

SESC Sumo-Bot Competition Rules

Overview: Robot Sumo contests feature two robots trying to push each other out of a ring. The competitions are non-destructive, student friendly, and great learning experiences. The purpose of this document is to encourage students in the SESC region to participate in robot sumo competitions.

Sumo-Bot Competition: The overall contest is structured using a double elimination tournament format, where each robot must lose two matches to be eliminated from the tournament.

A match involves two contestants whose robots operate in the sumo ring according to the game rules presented in this guide.

The first robot to win two rounds, wins the match.

Playing Field Specifications: The playing field is a circle with the dimensions below.

- Diameter: 36 Inches
- Border line: 1.25 Inches
- Starting line width: 0.5 Inches
- Starting line length: 4 Inches

The top surface is flat and smooth. The surface will be black in color.

The starting lines are two parallel lines centered on the field.

The outer edge of the field, the border line, is a white circular ring.

Sumo Bot Specifications:

- A maximum of 1 **LEGO EV3** for control, 2 motors for movement and 1 motor for an optional tool/weapon can be used.
- The Robot must be made ENTIRELY out of LEGO Bricks.
- The robot must be able to fit inside a 7" x 7" square box with no height limit.
- The robot must weigh no more than 30 oz.
- All actions must be totally pre-programmed. The use of any form of remote control is prohibited.

- The robot must be designed to wait five seconds after the contestant presses the robot's RUN button.
- The robot will not include any parts that might damage or deface the playing field.
- The robot will not include any part that fixes the robot to the playing field surface. The robot must always move.

Game Principles: A standard match consists of three rounds of up to three minutes each. The first contestant to win two rounds is the winner of the match.

Game Procedure:

Beginning of the Game

- Before the game, the contestants greet each other outside the playing field following the chief referee's instructions, and then enter the playing field. The contestants can place their robot anywhere behind their starting line. No part of the robot can be in front of the starting line before the match begins.
- At the referee's signal, the contestant presses a single button on the EV3. The game begins five seconds after the referee's signal. The contestants must exit the playing field during this 5 second period.
- Prior to the start of a match, the entire robot must fit inside a 7 inch square box. At any time after the start of the match, the robot can expand outside these dimensions.

End of the Game

- The game ends when the referee calls the winner. Both contestants should thank each other for a fair and competitive match after removing their robots.

A Game will be stopped and a rematch will be started under the following conditions:

- The robots are locked together in such a way that no more action appears to be possible, i.e. they have rotated in circles for 30 seconds or more.
- Both robots touch the exterior of the playing field at the same time.
- Any other conditions under which the referee judges that no winner can be decided.
- In case of a rematch, maintenance of competing robots is prohibited, and the robots must be immediately placed in the designated starting position.

- If neither of the competing robots win, or lose, after a rematch, the referee may reposition both robots to a specified location and restart. If that does not yield a winner, the match may continue at any location decided by the referee, until the time limit is reached.

Winning a Round: The following conditions define a victory.

- When a robot ejects its opponent from the playing field with a fair action. The robot is considered ejected the moment ANY part of the robot touches the exterior of the playing field. A robot hanging over the edge of the playing field or only touching any part of the cylindrical side of the playing field is not considered ejected, and the robot is still in play.
- If both robots fall out of the ring, the first robot to fall out of the ring loses. If any part of the robot touches the floor, that robot loses the round.
- When the opponent's robot goes out of the playing field on its own for any reason.
- If the robot tips over and is no longer able to move on the playing field.
- When the opponent's robot stops moving on the playing field for more than 10 seconds.
- If the opponent's operator interferes with either robot, or the field, during the match.
- Parts of the opponent's robot (weighing more than 1 ounce), are separated and dropped from the robot, then pushed out of the ring.

The following conditions define a Warning and round reset:

- No Start: During the countdown, if the contestant notices their robot has failed to start its countdown, the contestant may alert the referee and halt the countdown. Both robots are reset to start the round over. The contestant is given a warning. A second warning of any kind in a single round results in the robot losing that round.
- False Start: If a robot begins moving during the five-second period, the robot has committed a false start. A warning is issued and both robots are reset to start the round over. A second warning of any kind in a single round results in the robot losing that round.
- Competitors and spectators may not touch robots, the ring, or otherwise interfere during the match. No one should be within 1 meter of the Sumo ring, so as not to interfere with sensors. A warning will be issued to any team member disrupting

robots during a round. A second warning of any kind in a single round results in the robot losing that round.

Winning a Match: Robots winning 2 out of 3 rounds wins the match. In the case of a draw, the lead judge will allow another round to determine the winner.

Referee Stoppage:

At the referee's discretion, the referee may choose to restart a round if:

- Three minutes have expired.
- No progress has been made after the first half of a round (1.5 minutes).
- The robots fail to touch each other after the first half of a round (1.5 minutes).
- The robots are hopelessly entangled or otherwise deadlocked.
- Both robots fail to start or both contestants signal stoppage.

At the referee's discretion, the referee may choose to end a round and choose the round winner if:

- Smoke, fire, damage, or any other violation has occurred.
- No progress is likely to be made even if the round is restarted.

Violations:

A contestant who takes any of the following actions will be disqualified from the game:

- A contestant does not attend the appointed playing field when called at the beginning of the game.
- A contestant ruins the game, such as by intentionally breaking, damaging, or defacing the playing field.
- A contestant's robot does not meet the robot specifications.
- LEGO or other modular pieces glued together.
- A contestant displays unsportsmanlike behavior.
- A contestant intentionally injures the opponent's operator.

Any components that may be hazardous to participants, the board, or other robots including, but not limited to:

- Sharp or pointed edges
- Strong magnets
- Liquids
- Shooting parts
- Any kind of flame or flammable component
- Any use of remote or jamming devices
- “Sticky Wheels”
- Any other methods of increasing downward force

Modifications and Tune-Ups: Competitors may make minor repairs or adjustments to their robots between rounds, such as changing programs or moving adjustable components. However, competitors may not delay matches.

- Delaying a match may lead to a forfeit.
- Any modifications made to a robot during the competition will be subject to inspection. Robots must remain within size and weight restrictions.

Robot Building Tips:

- Decide how your motors are going to be connected together to make a solid chassis. This may or may not include the EV3 brick. Make sure they are connected in at least two places to ensure that they don't twist, and make sure they are aligned squarely to each other. Use lots of black studs.
- Add the EV3 brick if it's not part of the original drive chassis. Once again, make sure you have at least two points of connection. Four is even better.
- Add the third wheel, skid or slider that will keep your robot on an even keel. A wide base gives the best support, and if you use a third wheel, it's best to remove the tire to enable the robot to turn smoothly.
- Add the line sensors. It's important that they are about 1/2" off the ground pointing straight down. Put one on either side in the front. These should be in front of the forward-most ground-contact point of the robot to ensure that they sense the white line BEFORE the robot reaches the edge.
- Add the Ultrasonic Sensor once everything else is on the robot. These must be at the front, pointing forward, level to the ground, or tilted slightly down. Ideally they should be between 2 and 3 inches off the ground.

- Finally add the cables to the motors and sensors. Ensure that NO parts of the robot are anywhere near the front of the “eyes” as the Sumo-Bot will start chasing its tail (so to speak).

Spirit: Based on fair competition, Robot Sumo encourages friendships and the exchange of ideas, showcases accomplishments, advances robotics, and seeds interest in future generations of robot builders.

The rules are designed to support those principles. But, a written document is unable to cover all the circumstances and conditions of an event. The referee and contest organizers have complete discretion to interpret and alter these rules, at any time, to meet the intended spirit of the games.

Whenever reasonably possible, referees should provide helpful explanations and opportunities for correction to allow even novice contestants every chance to participate and have an enjoyable experience. When disagreements arise, participants and spectators should be flexible and remain respectful.

Referees and contest organizers have the right to determine the penalties for violations as they occur, on a case-by-case basis. Penalties can range from requesting a change in behavior, warnings, round loss, match loss, to disqualifications or even physical removal.

The Southeast Education Service Center is a proud supporter of computer science, STEM, and robotics programs within our region. We strive to host fun, educational, and engaging student competitions.