

PETRONAS Powering Knowledge



#RBTX2024

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# PETROSAINS RB TX CHALLENGE 2024

## RULES AND REGULATIONS

### ROBO SUMO 1kg

It is recommended that you review the General Terms and Conditions prior to reading the rules for a specific category, as it applies to all categories throughout the entire competition.



# ROBO SUMO

In collaboration with:



MINISTRY OF EDUCATION

Supported by:



\* Applicable to Robo-Sumo 3kg category only.



PETROSAINS

# **TABLE OF CONTENT**

## **1.0 INTRODUCTION**

## **2.0 GENERAL RULES**

## **3.0 QUALIFYING STAGE AND GRAND FINALS**

### **3.1 Ring Interior**

### **3.2 Ring Exterior**

### **3.3 Game principles**

### **3.4 Beginning of a match**

### **3.5 End of a match**

### **3.6 Match cancellation and rematch**

### **3.7 Winning a match**

### **3.8 Violations**

### **3.9 Disqualification**

### **3.10 Objections**

### **3.11 Specifications of robot tagging**

### **3.12 Injuries and Accidents during the Match**

### **3.13 Miscellaneous**

## **APPENDIX**

## 1 INTRODUCTION

Robo Sumo 1kg category challenged young innovators aged **10-17 years old** to build and program a resilient autonomous robot integrated with sustainable features which capable of pushing its opponent out of the ring. The robot that remains inside the ring will be declared the Robo Sumo champion.

## 2 GENERAL RULES

- a) A team must consist of a maximum of two (2) participants aged between 10 to 17 years old and one (1) guardian/teacher.
- b) Each team must have their own robot.
- c) A match involves two contestants (only one operator per robot is allowed inside the ring) who will operate the robot in the Ring according to the Game Rules
- d) For securing safety, wearing gloves during the match is **compulsory** for all participants.
- e) Competition Phases:

- **Registration:** Each team is required to register through the RBTX website. Each participant can register for one team **ONLY**.
- **Online Learning:** Participants are required to complete the learning modules and pass the assessment in the RBTX Portal to proceed to the next level. Passing marks is 80%.
- **Zone Qualifying:** The zone qualifying stage will be held physically. Participants need to attend physically at the zone qualifying venue. All costs incurred shall be borne solely by the participating teams.
- **Grand Finals:** Top teams from the Zone Qualifying Stage will be selected to move on to the onsite Grand Finals. All finalists will be informed of the competition schedule right after the completion of the qualifying stage.

- f) The robot

### Specifications of the robot

- The robot (when all parts are **fully extended**) must be within a width (w), length (l) and height (h) of **15cm x 15cm x 15cm**. Participants must show the judges that the robot can fit in the printed measurement box before every game.
- The robot must be self-operated (autonomous) with a start button on the robot body. Disqualification will be imposed if the robot is found to be non-autonomous.
- Weight (including accesories) must not exceed 1000g.

- There are no restrictions on the microprocessor, type, or brand of robot to be used.
- The robot can be built from scratch, custom made or bought off the shelves, and all shall compete within the same category as long as it complies with the rules and regulations as stated within. All costs or expenses for the robot build-up shall be borne by each participating team, and not the organizer.

### **Restrictions on robot design**

- The robot cannot expand in size during the game.
- The robot must not be equipped with any parts that might damage or deface the ring.
- The robot must not be equipped with a device that can release liquid, powder or gas.
- The robot must not be equipped with detachable parts or a firing/ throwing device.
- The robot must not be equipped with a device that obstructs the opponent's operation, such as a jammer or strobe light.
- The robot must not cause danger to the operators and audience.

## **3 QUALIFYING STAGE AND GRAND FINALS**

### **3.1 Ring Interior**

- The Ring interior is a circle Plywood plate with a minimum height of 250 mm and a diameter of 1000 mm including the borderline (refer to Appendix A). It has a black matte surface.
- The borderline is indicated as a white circle with a width of 30 mm. "On the border" is defined as being within the interior of the Ring.
- Shikiri lines (starting lines) consist of two painted parallel brown (or equivalent for absorption of IR light) lines centred in the ring with appropriate width and spacing. The separation distance between the lines is measured to their outside edges.
- During the games, it is up to the referee to decide whether the Ring can continue to be used or whether it should be changed when a scratch or tear appears on the Ring surface.

### 3.2 Ring Exterior

There will be a space appropriate outside the outer edge of the ring for the referee and contestants. This space will be of different colours, and any material or shape as long as the basic concept of these rules is not violated.

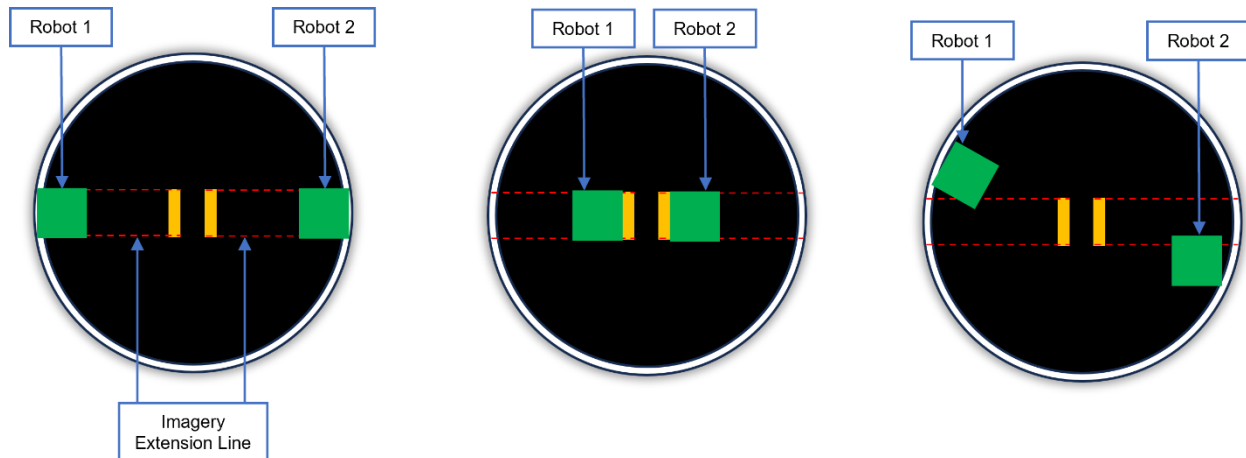
### 3.3 Game principles

A game consists of three one-minute matches. There will be no breaks in between the matches.

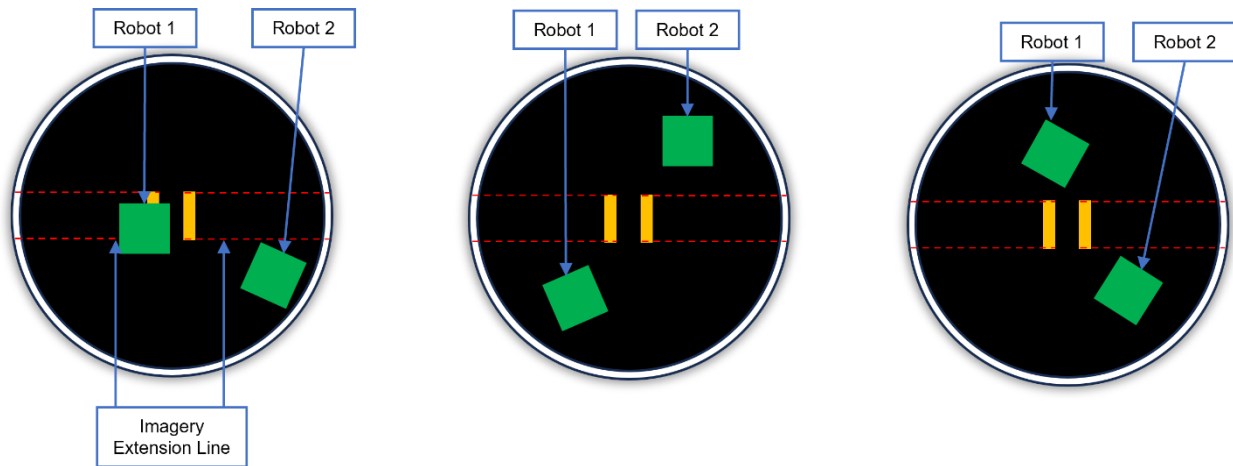
- a) The contestant with the most wins out of the three matches will be the winner of the game.
- b) In the event of a tie after the third match, the lighter robot will be declared the winner.

### 3.4 Beginning of a match

- a) Following the referee's instructions, the contestants will enter the Ring area and place their robots (facing any direction) centred behind their starting point.



Allowed Robo Sumo Placement



Prohibited Robo Sumo Placement

- b) At the referee's start signal, the operator must press the start button/flick a switch on their robot. The robot should be designed to begin action strictly after 5 seconds after it is turned on. During these 5 seconds, players must clear out of the ring area.
- c) No changes to robot components and batteries are allowed during the match

### 3.5 End of a match

The match will end when the referee calls the winner of the match or when the time limit is reached.

### 3.6 Match cancellation and rematch

A match will be cancelled for a rematch under the following conditions:

- a) Both robots touch the exterior of the Ring at the same time.
- b) Any occurrence of violations.
- c) Any other conditions under which the referee decides that there are no winners.
- d) In the case of a rematch, maintenance of competing robots is prohibited, and the robots must immediately be placed back at the starting point. The one-minute timer will not be reset.

### 3.7 Winning a match

- a) The robot which manages to push its opponent out of the Ring with a fair action will be declared as the match winner.



- b) A robot will be declared as a match winner if the opponent's robot steps out of the Ring on its own (due to any reason).
- c) A robot will be declared as a match winner if the opponent is disqualified or has more than one violation.
- d) The match will be considered a tie if both robots manage to stay in the Ring until the match timer ends.

### **3.8 Violations**

- a) The operator enters the Ring before the referee's call to end the match.
- b) The robot begins action before the referee's start signal or before the '5 seconds' mark.
- c) The robot does not move at all or is not powered on during the match.
- d) Any other actions that may be deemed unfair by the referee.
- e) A warning will be given for the first violation. A second violation will result in disqualification

### **3.9 Disqualification**

- a) A contestant is not present for robot inspection five minutes before the beginning of the game.
- b) The contestants' robot does not meet the "Specifications of the robot" and "Restrictions on robot design". For example, the robot size is bigger than 15cm x 15cm x 15cm or the robot is equipped with parts that will damage the Ring.
- c) A contestant ruins the game. For example, by intentionally breaking, damaging or defacing the Ring.
- d) A contestant displays unsportsmanlike behaviour. For example, using rude and offensive language, or injuring an opponent or a referee.

### **3.10 Objections**

- a) Contestants with any objections must express the disagreement to the organizer before the end of the game.
- b) Objections to the referee's judgement will not be entertained.

### **3.11 Specifications of robot tagging**

Contestants must clearly display the registered robot numbering code during the competition.

### 3.12 Injuries and Accidents during the Match

- a) A contestant can request to stop the game when he/she is injured or his/her robot has an accident which can prevent the game to continue.
- b) In the event that the game cannot continue due to a contestant's injury or robot's accident, the contestant who is the cause of such injury or accident will be forfeited. When it is not clear which team is the cause of the such incident, the contestant who is unable to continue the game, or who requests to stop the game, shall be declared as the loser.
- c) The game can continue in the event of any injury or accident if decided by the referee and the Committee members. The decision process shall take no longer than five minutes.

### 3.13 Miscellaneous

As long as the concept and fundamentals of the rules are observed, these rules shall be flexible enough to encompass the changes in the number of players and the contents of the matches.

## APPENDIX

### Appendix A



Sumo Robot (1kg Category): Game Field Setup

- **3cm** white border
- Separation of Shikiri lines **10 cm**
- Length of Shikiri lines **10 cm**
- Width of Shikiri lines **1 cm**
- The diameter of the Ring (including the white border) is **100cm**