing the match in the time allotted.

6.4. Getting the robots in order during the match and at intervals:

It is forbidden to leave the competition area with the robot between matches, except with proper permission (in case the robot needs to be repaired).

During one match (between matches up to 2 wins), deliberate replacement of existing parts or addition of new parts to the robot is prohibited, except that if a part is broken, the replacement part must be identical to the broken part.

7. Yuko (scored) points

The winner is announced in the following situations.

- If the robot has been pushed out of the Dohyo ring (the robot touches the area around the Dohyo ring).
- If the robot falls from the Dohyo ring and touches the area around the Dohyo ring.
- If the opponent's robot does not move within 10 seconds of the referee's start signal. (within 5 seconds after a 5 second delayed start).
- If, during the fight, a part weighing more than 5 g detaches from the opponent's robot and falls outside the ring, except if the part remains on the ring.
- If a competitor is given a "Keikoku" (warning) twice.
- If a player wishes to end a round early.

8. Hansoku offence) and penalty

8.1 Keikoku (warning)

A competitor who commits any of the following acts shall receive a "Keikoku" (warning). If a competitor receives 2 warnings, the opponent receives 1 Yuko point.

- If the robot operator or any item belonging to him enters the Dohyo Jyonai area before the referee signals the end of the round.
- If the robot makes a move before the start of the round (movement or shape change).
- If the robot is replaced after it has been placed on Dohyo.
- If any other irregular behaviour is detected.

8.2 Hansokumake (loss due to infringement)

A competitor who violates the following situations shall forfeit the match due to the violation

- If a competitor arbitrarily extends the time for a robot to line up (see Rule 5 "Match Principles").
- If a competitor deliberately disrupts the match (e.g. by deliberately breaking or deforming the Dohyo ring).
- If a Participant breaches the "Robot Usage Requirements" referred to in Section 4.
- If the robot does not move autonomously.

8.3. Sikkaku (disqualification)

In the following cases, the competitor will be excluded from the competition and will not be added to the list of competitors and results.

- If the competitor's robot does not comply with the requirements of Section 4.1 of the Competition Regulations.
- If a participant behaves in a manner that does not conform to the basic norms of courtesy (insults the opponent or the referees, uses foul language)
- If a competitor intentionally injures an opponent.

9. Objections

Judges' decisions are not subject to appeal. In case of conflicts and disputes, the judges or the organisers have the final say. Participants shall refer to the Chief Judge for the resolution of any disputes. Complaints must be lodged at the time of the Discipline. Any subsequent complaints

will not be accepted. In the event of any conflict or dispute, the Chief Judge and/or the organisers will have the final say.

NB: Rude behaviour is not tolerated and a team that disobeys the decisions of the referee/chief referee may be disqualified by the chief referee and/or the competition organisers.

10. Requirements for robot markings

10.1. Robot designations

obots must be identified with number stickers. Stickers are provided by the organisers.

10.2 Designations of Participants

If necessary, the same number plates will be attached not only to the robots but also to the participants' clothing.

11. Changes to and Repeal of Rules

Any changes to the rules or cancellation of the rules will be decided by the main event organisers.

Annex 1: Picture of the match area

