



SUMO

Overview

MINDSTORMS Sumo is very much like its real-life counterpart. Two robots face off inside a circular ring, and each tries to disable its opponent or push it out of bounds. "Disabling" refers to physically preventing an opponent from continuing to compete, such as by lifting it into the air or flipping it over, and is highly encouraged. However, pushing an opponent out of the competition ring is just as valid, and there is no bonus awarded for choosing one strategy versus another.

Playing Field

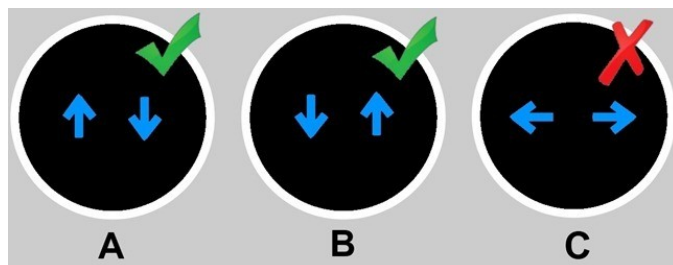
The competition takes place on a circular flat surface, four feet in diameter. The circle is painted flat black, except for a two inch wide white border around the circumference. Generally, a robot will be declared out-of-bounds (and thus the loser of the round) if it touches the ground outside the ring. The ring may be raised a few inches to help determine when a robot has touched the ground.

Competition

MINDSTORMS Sumo is typically played in either a round-robin style tournament, where each robot competes against every other robot with the winner determined by the highest cumulative score; or a double-elimination style tournament, where a robot climbs the tournament bracket until it loses twice. The round-robin is the preferred style, but if there are a large number of entries, the judge may elect to run a double-elimination event due to time constraints.

Each match consists of a maximum of three rounds in a best-of-three format. Each round is limited to three minutes. If there is no clear winner after three minutes, the round will be declared a draw. In round-robin style tournaments, robots will receive one point for a win, half a point for a draw, and zero points for a loss.

At the start of a round, the robots should be placed side-by-side in the center of the ring, facing in opposite directions, with approximately a six inch gap between them. (See the illustration to the right.) At the starting signal, each person may touch his robot once (such as by pressing a touch sensor or a button on the RCX, NXT, or EV3) and then must



immediately move a safe distance away from the competition circle. No further interaction is permitted with the robots until the round ends (with one exception, see below); in particular, neither the contestants nor the audience may signal the robots by remote control, light signal, or blocking of the ultrasonic sensor.

Once each person has started his robot, the robot must wait five seconds before moving or taking any action. The first motion for each robot should be forward. If there is no clear front or back to a robot, the direction of this first motion will define the front for purposes of the initial facing of the robots.

If, during a round, the robots are entangled and wear and tear is occurring, both contestants can agree to a restart of that round. This is the only exception to the rule against interacting with the robots after the round begins. The robots may be placed in their initial positions and restarted, but the clock will continue running and the three minute time limit still applies. The robots must be restarted in the same way as if the round were started from the beginning.

Robots are not required to stop automatically at the conclusion of a round.

Robot Design

Robots can be of any design, subject to certain restrictions. All robots must fit within a 12 inch square at the beginning of a round. The robot may expand beyond these boundaries during a round, but only after the initial delay has elapsed. There is no height limit. Robots must weigh no more than 1 kilogram, or 2 pounds 3.274 ounces.

Robots must be capable of winning a round against an immobile block of LEGO bricks meeting the weight and dimension requirements. This rule is intended to discourage robots that stay in one place or evade their opponent without engaging.

Robots must be constructed of 100% LEGO-brand parts, with special exceptions allowed for third-party sensors (Unlimited Sumo only, as in the next section) and batteries. No modification (melting, glue, deformation, etc.) of the bricks is permitted. Robots may be programmed in any language.

There is a limit of one robot per person per tournament.

Variants

There are two variants of MINDSTORMS Sumo, Stock and Unlimited. In brief, Stock Sumo robots are restricted to a specific "stock" inventory of parts, while Unlimited Sumo robots can use any number and type of parts. Here are the more detailed specifications:

- Stock Sumo robots must be built using only the parts in a single standard MINDSTORMS set (e.g. RIS 1.0, 1.5, or 2.0; or NXT 1.0 or 2.0; or EV3 1.0; or the LEGO Education equivalents) - with two important exceptions. First, Stock

Sumo robots are allowed to use two light sensors, even though stock MINDSTORMS sets typically contain only one. Second, Stock Sumo robots are restricted to two motors, even though the EV3 and NXT sets contain three. This is to level the playing field against RCX robots, since RIS sets only contain two motors. (And yes, people do still enter RCX robots.)

- Unlimited Sumo robots may be built with any number and type of LEGO parts. In addition, Unlimited Sumo robots may use sensors provided through third-party companies such as HiTechnic.

Both the Stock and Unlimited competitions will otherwise be run using the same rules, so, for example, Unlimited Sumo robots must still satisfy the size and weight restrictions. Stock and Unlimited are considered separate tournaments, so a person may enter one Stock Sumo robot and one Unlimited Sumo robot without violating the "one robot per person per tournament" restriction. However, if a person is entering both tournaments, the robots must be distinct builds – one cannot simply reuse the Stock robot, with or without modifications, as the Unlimited robot.

Rules and Exceptions

The tournament judge reserves the right to grant exceptions or modifications to the rules if the situation calls for it. For example, if a large number of competitors misunderstood a contest requirement and built robots that would be disqualified on the basis of that requirement, the judge may decide to waive that requirement for the robots in question. Such actions would only be taken in unusual situations; the rules will generally not be waived for only a single robot. The primary goal is to allow the greatest number of people to compete on equal terms in a fair contest, providing reasonable accommodation if appropriate, but without showing preferential treatment to any one person. Any disputes will be resolved first by appealing to the rules and then to the tournament judge. All decisions made by the judge are final.

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