

SUMO BOTS

Description: Prior to the competition, students must design and construct a competing robot (bot) that will attempt to force an opponent's robot from a defined arena.

Team: Up to two

Approximate Time: Two minutes competition time.

Devices are to be impounded. Check with the Tournament Director for the impound schedule. Students may take the bot with them when they are eliminated from the tournament, but no appeals may be filed once the team has removed the bot from impound.

Construction Overview:

1. No commercially purchased robots will be allowed, however parts of commercially purchased products may be used (e.g.: salvaged servos, remote controls, wheels etc.). Remote control cars may be used if the car is modified and fills the requirements above. Modified means something that has been altered on the car. For example, different body, wheels, or additions like scoops, arms, or any other offensive or defensive devices.
2. Robots must be controlled by radio remote, no cords or wires will be permitted. The bot must be able to operate on **three** frequencies (See www.newyorkscioly.org/SOPages/SumoFrequencies.html for details). The bot must be designed so that batteries can be plugged in, switches turned on, and channels changed, all within 2 minutes.
3. Robots must be powered by electricity, no fuel or combustion engine designs will be allowed.
4. The robot must fit into a **40 cm x 40 cm** square area and include a place for the school name and the mass of the bot.
5. The robot must not weigh more than **2.0 kilograms** including batteries. The weight of the remote is excluded.
6. The combined voltage of all batteries located inside the bot cannot exceed **14.4 volts**.
7. The robot may have devices to remove the opponent from the square except any projectiles tethered or untethered, flames, sharp objects, and magnets.
8. Items that cause the robot to exceed the 40 cm x 40 cm perimeter may be allowed if they return to fit within that perimeter within 10 seconds of the match's conclusion. If the bot is designed to expand during competition and cannot return to the 40 cm x 40 cm size within 10 seconds of the match's conclusion, that bot will be declared the loser of the match.
9. **Impounded batteries are restricted to the batteries that run the bot and spares for running the bot.**
10. **Event supervisors may require teams to submit the 3 frequencies their bot can use prior to the competition.**

Competition:

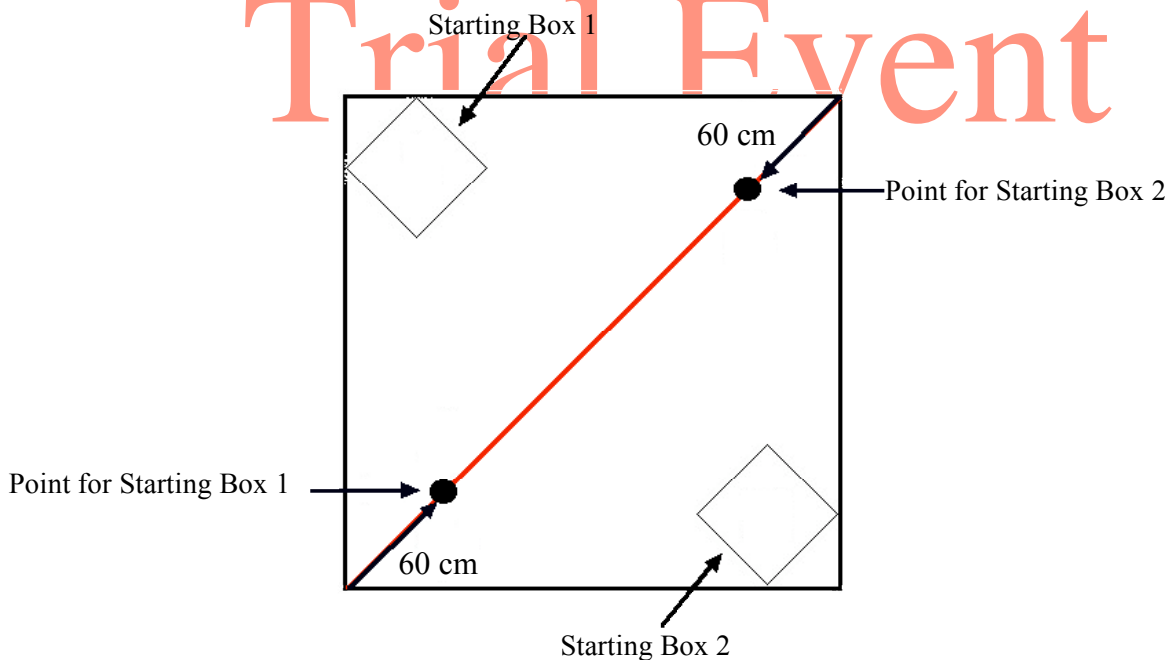
1. Competition will proceed in tournament fashion--double elimination with random pairings for the first round. If preliminary rounds are required, the top two teams of the preliminary round will receive **two (2) bonus points** in their score and will advance to the Finals.
2. Once called to compete, teams will have a maximum of 1.5 minutes to prepare their bot (plug in batteries, turn controls on). If frequency needs to be changed, teams will be given an additional 30 seconds in prep time. Any robots that are not ready to compete within 1.5 minutes (2 minutes if frequency crystals need to be changed) of being called will forfeit their match.
3. Teams may not work on their bots prior to being called for their first bout.
4. **No recharging facilities will be provided by the event supervisor.**
5. The arena of competition will be a square **with a minimum size of 4' x 4' and a maximum size of 6' x 6'**. **The actual size of the ring will be announced after impound has been completed.**
6. **The ring will have starting boxes designated in opposite corners of the ring (see diagram below). There will also be two spots marked on the ring, 60 cm from the other two corners.**
7. **Rings may be on the surface of the floor or a raised platform. The event supervisor will designate the edges of the ring, the starting boxes for the bots and the two additional spots with tape, if the ring is on the floor, or with either tape or a magic marker if a raised platform is used (if a raised platform is used, the edges of the platform will denote the edge of the ring – no additional marking will be required). If the ring is raised, the maximum height above the floor will be one inch.**
8. **Bots may not damage the surface of the ring or deliberately deposit any foreign substances on the surface of the ring.**
9. Bots will start **facing each other** in opposite corners of the square. **The judge will place a tennis ball on each of the two designated spots. When the judge gives the 3-2-1-Go command, each team must first travel to the spot to their right (a team will have reached their spot when they move the tennis ball). Teams may not turn to face their opponent or initiate contact with their opponent until (a) they have reached their designated point; or (b) their opponent has initiated contact with them. Any team that initiates contact or turns to face their opponent before either reaching their spot or being attacked by the other bot will forfeit the bout.**
10. **The time spent attempting to reach the designated point will not count as far as stalling is concerned.**

However, if one team reaches their spot first and turns to attack the second team and the second team begins to take evasive action rather than attempting to reach their spot, that time will be counted towards a possible stalling penalty.

11. Teams will have two minutes to force the opponent from the arena. If no robot has been declared a winner at the end of the two minutes, then the lighter of the two will be declared the victor.
12. If a part falls off during the competition, the clock will be stopped, piece(s) removed, and the competition will continue.
13. If any of the judges determine that a bot is taking a defensive posture or is backing away continually for 15 seconds, time will be called and that team will receive a stalling penalty. If this is the first stalling penalty of the match, the team will receive a 15 second penalty and competition will resume where it left off. If it is the second stalling penalty, the team will forfeit the match.
14. If the opposing robots have not made contact after 45 seconds, then competition will halt and the competitors will resume competition at a closer interval.
15. If bots become entangled so that neither bot can move for 10 seconds, the judges will stop the clock, the teams will place their bots at the start position, and competition will resume.
16. Any team that continues to operate their bot after time has been called will forfeit the match.
17. Except as described in the **Competition**, sections 12, 13, 14 and 15, once the match has started there will be no time outs allowed until the match is over.
18. Definition of “out of square:” A bot will be declared the winner when the other bot is completely out of the square and is no longer touching the tape (or once the bot is completely off the ring if a raised ring is used). This definition applies whether the bot has been forced out by their opponent or leaves under its own power.
19. If a robot is damaged during competition, the students may make repairs to the bot after the match, while they wait to be called for their next match. It is suggested that a separate repair area be set aside so that there will be no concern about students having unsupervised access to other teams’ bots.

Scoring:

1. Final rankings will be determined by each team’s number of wins. Ties will be broken by: (1) the total of their losing times **divided by the mass of the bot** (high score wins) and; (2) the mass of the robots (lower mass wins).
2. Those teams who fail to follow the rules will be ranked behind all those who did.
3. Any team that deliberately attempts to do physical damage to an opponent’s bot will be disqualified.
4. Any bot that is determined by the event supervisor to be unsafe shall be disqualified.



Ring Diagram: The points the bots have to get to before they can engage their opponent are placed along the diagonal connecting the two corners by the red line in the diagram, 60 cm from the corner (the red line is for clarity – it should not be marked on the ring itself)