

Pacific Northwest Engineering Student Design Conference

Autonomous mini-SumoBot Competition



(For illustration only. Pictures do not endorse any particular design or eligibility.)

Introduction:

A “Mini-Class” SumoBot is a relatively small, self-propelled, electromechanical robotic device, designed to compete in Sumo-style Matches by forcing an opponent’s similar device out of a designated circular Competition Area.

Autonomous mini-SumoBots, once placed in Starting Position and activated, operate by their own sensors and internal logic and programming, without any human guidance or control. Mini-SumoBots do not use any form of weapons or flipping / overturning devices; this is a pushing and shoving competition. Competitions are conducted in the style and traditions of classic human Sumo.

We are pleased to offer this mini-SumoBot Competition at our Student Engineering Design Conference.

Competition Summary:

SumoBots are prepared in accordance with the device Requirements in these Rules and entered by student teams or individuals. Competition Rules, Competition Area, and Judges and judging supplies (e.g. weighing scale, Bracket pages, and stop-watches) are provided by the Host organization.

A Match between two SumoBots consists of three one-minute Rounds, and a Match shall be won in a best-of-three format, or in ‘overtime’ if needed, or (rarely) by a Judge’s decision.

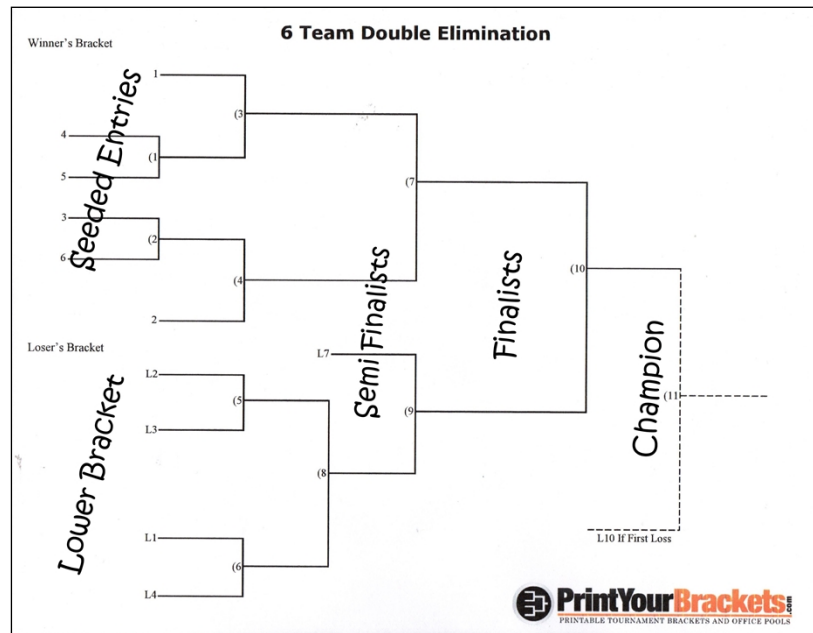
This is a Double Elimination tournament, two defeats causing elimination, conducted in accordance with ordinary and commonly-available Sports Brackets.

Brackets:

Brackets are used to manage the progress of the Matches and Competition. Competition Brackets are specific to the number of Entrants.

Double-Elimination Brackets Charts are available for the number of Entries from the Web by these Links:

3 Teams	4 Teams	5 Teams	6 Teams	7 Teams	8 Teams
9 Teams	10 Teams	11 Teams	12 Teams	13 Teams	14 Teams
15 Teams	16 Teams	17 Teams	18 Teams	19 Teams	20 Teams



Initial match-up's and order of SumoBot placement in the Competition Area is determined by the pre-event drawing of numbered slips of paper.

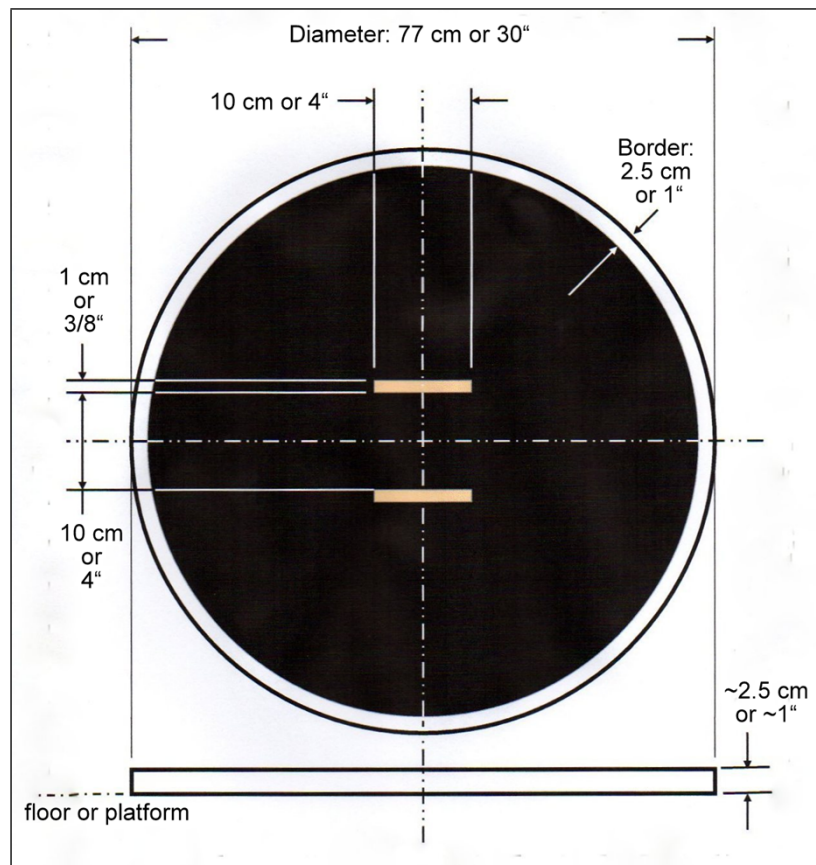
Specifications for the Competition Area Ring:

The Competition Ring (“dohyo”) is a level, circular, painted platform of substantial thickness, with a Central Area, Starting Lines (“shikiri”) and a Border Ring.

The Central Area of the Ring shall be painted a dull or matte black. The Starting Lines shall be a dull or matte brown color. The Border Ring shall be a shiny white. The underlying surface may be any common floor material, e.g. carpet, hardwood floor, linoleum, grass, but may not be of a similar color to the Border Ring. The Competition Room and Ring shall be arranged for easy spectator viewing and Judge access all around.

Common Ring materials are “AC Grade” (or similarly smooth) nominal 1” plywood or laminate, or, 1” wood material with Melamine coating. Material thickness is not a “critical” dimension, it just needs to be sufficient for sturdiness and to clearly “show” that a SumoBot has gone off the Ring and onto the floor.

Entrants shall be given ample opportunity prior to the Competition to examine the Ring, for example to make trial runs and to calibrate their sensors, and to make the Judges aware of any Ring defects.



Specifications for the SumoBots:

Length and width: configured and placed as for a start of a Match, the SumoBot must fit within a horizontal square 10 cm or 4 inches on a side. There are no restrictions on height. Weight shall not exceed 500g or 1.10 lbs.

The SumoBot shall have an easily recognizable Name or identifying logo. The identifier may be boastful or powerful, but shall not be vulgar or disrespectful to the Competition or participants.

In Competition: after being activated by a Team member, a SumoBot shall remain totally still for at least 5 seconds; this permits the Team members to depart the Competition area safely. The SumoBot may be programmed to have a selectable variety of initial starting motions and tactics.

A SumoBot may expand in size during competition, but may not separate into separate pieces or distribute any materials onto the Ring.

Jamming devices, e.g. Infrared LED's or sonic devices, which may interfere with or debilitate the opponent's SumoBot, are not allowed.

Components that could damage or break the Ring or the opponent's SumoBot in excess of normal competition action, or harm any participant, are not allowed.

Devices that contain liquid, powder, gas, or other substance for throwing at the opponent are not allowed. Flaming devices are not allowed. Devices that throw things at the opponent's SumoBot are not allowed.

Sticky substances to improve traction are not allowed. Tires and other components of the robot in contact with the ring must not be able to pick up and hold a standard 3"x5" index card for more than two seconds.

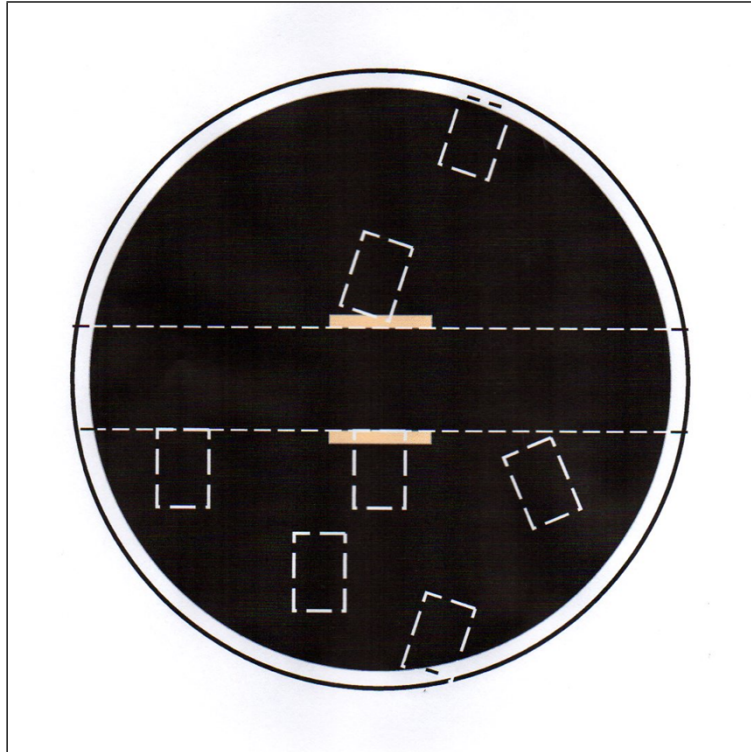
Devices to increase hold-down or traction force, such as a vacuum pumps or magnets, are not allowed.

Sharp edges, burrs, slivers, and sharp ends of exterior components are not allowed. Sharp features shall be blunted, or covered with durable tape or a similar cure.

Conduct of Competition:

When summoned by the Judge or a Master of Ceremonies, one designated member of each Team shall proceed to the Competition area with SumoBot. The Contestants shall cordially greet each other, then place their Sumobots in starting position.

Each Sumobot may be placed upon its own brown Starting Line, or beside it, or anywhere on the Ring behind it. No part of the Sumobot may protrude farther forward than the forward edge of its Starting Line. Here are some examples of allowable starting positions:



The Sumobot with the lower initial paper-slip number, or the SumoBot which won the more recent Match, shall be positioned first. Knowing the starting position of the higher-ranked SumoBot can be valuable in deciding the subsequent placement of the lower-ranked Sumobot. Contestants shall signal their satisfactions of both of the SumoBot placements to the Judge.

The Judge shall signal the imminent start of the Round, and the Contestants shall be ready to activate their SumoBots.

At the Judge's signal, Contestants shall activate their SumoBots. The SumoBots shall remain still for at least five seconds as the Contestants depart the immediate area.

Five seconds after the Start signal, the Clock shall start. Rounds shall last one minute each. The Judge shall signal the end of the Round and the SumoBots shall be inactivated and retrieved.

Matches consist of three Rounds. If a Match Victory is not established after the completion of three Rounds, the Judge may initiate additional 'overtime' Rounds of three minutes duration each, until a clear Victor is established.

In the unlikely but possible occurrence that extended Rounds do not establish a clear Victor, the Judge may consider technical proficiencies and overall performance and simply award an un-appealable Match Victory to the SumoBot deemed to be superior.

Competition Terminations and Re-starts:

The Match shall be terminated and an immediate Victor of the Match shall be declared if:

- The Opponent's SumoBot is found to have been entered into the Competition despite being in violation of the device Requirements.
- The Opponent declares own SumoBot to be irreparable and unfit to continue the Match.
- In the opinion of the Judge, upon seeing a continuous and egregious period of passiveness or inactivity and after discussion with the Opponent, the Opponent's SumoBot is concluded to be irreparably inactive or inoperative.
- The Opponent requests and is granted time for repairs, but fails to return to the Competition Ring with restored and ready SumoBot within a time limit specified by the Judge. Judges may conduct other Rounds and Matches in the meantime if allowable by the required sequence of the Brackets.
- Although accurate, reasonable, or even merely debatable calls for investigation of an Opponent's SumoBot or of the Competition facilities may be made without penalty, either Contestant makes a totally unfounded or bad-faith complaint.
- Any Team member or supporter from a Contestant's home institution utters a generally audible vulgarity or a disrespectful or threatening comment. Ordinary cheering is, of course, fine.

The Round shall be terminated and an immediate Victor of the Round shall be declared if:

- The Opponent's SumoBot begins moving before five seconds after the Start signal.
- The Opponent's SumoBot is forced off of the Competition Ring and rests at least partially or completely in contact with the underlying rug or floor. Temporary and possibly imperceptible or debatable protrusions beyond the vertical rim of the Competition Ring are not sufficient to declare a Victor.
- The Opponent's SumoBot, by its own actions, comes into the same contact with the floor.
- The Opponent declares for a halt to the Round, for the physical protection of own SumoBot. The Opponent may request some repair time, giving reasonable and accepted assurances of restorability and a return to the Competition.

The Round and the Clock shall be re-started from a proper Start if:

- The Judge or either Contestant calls for a Ring clean-up and re-start due to Ring damage or loose or broken pieces on the Ring.
- In the opinion of the Judge, upon seeing these situations:
 - Both SumoBots have become obviously inactive or inoperative, without a detectable and obvious time-sequence distinction.
 - Both SumoBots go off the Competition Ring and onto the floor, without a detectable and obvious time-sequence distinction.
 - The SumoBots are merely orbiting each other, or roaming around without meaningful progress, or are entangled, such that that continuation of the Round would be of no value.

Recognitions and Awards:

- Per the Brackets Sheet: Champion (First Place); Finalist (Second Place); Semi-Finalist (Third Place). Announced and presented at the Awards Banquet.
- Depending upon our Budget, possible monetary Awards, which are subject to Host-Institution and IRS Reporting Requirements. Awards may be provided at the Event, or, sent afterwards.
- Certificates, possibly available at the Awards Banquet, depending upon our 'on-site printing' capabilities, or, sent afterwards.
- For Contestants who "collect" Bonus Points ("yuhkoh"): each Round Victory shall generate one yuhkoh, and a Match Victory granted by a Judge's decision shall generate two yuhkoh.