

# **SumoBots Competition Rules**

## **IEEE Spring 2024 Joint R2 & R1 SAC**

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## **1 Introduction**

### **1.1. Competition Title: SumoBots Competition**

### **1.2. Competition Description**

The SumoBots Competition is one of the only competitions at the SAC that allows student teams to face-off directly against each other. Teams will prepare their fighters by building, designing, and coding a robot. The robot must act autonomously once the fight begins, and work to push the enemy robot outside of the arena in a sumo-style battle.

### **1.3. Competition Categories**

There are two competition categories: Kit and Custom. Kit teams are only allowed to perform software modifications on the selected robot, while Custom teams may perform software and hardware modifications. Teams participating in different categories will not compete against each other, and prizes awarded will be for each category.

## **2 Participant Eligibility**

### **2.1. IEEE Membership**

All participants shall be registered IEEE student members attending the university they identified when registering for the SAC.

### **2.2. Team Composition**

Teams shall consist of one to four participants. There are no graduate students allowed in this competition.

### **2.3. Number of Teams**

There is a limit of 2 teams that one university may register for this competition.

## **3 Kit Category Robot Specifications**

### **3.1. Robot**

The robot is the Pololu Zumo 32U4, which can be bought from their website or on Amazon. The robot used in the competition must be similar to this robot. Teams with the same robot from previous years are free to reuse their bot as long as all hardware modifications are removed. The robot, once programmed and prepared by the team,

must be completely autonomous, able to move and make decisions without outside interference.

### **3.2. Add-ons**

Physical add-ons are allowed, if the length and width of the sumobot is under 6 inches, and the bot weights less than 2 pounds. Software modifications will be permitted for the kit competition.

### **3.3. Power and Safety**

The robot is to be powered by the 4 AA batteries it is built to use. The robot cannot be destructive or harmful in any way. 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 with these terms is grounds for disqualification of the bot from the competition, whether the infraction was intentional or not.

## **4 Custom Category Robot Specifications**

### **4.1. Weight and Size Limits**

The robot has a mass limit of 2 pounds and may not exceed a 10cm-by-10cm area at any point in the competition. There is no height restriction.

### **4.2. Self-Containment**

The robot shall be self-propelled 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. The robot, once programmed and prepared by the team, must be completely autonomous, able to move and make decisions without outside interference.

### **4.3. 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).

### **4.4. 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.

#### **4.5. Power and Safety**

The robot may only be powered by removable standard batteries, like AA or AAA batteries. 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 with these terms is grounds for disqualification of the robot from the competition, whether the infraction was intentional or not.

## **5 Dohyo: The Arena**

### **5.1. Specifications**

The Dohyo for this competition is constructed of wood and has the following dimensions:

- Diameter- 30 inches
- Height- 3/4 inch
- Border Width- 1 inch

### **5.2. Interference Area**

There will be a circle with a 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 that 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.

## **6 Competition Structure**

### **6.1. Safety Inspection**

In an attempt to prevent potential incidents from happening, all robots are required to go through a safety inspection prior to competing.

### **6.2. 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, which 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. If a team loses a match while competing in the loser’s 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.

### **6.3. 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.

### **6.4. Rounds**

The robots shall be placed parallel to one another in the center of the Dohyo. At the beginning of each round, the referee will say "Ready. set. Go!". The team member who placed the robot will then press a physical switch to initialize the robot. Rounds are allotted 3 minutes each. A round shall end after the 3 minutes have expired, or if a robot leaves the Dohyo, whichever comes first. Leaving the Dohyo is defined as any part of the robot touching the floor that the Dohyo is placed on. The robot that leaves the Dohyo first for any reason is considered the loser of the round. The round will also end if either robot loses power, begins to smoke, or is otherwise disabled. The surviving robot in this case is named the winner.

### **6.5. Start Delay**

The robot shall not begin moving until after five seconds have passed since the pressing of the button. During the 5 second delay, all contestants and judges must leave the interference area. If a robot 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, and the other team will automatically be declared the winner of the match.

### **6.6. Ties and Overtime**

In the event that a round extends past the allotted three minutes, 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. If a tie occurs in the third round, and the current score is one to one, then a fourth round shall be added. If this fourth round ends in a tie, both teams shall be sent to the loser's bracket.

### **6.7. 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.

### **6.8. Judge's Discretion**

The acting referee of the match will judge to their discretion whether or not a participant's violation of these rules, or disregard for safety, warrants disqualification.