

Sumo Robot - Scratch Competition Rules

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Competition Description

Two teams place an autonomous robot in a circular ring called a Dohyo, and much like the traditional Japanese martial art of Sumo wrestling, each robot attempts to push the opposing robot out of the ring. Once one of the robots has been pushed out of the ring, the round is over, and the one who remains in the Dohyo is considered the winner. Whichever team's robot successfully wins two rounds is permitted to proceed to the next tier of the competition. In the sumo competition, teams have freedom to design and build their own robot; it is up to the team to combine excellent design and code in order to win.

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1. Eligibility

IEEE Membership

All competitors must be an IEEE member with the University they are representing.

Team Size

Each team shall consist of 1-5 members from any discipline. There is no restriction on the number of teams from a given university that may enter the competition.

Graduate Students

Graduate students are not allowed to participate. Teams must be made up of only undergraduate students.

Team Roster

A team roster shall be presented to the competition organizers as well as the judge(s) before March 31st.

Change in Team Roster

There will be **no exceptions** to the March 31st deadline. If there is a change in the roster before this date, it is up to the team to report the change to the competition organizers. Arriving with a team which contains members who were previously undeclared is grounds for a denial to compete.

IEEE

Every team member must be a National IEEE member.

2. Robot Specifications and Design

Height and Weight Limit

The robot has a mass limit of 600 grams and may not measure more than 10cm by 10cm before it is started (ramps, etc may be deployed after starting signal is given).

Self-Contained

The robot shall be self-impelled and self-controlled. Once the robot has been positioned and the start sequence has been initiated, no re-positioning, remote control, or additional power can be used.

Robot Materials

The robot can be made of any material, and can utilize any sort of processor, electronic sensor, or battery. The robot may not utilize any form of combustion, and must be designed for all components to remain attached to the robot for the duration of the competition (e.g. no projectiles).

Starting Mechanism

A robot can be started by any means. A few examples are a button, a clap, a whistle, or an infrared signal. This is for starting the robot as soon as the judges complete the “Ready, Set, Go” command.

Power and Safety

Any power source may be used. The robot cannot be destructive or harmful in any way.

Autonomy

Once placed on the Dohyo and started, the robot must move entirely autonomously without any outside aid.

Human and Robot Safety

The robot shall be non-offensive, non-destructive, and non-harmful to humans as well as to the facilities at the competition. Failure to comply to these terms is grounds for disqualification of the bot from the competition, whether the infraction was intentional or not.

Judge’s Discretion

The acting referee of the match will judge to their discretion whether or not the infraction warrants disqualification.

Safety Inspection

In an attempt to prevent these incidents from happening, all robots are required to go through a safety inspection which can include but is not limited to: demonstration of robot, handling of the robot, and requesting to see source code.

3. Dohyo

Specifications

For this competition, the Dohyo seen in Figure 1 will be used in the competition. This Dohyo is constructed of panel wood and has the following dimensions:

- Diameter - $30\frac{1}{16}$ inches
- Height - $\frac{3}{4}$ inch
- Border Width: 1 inch

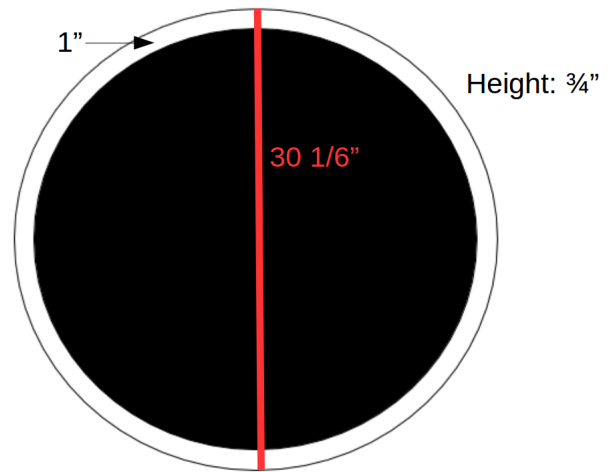


Figure 1. Diagram of the Dohyo with two blue sumobots placed antiparallel, as is prior to the start sequence.

Interference Area

There will be a circle with diameter of 55 inches centered at the center of the Dohyo which acts as the Interference Zone. This zone shall remain unoccupied and will not contain any obstacles which could inhibit the proper functionality of the robot. The only time a person is allowed within this area is when setting up, starting, or retrieving a robot.

4. Competition Structure

Tournament Style

Similar to past years, the competition shall be structured as a Double Elimination Competition. Teams will begin in the “winners bracket” at the start of the competition.

Winners Bracket

This bracket will contain only those who have not lost any match, up until the semi-final rounds. The winner of a match occurring in this bracket will move on to further matches within the bracket. Those teams who lose in this bracket fall to the losers bracket.

Losers Bracket

Once a team has lost a round from the Winners Bracket, they are placed into the Losers Bracket. If a team loses a match while competing in this bracket, they are eliminated from the competition. The team which can move forward in this bracket without accruing another loss will be placed back into the winners bracket to compete in the semi-final rounds.

Matches

A match between two robots shall be broken up into three individual rounds. The first robot to receive two victories is considered the winner.

Rounds

Setup

The robots shall be placed parallel to one another in the center of the Dohyo shown in Figure 1.

Initializing Robot

At the beginning of each round, the referee will say “Ready. set. Go!”. At the end of this phrase, the team member which placed the robot will press a physical switch which will initialize the robot.

Starting Delay

The robot shall not begin moving until after five seconds have passed since the triggering of the starting mechanism.

False Start

If a robot is begins operation before the five-second wait period, the round will be restarted and a warning will be issued. If a robot is issued three warnings, it immediately forfeits the round.

Leaving the Interference Area

During the 5 second delay, all contestants and judges must leave the Interference area.

Ending a Round

A round shall end at the end of three minutes of combat or if a robot leaves the Dohyo, whichever comes first.

Leaving the Dohyo

Leaving the Dohyo is defined as **ANY** part of the robot touching the floor that the Dohyo is place on. The robot that leaves the Dohyo first for any reason is considered the loser of the

round.

Special Conditions

Match Delay

If for any reason, a team has not placed their robot on the Dohyo after five minutes of the beginning of the match, the other team will automatically be declared the winner of the match.

Overtime

In the event that a round extends past the three minutes allotted, the round is considered to be a tie. Should all three rounds be declared a tie, both teams shall be sent to the loser’s bracket.

Third Round Overtime

If a tie occurs in the third round when the score is at 1 to 1, a fourth round shall be added. If at the end of this round there is a tie, both teams shall be sent to the loser’s bracket.

Malfunction

A round can be ended if a robot begins to smoke, leak, falls apart, or acts in such a way that poses a threat to the people nearby. If this occurs, the robot which is still intact is declared the winner of the round.

Mutual Draw

A round can be ended early if both teams agree to a tie as the result of the round. This is to allow teams to not damage their bots due to stalled motors or other harmful circumstances. Both teams must agree to the draw for this to occur.