PROJECT BUCEPHALUS
Learning. Sharing. Teaching.

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2023 Robot Sumo Tournament

Version 2.1 (20/07/2023)

(Most recent updates are in Red)

Welcome to the Robot Sumo Challenge!

This document contains all the relevant rules and regulations that are needed to compete in the 2023 tournament. Any questions can be directed to Project Bucephalus via www.projectb.net.au.

Outline

Robot Sumo is a competitive robot event, where two robots face each other on a circular playing field. On the command to start, the robots attempt to force their opponent out of the ring. Robots are defeated if they touch the ground outside the ring for any reason.

Robots must be built to specific design rules. Read this document carefully to avoid problems on the day.

2023 Event Details

The 2023 Sumo tournament is open to all competitors of all ages and location, provided they can attend the tournament in person. **Pre-Registration is essential.** Depending on the final number of competitors, the competition may be split into separate age divisions.

Date: Saturday, 12th August
Times:

- 9:30 am – 11:00 am (Robot Building Class and Robot Testing Sessions)
- 10:30 am – 11:00 am (Robot Check-In)
- 11:00 am – 2:00 pm (Sumo Tournament Qualification Matches and Science Week activities)
- 2:00 pm – 3:00 pm (Sumo Finals)

Location: University of Wollongong Shoalhaven Campus (George Evans Rd, West Nowra)
Competition Cost: Each team pays $10 to register a robot. Teams consist of 1-3 students.

UOW Science Week activities will be taking place at the same time as the Sumo Tournament.

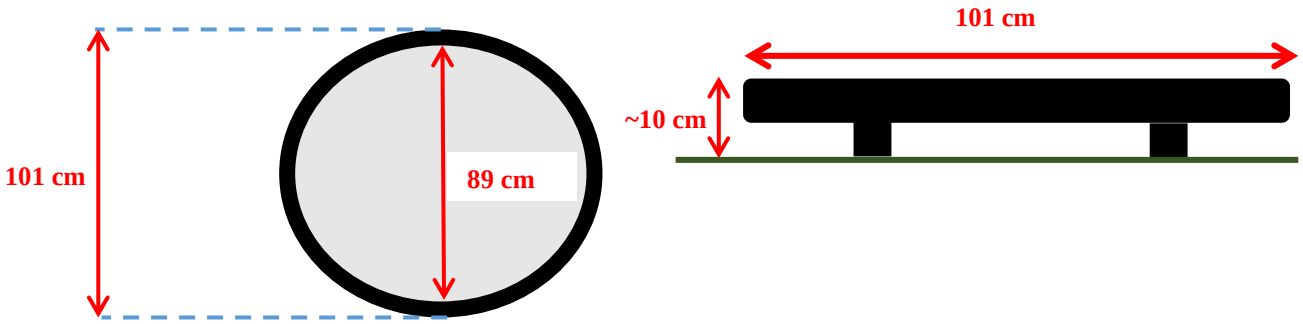
Registration Details

All teams wishing to register a robot must do so at www.projectb.net.au/sumo .

Rules and Regulations (Version 2.1)

1. Board Dimensions

1.1: Sumo matches will be conducted on a raised, smooth circular wooden ring, 101 cm (+/- 3 cm) in diameter. A 6 cm (+/- 1 cm) wide black line is painted around the edge of the ring. The rest of the ring is painted white. The ring will be approximately 10 cm above the ground.



2. Robot Construction/Programming

2.1: Robots can be built from a LEGO robotics platform: either SPIKE Prime, Inventor, EV3, NXT or RCX sets. Only 1 controller brick is allowed per robot. No other electrical power source is allowed on the robot.

2.2: All LEGO® Sumo robots must be constructed of 100% unmodified LEGO® parts (no gluing, cutting, melting, or other modification or modified pieces are allowed). Only LEGO robotics sensors and motors may be used. There are no limits on the number of sensors and motors.

2.3: In start position, all robots must fit completely within the boundaries of a standard SPIKE Prime crate lid (i.e. 24 x 34.5 cm). There are no height restrictions.

2.4: Robots will be divided by into the following categories:

- Technology Platform: SPIKE Prime/Inventor, EV3, NXT or RCX
- Weight: “Lightweight” robots weigh 1 Kg or under. “Heavyweight” robots weigh 1 Kg to 1.5 Kg. No robot can weigh more than 1.5 Kg.

Different divisions will compete separately as robot numbers allow.

2.5: Each robot must be activated by a “Start Button” (Either Sensor or Brick/Hub button). The button used must be easily accessible.

2.6: All robots must be programmed for the following initial steps when the program is run:

- (Optional) Complete any configuration steps.
- Show an Orange Light
- Wait for user activation.

- Play 3 tones, each of 1 second duration, accompanied by 3 light changes (Green, Orange, Red) Robot remains motionless during this time.
- Begin round.

2.7: Robots can be programmed in any compatible language.

2.8: Robots must be completely autonomous.

2.9: At all times, robot behaviour must be non-offensive, non-destructive, and non-harmful to humans, robots, and the facilities.

2.10: All robots must have all non-competition trailing parts (e.g. cables) securely packed away to prevent damage to them or the robot itself.

2.11: All robots must pass an inspection prior to competition.

3. Match Rules

3.1: Robots can be entered by individuals or teams. Teams are limited to three people.

3.2: Teams are responsible for ensuring Robots are charged, repaired, and in proper start position prior to each round.

3.3: Matches will be scheduled throughout the day. Teams will receive schedules on registration.

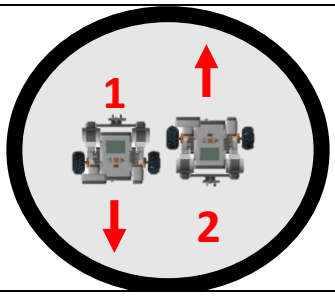
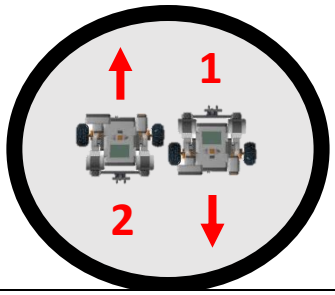
3.4: Teams must be present 5 min prior to the start of each match or suffer a forfeit.

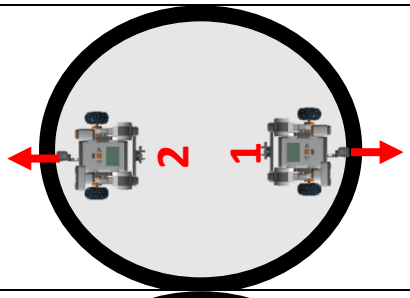
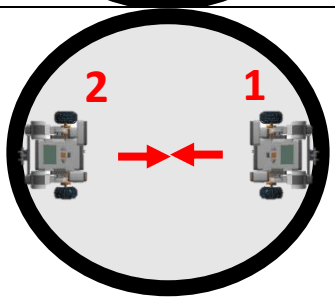
3.5: Once called to the ring, Teams are allowed 1 min to perform any calibration or setup.

3.6: Matches are comprised of 3 separate rounds played in succession against the same opponent. Each round can last no longer than 2 minutes.

3.7: Teams are allowed 1 min repair time between rounds.

3.8: Each round will require the robots to start in a different position. In order:

1. Opponent on Left (Reversed Alignment) Robot will face in opposite directions (randomly determined by referee). Robots will be positioned 10 cm from the centre of the board.	
2. Opponent on Right (Reversed Alignment) Robots will keep their initial orientation, but swap sides. Robots will be positioned 10 cm from the centre of the board.	

3. Back-To-Back Robots will be positioned with their foremost point touching the black ring.	
4. Head-To-Head (Optional) Robots will be positioned with their rearmost point touching the black ring. Referees may need to use this formation to resolve a finals match that ended in a draw.	

3.9: At the beginning of each round, team place robots in a designated start position (chosen by the referee) in a state to allow the game to begin when a start switch is activated.

3.10: Each team will select an operator. The operator will activate the robot when the referee announces the start of the round.

3.11: Each round, Sumo robots attempt to push each other out of the circle. If no robot has won after 2 minutes the round is considered a draw.

3.12: A robot is judged "out" if any part of the robot leaves the ring **and** touches the ground outside the ring. A robot that falls off the edge of the ring but doesn't touch the ground is still "live".

3.13: A robot is judged "out" if it is flipped over and unable to right itself within 5 seconds.

3.14: If a robot falls out of the ring, the opponent is judged the winner. If both robots fall out of the ring, the first robot to touch the ground outside the ring is declared the loser.

3.15: The referee will halt the Match if robots are entangled or stuck in a prolonged pushing match that lasts 10 seconds without noticeable change for either side. The round will be declared a draw.

3.16: A False Start is called when a referee rules that robot(s) have 1) failed to activate on time or 2) have activated too soon by a significant margin. A Referee can call ONE restart per match for each robot. Any other False Start results in a forfeit (if the False Start advantages the erring robot) or continued play (if the False Start puts the erring robot at a disadvantage).

3.17: Once a round begins, no human intervention is allowed.

3.18: The Referee may intervene in a match to prevent damage to robots or playing area. The Referee will declare the match a draw, require a replay, or declare a winner as they see fit.

3.17: The Referee's decision is final.

4. Scoring

4.1: Each round ends in a Win, Loss, or Draw for each robot.

4.2: Robots score 3 points for a win, 2 point for a draw, and 1 points for a loss.

4.3: At the end of each Match, the points for each robot are added to their overall totals.

4.4: Heavyweight and Lightweight robots will compete in different divisions if numbers allow. Otherwise Lightweight robots competing against Heavyweights will earn a bonus 3 points per match.

5. Tournament Rules

5.1: Robots must be placed inside a (clearly labelled) crate/box and must be checked and registered with the organisers at the beginning of the tournament.

5.2: Each Team will be given a place to store their robot between matches. Unless being charged or repaired, robots are to be left in this area until the end of the tournament.

5.3: The Tournament will consist of two stages: Preliminary Matches (to determine overall standings), and Knockout Matches (deciding the overall Championship)

5.4: Each Robot will compete in no less than 3 Preliminary Matches against random opponents. Points from these Matches will be used to calculate an overall standing for each Robot. Extra Preliminary Matches will be scheduled as numbers permit. Each Robot will compete in an equal number of Preliminary Matches.

5.5: At the completion of Preliminary Matches, a percentage of the top teams (determined by overall competition numbers) will be selected for the Finals and will play in Knockout Matches. Other robots will have been eliminated.

5.5: Knockout Matches are played against random opponents that were selected for the Finals.

5.6: Each Knockout Match is played as per standard rules, EXCEPT that the winner is the first robot to score two victories. The loser is eliminated. If the result is a draw, the referee will play an extra round from a “Head-To-Head” configuration. If this is a draw, the referee **MAY** declare up to three additional rounds (as per standard order) with the first robot to score a victory being declared the winner. If there is still no result after the additional three rounds (or if the referee declines the new rounds), both robots are assigned new opponents.

5.7: Once each Finals robot has participated in a Knockout Match, the surviving pool of robots will be allocated a new opponent for a new Knockout Match. This will continue until there are only two robots remaining.

5.8: The last Knockout Match is the Grand Final and will determine the overall Champion.

5.9: Other than those awarded to the Champion team, additional awards or acknowledgements may be handed out at the Judge’s discretion.