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# EV3 Auto Sumo Junior Category Game Description, Rules and Scoring

Updated : 21/01/2025





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### A. Brief

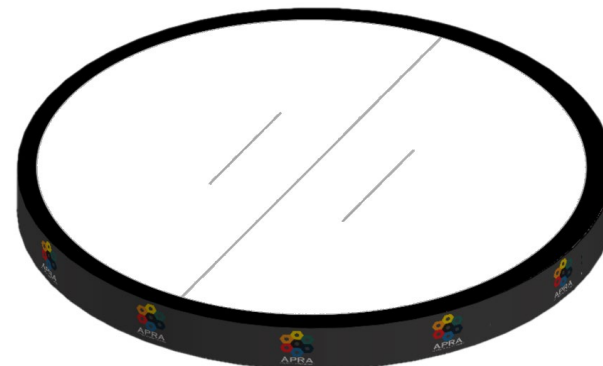
A1. The participating teams are composed of one to three members. Each team will use one sumo robot and another team's sumo robot to push the opponent's sumo robot out of the field within a limited time.

A2. Quota for participating: Each school or organization can only send two teams to participate.

A3. Participating age: Participating members must be 13 - 18 years old (birth date in 2025 season is 2007 – 2012).

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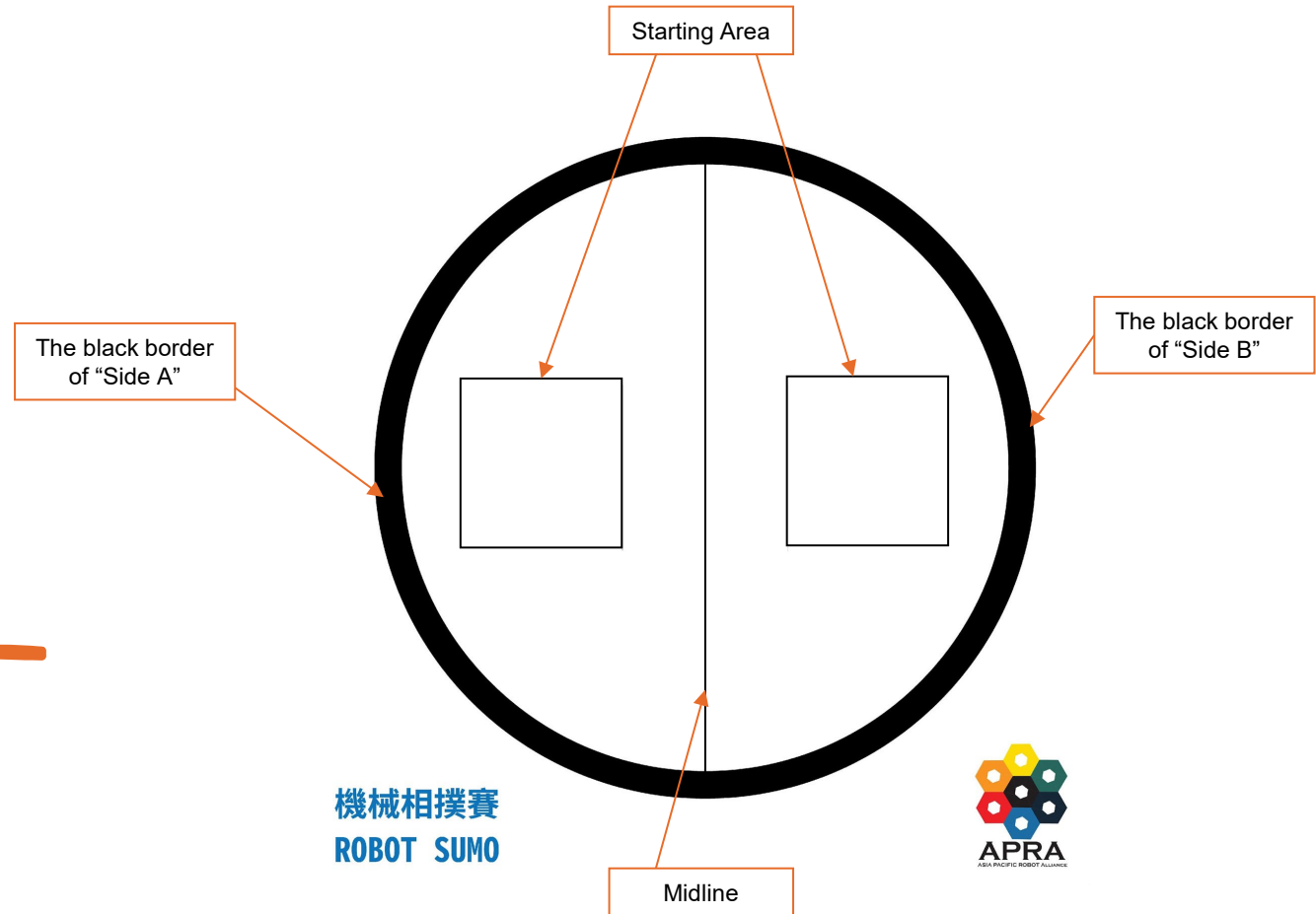
## EV3 Auto Sumo Junior Category Game Description, Rules and Scoring



*Sumo field*



## B. Game Description



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## EV3 Auto Sumo Junior Category Game Description, Rules and Scoring

### B. Game Description

B1. A round of game consists of several matches simultaneously or successively; a match consists of several rounds.

B2. Before the robot starts, the vertical projection of the robot must be completely within the frame line of the starting area (the starting line is a thin line that is visible but does not interfere with the sensor). After each round of game, the two teams must swap sides.

B3. There will be three rounds in each match of the game. The order of placing robots in the first round will be determined by a coin toss. The one who guesses right will put the robot first, the second round will be placed by the other team first, and the third round will be decided by a coin toss.

B4. If any part of the robot touches the ground, the round is lost and the opponent wins.

B5. After the referee announces the start, the robots of both sides must move until the vertical projection touches the black border of their side before they can start the sumo match. The robot cannot stretch or deform until the robot touches the black border of the side. If there is a violation, the round will be judged as a loss. .

B6. The time limit of the round is 1 minute, and the referee will make a decision based on the situation at the end of the time limit.



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### B. Game Description

B7. When 1 minute is up, after the round ends, if both robots are still in the arena, the decision will be made as follows:

- i. Robot A cannot move normally, but Robot B can move normally, then Robot B wins. (Definition of normal movement: The robot stops moving in place for no more than 3 seconds, except when two robots are in contact)
- ii. If both sides can move normally, the winner will be determined according to the position of the robot:
  - When the robot is completely in the enemy's half, it is determined as "completely occupying" the opponent's base;
  - When the robot is vertically projected on the midline, then It is judged as "partial occupation" of the opponent's base;
  - When the robot is completely in one's own half, it is judged as "no occupation" of the opponent's base.
  - "Completely occupying" is better than "partial occupation". "Partial occupation" is better than "no occupation".

B8. The referee will record the result, and the team needs to sign it. If the team has any doubts about the result recorded by the referee, it should file or appeal immediately, and subsequent appeals will not be accepted.

B9. If the referee finds a robot that does not conform to the rules during the inspection time, the team must modify the illegal component within 1 minute. If the robot specification is not met within the time limit, the game will not be allowed.

B10. The preparation time before the game is 1 minute. Up to two players can enter the game area, and the team can adjust the robot.



## B. Game Description

B11. During the preparation time before the game and after the start of each game, the program cannot be loaded from the computer to the robot.

B12. After the start of each game, if any part of the robot accidentally flies off, it is no longer part of the robot, and the referee can remove it and give it to the competitor.

B13. After the start of each game, all components of the robot shall not be re-assembled or modified, batteries shall not be replaced, nor shall the game be requested to be suspended.

B14. Each team has an opportunity to arrange the robots in place for 1 minute after each round of game. As long as one of them proposes, both parties can reorganize the flying parts, but no further parts can be added or removed, and no program downloads or battery replacement are allowed.

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### B. Game Description

B15. All teams are not allowed to bring the game field to the venue for practice. The organizer will provide simulation time to all teams before the tournament. According to the tournament schedule, each team will go to the venue to line up for robot simulation. The number of simulations is unlimited, and each simulation is limited to 2 minutes. When queuing, team members must queue with robots, otherwise the team will need to re-queue.

B16. Only one robot (one microcontroller) may be used per match. It is illegal to use multiple robots in a single round of game. Teams can use different robots in the next match of game. However, it is strictly prohibited to exchange robots or parts between different teams. Once the violation is found, the relevant team will be disqualified.

B17. After the start of the game, if a participant interferes with the game in any way, the round will be stopped and the opponent will win; if it is influenced by others, the round will not be scored.

B18. Before the start of the game, the participating teams need to ensure that the operation is normal, and it is strictly forbidden to interfere with the opponent in any way at any time, otherwise the participating team will be immediately disqualified from the game.

B19. If there are any special circumstances, all decisions shall be based on the decision of the chief referee, and no objection shall be allowed.



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### C. Scoring

C1. Each event may have different competition systems (promotion methods, group stage, knockout, etc.), please pay attention to the official announcement.

C2. The first round of this year is a group match. All teams are divided into several groups to compete against each other. If the ranking is the same, a multi-party wrestling match will be added. The second round will be played by knockout until the championship, runner-up, quarter and runner-up are decided.

C3. In the group stage or knockout stage, there are three rounds in each match, the one with the higher total score "wins", and if the total score is the same, the one with the lighter weight "wins".

C4. 1 point is awarded for each "win" in the group stage. After all games are completed, they will be ranked by score. If the scores are the same, a multi-party wrestling match will be held to determine the ranking order.

C5. In the multi-party wrestling game, all teams place robots on the field at the same time according to the referee's instructions. The game is limited to 1 minute for one round. If it touches the ground, the referee will be removed from the field. If there is one robot left or the time limit is over, the game will end. . The later the robot leaves the field, the higher the ranking. If there is more than one robot left on the stage, the robot with the lighter weight will be given priority.

C6. In the knockout round, the team "wins" in each game and can advance, waiting for the next round of game.





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## EV3 Auto Sumo Junior Category Game Description, Rules and Scoring

### D. Game Rules

D1. The size of the robot cannot exceed 25cm in length x 25cm in width x 25cm in height. Before the start of the task, the referee informs the participating teams to place the sumo robot in the review area and perform a set measurement. After the set is qualified, the robot cannot be modified, disassembled or changed. After the robot touches its own black border line, the size of the body will be is not subject to this restriction.

D2. The total weight of the robot including batteries is less than 1500 grams (g).

D3. Participating robots can only use one microcomputer controller (EV3 or NXT). The number of motors and sensors is not limited.

D4. Only official rechargeable batteries or 2A batteries with a maximum voltage of 1.5V per battery (the total voltage does not exceed 9V) can be used. The referee has the right to ask the participant to turn on the microcomputer controller and inspect it; if there is any violation, the team must make corrections within 1 minute. If teams do not meet the requirement within the time limit, they will not be allowed to participate in the game.

D5. The robot can be freely modified, but it must be built with LEGO® parts or self printed 3D-printed parts, except for the electronic parts.



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### D. Game Rules

D6. 3D printed part materials must use thermoplastics (e.g., PLA, ABS resin, HIPS, nylon), and only one can be used.

D7. The parts to be 3D printed in-house must fit into a cylinder 8cm in diameter and 10cm high.

D8. Self-3D printed parts must be accompanied by their 3D printing design file (.STL). The referee has the right to ask the participant to open the file and view the 3D printing design; if the 3D printing design is not presented, the part will not be allowed.

D9. Other building materials, such as glue, tape, screws, etc., are not allowed.

D10. The control program must be written in LEGO® classroom \ LEGO® MINDSTORMS™ EV3 \ LEGO® MINDSTORMS™ NXT or ROBO LAB software.














D11. Teams must bring completely separated parts to the game venue. No part can be pre-assembled before the game, and documents, pictures and other guidelines cannot be used to help build them.

D12. The participating robots must be fully autonomous robots and cannot use wireless communication or remote/wire control systems to control the robots, otherwise the team will be disqualified.



## D. Game Rules

D13. The types of motors and sensors that can be used are not limited. The sensors and motors that can be used are as follows:

 <p>9842-NXT Motor</p>	 <p>9843-NXT Touch Sensor</p>	 <p>9844-NXT Light Sensor</p>	 <p>9845-NXT Sound Sensor</p>	 <p>9846-NXT Ultrasonic Sensor</p>
 <p>9694-NXT Color Sensor</p>	 <p>45502 Large Motor</p>	 <p>45503 Medium Motor</p>	 <p>45504 Ultrasonic Sensor</p>	 <p>45505 Gyro Sensor</p>
 <p>45506 Color Sensor</p>	 <p>45507 Touch Sensor</p>	 <p>HiTechnic NXT Color Sensor V2</p>		

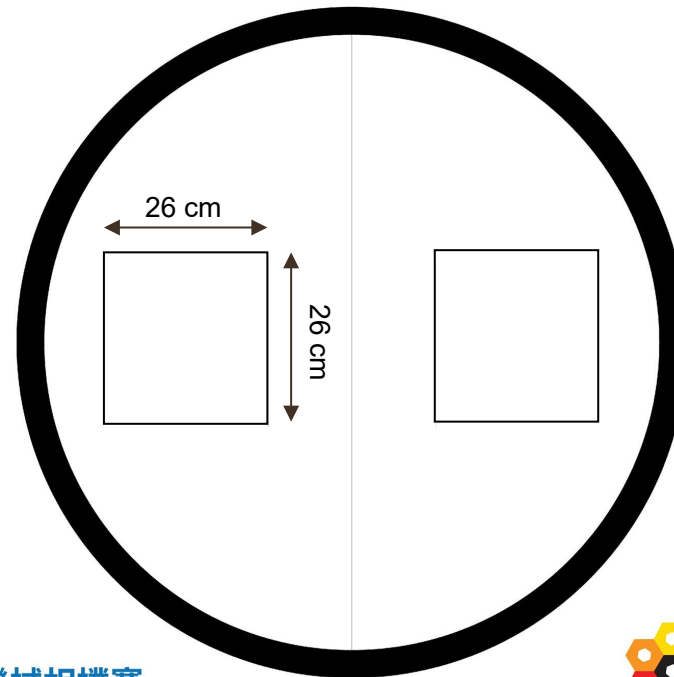
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## D. Game Rules

D14. The game field is a circular field with a black frame on a white background. The diameter of the entire circle of the field is about 120cm, the diameter of the white circle in the inner area is 110cm, the starting line is about 20cm from the center line, the width of the black circle is about 5cm, the thickness of the field is about 2cm, and the surface of the field is about 6cm above the ground. The exact location, size and weight of the game venue and its accessories are provided on the day of the game.



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機械相撲賽  
ROBOT SUMO





## E. Other Rules

### Responsibility of Parties

E1. During the game, the referee has the final decision.

E2. Any objection to the decision of the referee will be warned. If you continue to argue, you will be immediately disqualified from the tournament.

E3. After the game, both teams send a representative to sign the score sheet for confirmation.

E4. When confirming the score sheet, a protest can only be lodged if the score is incorrect or if there is a problem with the result of the game. Once the score sheet has been signed, no protest may be made by either party.

E5. The referee may interpret the rules.

E6. In special circumstances, such as unforeseen problems or the capabilities of robots that everyone agrees in the game, the rules can only be changed with the consent of the chief referee.

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## E. Other Rules

### Inspection of Robot

E7. If the robot is modified during the game, the referee may ask for inspection again.

E8. Any robot that does not comply with inspection regulations, it will not be able to use in the game until it is corrected.

E9. Modifications must be made within the time schedule of the game and teams must not delay game play while making modifications.

E10. If the robot cannot comply with all the regulations (and cannot comply after the modification), it will be disqualified from the game. (without disqualification).

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## E. Other Rules

### Fair Play

E11. Except for the participants and staff, no one is allowed in the game area.

E12. No one other than the participants is allowed to modify the robot or the program.

E13. Participants are not to be prompted or assisted in any way during the tournament.

E14. Do not touch robots from other teams.

E15. If the above situations are found during the game, the team may be disqualified from the tournament.

E16. When the team registers for the tournament, it is also necessary to clearly read the relevant registration terms and game rules.

E17. When the content of different files conflicts, the order of precedence of the rules is:

Final Decision of Organizer > Rules Update > EV3 Auto Sumo Junior Category Rules.

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