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MALAYSIA FIRA ROBOWORLD CUP	
RoboSot Challenge Rules and Regulation for 2026	

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RoboSot Goals

Research on mobile autonomous robot platforms is receiving an increasing share of attention, especially in the area of household domestic appliances. The problems and challenges faced during the development of these robots are many and varies thus often significantly different from the problems faced in both the large sized robot and humanoid forms. Compared to the legged robots, as these robots are fully autonomous, they brings many challenges in the areas of hardware design, communication, co-operation, intelligence and sensing. While in comparison to the humanoid leagues, they have the flexibility to employ non-human like sensing and motion systems. This creates a much faster platform and this alone brings challenges in sensing, locating, and planning to the fore. It is our goal that the RoboSot challenge will be a dynamic challenge that continually shifts its goal from year to year to meet the problems and challenges that arise in this field. We also hope that competing teams will also find the challenges along this path both interesting and rewarding.

1. Challenge Structure

The RoboSot Challenge this year consist of 3 major challenges namely the **Avoidance Challenge**, **RoboSot Race Challenge** and **RoboSot Soccer Challenge**.

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2. The Referee and Assistant Referee

2.1 *The Authority of the Referee*

Referee and Assistant Referee are appointed among the technical committee. They has full authority to enforce the Laws of the Game along the gameplay.

2.2 *Powers and Duties of the Referee*

- **Enforces the Laws of the Game** and controls the commencement and restart of the match.
- **Has full authority to stop, suspend, or terminate the match** at their discretion due to rule infringements, external interference, or safety concerns.
- **Assesses robot conditions during gameplay**, stopping the match if a robot is deemed seriously damaged and ensuring its removal from the field, or allowing play to continue if the damage is minor.
- **Ensures field safety and control** by preventing unauthorized personnel from entering the field during gameplay.
- **Submits an official match report** to the appropriate authorities, detailing any disciplinary actions involving human players or team officials, as well as any incidents occurring before, during, or after the match

2.3 *Before the Gameplay and during the Gameplay*

- Prior to the event date, every participating team must attend a pre-challenge briefing conducted by the referee, either through an online platform or a physical meeting, as appropriate. This briefing is intended to inform teams of the rules and any updates or changes, to support proper preparation and development.
- All participants must attend the briefing held during the event to clarify any misconceptions of the challenges and to address or resolve any disputes related to the rules.
- Only visual proof will be considered if any participant intends to appeal the decision made by the referee. The appeal must be made before the next trial/match is preformed.
- Interval time between trial/round depends on the referee's decision as it depends on the number of participating teams for each challenge. During intervals between trials/rounds,

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human play may make any modification on the robot and are allowed to test the field along with the challenges' tools but at a considerate manner among participating teams.

2.4 *General Rules that apply to all RoboSot Challenge*

- Any rule referring to “**crossing a boundary or line**” requires at least **50% of the robot or ball** to cross the line, as determined by the referee.
- Two types of balls are used: **RoboSot Race** uses children’s plastic ball-pool balls (**68–70 mm diameter**, see Figure 5), while **RoboSot Soccer** uses an orange Stress Therapy Foam Ball (**6.6 cm diameter**, see Figure 7).
- Only the **Race Challenge** and **Soccer Challenge** permit robots to cross boundary lines and return to the field.
- All three challenges allow the use of **self-developed or commercial robots** (e.g., TurtleBot 3 Burger, Bveeta Mini), provided they comply with each challenge’s size specifications.
- All robots must pass **referee verification**. Robots failing verification are given **24 hours** to modify and reverify, followed by an additional **15-minute final adjustment window** if still non-compliant; failure results in disqualification from that challenge.
- Teams must arrive **1 hour before the challenge** for robot inspection. Any required modifications completed **at least 15 minutes before the start**, or marks will be deducted.
- The **RoboSot Master Award** is presented to the team with the highest total score across all challenges, based on medal points (**Gold: 3, Silver: 2, Bronze: 1**). Ties are broken by higher achievement in the **Soccer Challenge**, or if necessary, the **Race Challenge**.

3. **RoboSot Avoidance Challenges**

The avoidance challenge requires the RoboSot platform to develop and exhibit capabilities in the area of obstacles avoidance with vision and sonar application.

Challenge Format:

The challenge is conducted in a one-by-one trial format. In each trial, every team must maneuver their to the goal line marked by a blue goalpost in the shortest time possible to score points. The robot must avoid touching any obstacles or crossing the boundary line. All participating teams will compete in three trials, and the winner is determined based on the total score from all trials. Note that obstacles

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pattern will be changed on every trial.

Testing Time:

Before the game begins, each team will have a separate 5-minute testing period. After all teams have completed their individual tests, there will be a common 5-minute testing session for all teams.

Note:

During the match, there will be no testing time allocated, and measuring the distance between the obstacles physically by human players is not allowed. All the locations of obstacles and goalpost will remain the same for every trial.

Robot:

The size of each robot is limited to a maximum of (W) 24cm × (L) 24cm x (H) 40cm in resting stage. All accessories such as the gripper and kicker must be attached during the robot verification process.

Challenge Setup::

- **During the challenge**, teams are not allowed to place any markers on the field and are not given any testing time after placing the robot at the start point. Once positioned, the robot must not be moved prior to the start signal.
- **Each team must complete three (3) trials.** A team may withdraw from any trial either before or during the run if unable to perform the challenge; however, withdrawal will result in a score of **zero (0)** for that trial.
- **For each trial, the referee will place fifteen (15) obstacles** on the game field according to the designated placement pattern.
- **During gameplay, human players are only permitted to press the start button** on the robot or via a remote start mechanism. Any use of computers or remote-control systems to move or guide the robot will result in **disqualification for that trial.**
- **The robot may be oriented in any direction** when placed on the start marker.
- **The referee will signal the start and end of each trial** using a whistle.
- **All teams will compete using the same obstacle placement pattern within each trial**, ensuring fairness.
- **Obstacle placement patterns will change between trials.** Refer to the *Obstacles and Placement Rules* section for further details.

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Gameplay:

- During gameplay, teams must maneuver their robot toward and across the goal line in front of the blue goalpost while avoiding all obstacles.
- Any contact between the robot and an obstacle constitutes a **foul**, and the trial will immediately end.
- Robots must remain within all boundary lines; crossing any boundary results in the trial ending.
- The referee will record the time when the robot completes the task or when a foul or stop is called, marking the end of the trial.
- If the robot fails to cross the goal line within **2 minutes**, the distance traveled will be measured perpendicularly from the start line to the farthest point of the robot touching the ground at the whistle, regardless of direction or boundary status.
- If the robot fails to move at the start, the team must inform the referee and withdraw; a **zero (0) score** will be recorded for that trial.
- If the robot passes beyond the end boundary line behind the goalpost without crossing the goal line, it is considered **out of bounds** and the trial ends.
- Teams may request to end a trial before the 2-minute limit; the trial will stop only after the referee's whistle, and distance will be measured at that point.
- The winner is determined based on the **highest total score** achieved across the challenge.

Score:

- Fail to reach the goal line within 2 minutes . Maximum travel distance of 400cm only:
 - $\text{Score} = \text{distance traveled (cm)} * 0.2$
 - Up to 80 points.
- Successfully completed the task as judged by the referee within 2 minutes:
 - $\text{Score} = 80 (\text{distance traveled}) + [\text{Remain time (sec)} * 0.2] + 20 (\text{completion bonus})$
 - Up to 124 points.
- The winner of the challenge is based on the total score of all trials. If two or more teams have the same score, the tiebreaker will be based on the shortest time to complete the challenge in any of the trials. In case of no team successfully completes the challenge in any trial, the tiebreaker for teams with the same scores is based on the total traveled distance in all 3 trials.

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Obstacles and Placement Rules:

- The challenge field is bounded by a white line measuring **400 cm × 300 cm**.
- Black matte cone obstacles measure **13.5 cm × 13.5 cm × 23 cm (H)** (see Figure 2) and are placed within the field, excluding the goal box.
- Before the challenge begins, a **5-minute common testing period** with **three (3) obstacles** is provided for calibration.
- After testing, the referee will randomly place **fifteen (15) obstacles** within the play area, either personally or with assistance from participants or the audience.
- The referee will ensure a **minimum distance of 45 cm** between obstacles (measured at the base) and will mark obstacle locations so that placement patterns remain identical for all teams within the same trial.
- There is **no minimum distance requirement between the ball and obstacles**, provided it is reachable by the robot without causing a foul, as determined by the referee.
- Obstacle placement patterns will **change for each trial**.

Field and Accessories Specification:

Total Field size:	5m x 6m
Game field:	3m x 4m (Excluding Line Thickness, effective size is measured between center of the boundary line)
Material:	100% fiber synthetic needle punch carpet
Colour:	Light green

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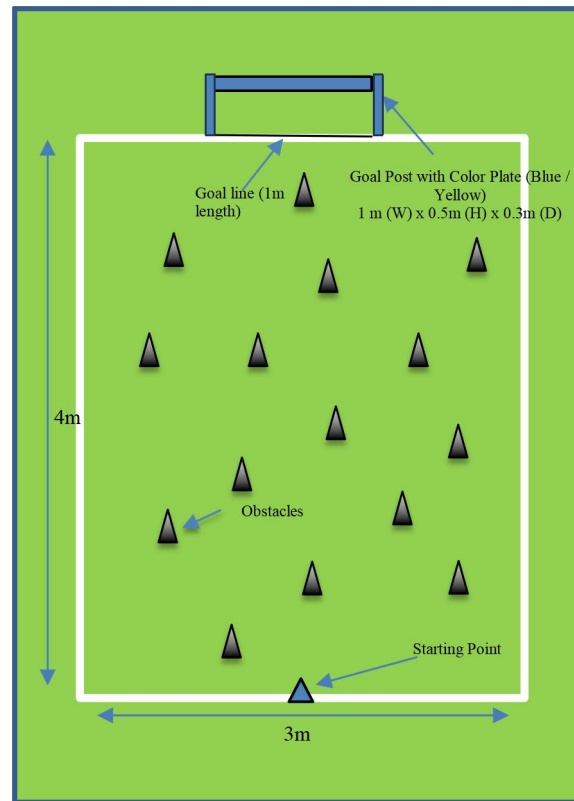


Figure 1: Avoidance Challenge robot game field and robot's starting point.

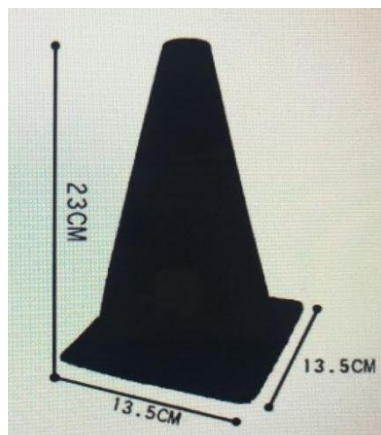


Figure 2: Avoidance Challenge Obstacle size: black matte cone.

Goalpost Specification

- 1.0m x 0.3m x 0.5m (Width, depth, height)
- Frame material: Wooden (white colour)
- 3cm x 3cm crossbar at the top of the goal box (white)
- Goal internal colour: Navy blue

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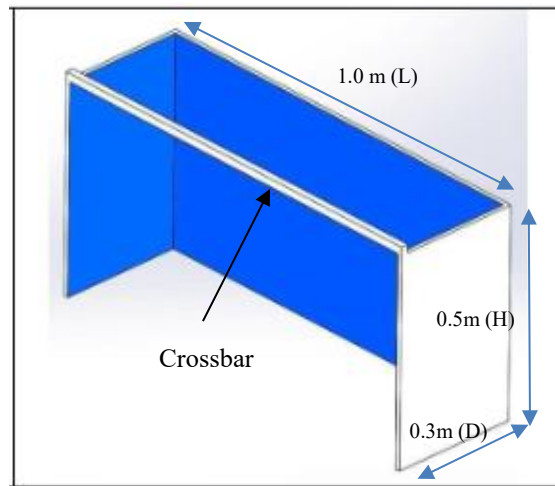


Figure 3: Avoidance and Soccer Challenge goalpost size.

4. RoboSot Race Challenges

This is a small-sized wheeled robot challenge. The Race Challenge requires the development of robots to exhibit capabilities in the area of vision identification and path planning.

Challenge Format:

The challenge is performed in one-by-one trial setting, as in every trial, every team must find and bring the coloured balls to the goal area (marked by red, blue and yellow patches) in the shortest time to score points on each trial, without touching any obstacles by the robot along the way or the ball to the wrong colour patched. After the game starts, the robot must search for the colour ball in the field and push the ball into the corresponding colour area to gain scores. The winner of the challenge is the team with the highest total score.

All participating team will compete in all 3 trials as winner of the challenge is based on the total scores from all trials. Ball and obstacles pattern will be changed on every trial.

Testing Time:

Before the game begins, each team will have a separate 5-minute testing period. After all teams have completed their individual tests, there will be a common 5-minute testing session for all teams.

Robot:

- The size of each robot is limited to a maximum of (W) 24cm × (L) 24cm x (H) 40cm in

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resting stage, without extending any of the parts to the maximum size.

- All accessories such as gripper and kicker must be fully attached during the robot verification and measuring process.
- Additional accessories may not be added-on during the gameplay as all accessories must be attached during size verification process.

Challenge Setup:

- Team that participates in this challenge may use robot that is self-developed or purchased, such as TurtleBot 3 Burger and Bveeta Mini, as long as it meets the robot specifications.
- Teams can use any software to integrate with robot system.
- During the robot verification process, the competing robots are measured in the resting state, without extending any of the parts to the maximum size. However, additional accessories may not be added-on during the gameplay as all accessories must be attached during size verification process. During the gameplay, the robot is allowed to extend bigger than the maximum size.

Gameplay:

- Each team participates in **3 rounds**, with **3 minutes per round**. Robots must start from the designated start point (marked X, see Figure 4).
- Before each round, the referee will place **12 balls** (4 each of red, yellow, and blue) and obstacles on the field as shown in Figures 2, 4, 5, and 6. Placement patterns will be kept consistent across teams.
- A **bonus ball color** is drawn by the referee at the start of each round. Pushing the specified color into its matching area awards **double points**.
- Robots must **autonomously locate and push balls** into the corresponding areas. Successfully scored balls will be removed by referees to prevent accidental interference.
- Robots may retrieve balls that leave the field autonomously, but human players or referees may **not touch or relocate the balls**. If a robot cannot return, the human player may request a failed attempt from the referee.
- **Human intervention during gameplay is prohibited**. Violations will result in warnings, point deductions, or disqualification for repeated offenses.
- Rounds begin only when the **referee blows the whistle**. Robots must remain stationary until then; early movement results in a warning or disqualification if repeated.
- Participants **cannot delay or obstruct** the challenge; violations lead to disqualification.

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- The game field is durable; robot weight or size will not damage it. Teams are responsible for disruptions caused by venue conditions but may consult the organizing committee for solutions.
- Organizers **reserve the right to interpret the rules.**
- Teams may design any **ball-pushing or dribbling mechanisms**, provided the robot stays within size limits.
- Balls must touch the correct area to earn points. If a ball rolls over the wrong area, **5 points are deducted** (unless the ball did not touch the ground).
- Robots touching obstacles will incur point deductions; obstacles are **not repositioned** after fouls.

Game Field Specification:

- The game field size is 400 (L) x 300 (W) (cm). The goal is divided into 3 areas as shown in Figure 4. The size of each goal is 50 (L) x 50 (W) (cm).
- The ball used in the challenge is a plastic ball for children's ball pool. The diameter of the ball is about 68-70mm, as shown in Figure 5.

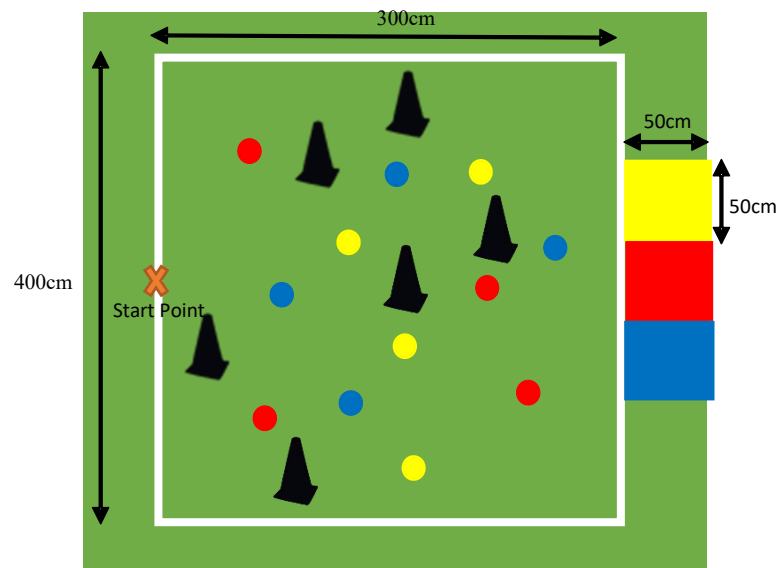


Figure 4: Game Field size and setup

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Figure 5: Plastic ball for Race Challenge

Score:

- Successfully pushing or kicking the **Golden Ball** (bonus color drawn by the referee) into its correct area awards **20 points**; other balls earn **10 points**.
- Pushing a ball that **touches the ground** into the wrong color area deducts **5 points**.
- Touching any **obstacle** deducts **3 points** per occurrence.
- **Human player interference** without referee approval deducts **5 points**.
- Failure to complete required robot modifications **15 minutes before the game** deducts **5 points**.
- All conditions and point deductions are **judged by the referee**.
- The **referee calculates the round score**, and the team with the **highest total score** wins.
- In case of a tie, the team with the **shorter total time** across three rounds is ranked higher.
- The winner's score cannot be less than **0 points**.
- If three top scorers cannot be identified after three rounds, **two additional rounds** will be played the next day.

5. RoboSot Soccer Challenge

The Soccer Challenge requires the RoboSot platform to develop and exhibit capabilities in the area of dynamic obstacles avoidance with passing capability.

Challenge Format:

The challenge is performed in league format, as every team's robot must perform penalty task in a soccer game, with both team only allows to place 2 to 3 robots on the game field. A minimum of 4

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teams is need to perform this challenge.

Testing Time:

Before the game starts, each team will have 5 minutes setup time.

Team:

- Human Player: Only **FOUR (4)** human team members are permitted to participate actively in a match.
- Team Size: A match shall be played by two teams, each consisting of 2 or 3 robots. Additional robots may be used as substitutes, but must be verified during robot verification session.
- Goalkeeper: Only one of the robots can be designated as the goalkeeper. The goalkeeper may only catch or hold the ball when it is inside its own goal area (goal box and goal post).
- Remote Computer: Each team is also permitted a remote computer/control to transmit procedural information upon stoppages in play.

Robot:

- Each robot must not exceed the maximum dimensions of 24cm (W) × 24cm (L) × 40cm (H) in **resting state**. However, **goalkeeper (goalie) must not exceed the maximum size when fully extended**. This limitation is implemented to prevent the goalkeeper from completely blocking the goal post..
- All accessories such as gripper and kicker must be fully attached during the robot verification and measuring process.
- Additional accessories may not be added-on during the gameplay as all accessories must be attached during size verification process.
- A color patch, either magenta or cyan is allowed to easy identification of robot.
- Each team may choose to play each game with either one or two robots.
- Note that the ball must remain at least 50% visible from the top view at all times as judged by the referees. Robots that hide or cover the ball too much may be penalized for illegal possession.
- During play, no robot may grab or hold onto the ball with any part of its mechanism—neither with fingers, suction, magnets, etc, to grip, clamp, suction, magnetically attach to, or otherwise hold the ball during normal play. Robots may only propel the ball control by:

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- Dribbling: keeping the ball under gentle, continuous contact (e.g. with a curved surface)
 - Kicking: making a discrete impact to propel the ball.
- Goalkeeper exception: A designated goalkeeper robot may grip and hold the ball, but only when the entire robot is inside its own goal area (goal box and goal post).
- Valid dribble: A dribble is legal only if an opponent can dislodge the ball from the dribbling robot by a single kick or contact.
- Note:
 - Gripping is defined as any action where the ball is fully enclosed or held in a way that prevents others from gaining possession.
 - Dribbling should allow fair contestability—i.e., opposing robots should be able to challenge and take the ball.
- The role of the defending robots may be interchangeable during the game, however the active goalkeeper must always comply to the maximum robot size during the gameplay.

Autonomous System:

- Each robot must be fully independent, with vision system, powering and motoring mechanisms self-contained. Image processing must be done on board the robot. No global vision system is allowed.

Robot Behavior:

- Each robot must finish the following behaviors autonomously, navigating on the game field and following the ball. If any one robot cannot finish, it would lose the qualification in RoboSoc Soccer Competition.

Communication:

- Remote Computer Control: A remote computer or control may be used to transmit procedural information to and from the robots whenever there is a stoppage in play or upon explicit instruction from the referee. Permissible commands include:
 - Start/Stop Commands.
 - Formation/Setup Commands
- Commands may not transmit any positional data. Positional data must only be stored on the robots themselves. These commands are executed via a button-press on a remote control, or a key-press/mouse click on a host computer. Examples of the use of such commands would be

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automating the positioning of robots for kick-offs, and penalty kicks.

- Teams must be able to start and stop the robots from the remote computer/control. Formation and setup functionality is desirable but not essential. Repositioning may alternatively be done by a human handler. These will make the game more autonomous (reduced robot handing) and improve the event visually RoboSot Soccer Competition for spectators. For now, this functionality is transition. Eventually it is hoped that these can also be automated by detecting pre-specified cues from either a human or remote electronic referee.

Inter-Robot Communication:

- Robots may freely transmit information between one another.

Challenge Setup:

- Referee will develop the game match table before the challenge.
- Teams must meet at least 15 minutes prior to the game to resolve communication issues and color patch designations.
- Communications- Any communication conflicts must be resolved prior to the commencement of the coin toss to initiate the game. This is especially the case for teams using RF communication.
- Color Patches - Each team may attach color patches to their robot if needed. However, in the event of a conflict between teams in a match, the decision will be determined by a coin toss conducted by the referee.
- Coin Toss - A coin toss will be made by the referee immediately prior to the commencement of the game. The winner of the toss shall choose who will attack in the first half of the match.
- Game Duration: The duration of a game shall be two equal periods of 5 minutes each, with a half time interval for 5 minutes. An official timekeeper will pause the clock during substitutions, while transporting an injured robot from the field, during time-out and during such situations that deem to be right as per the discretion of the timekeeper.
- If a team is not ready to resume the game after the half time, an additional 5 minutes shall be allowed. If the team is still not ready to continue the game, that team will be disqualified from the game.
- In cases where more than 4 teams are participating in the challenge, the Head Referee may appoint a team member from each participating team as the referee and timekeeper throughout the challenge. Failure to attend the referring task will result in disqualification for the next match of that team.

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Gameplay:

i. Game Duration

- Each match shall consist of **two (2) equal halves**, with each half lasting **15 minutes**. Between the first and second halves, there shall be a **halftime interval of 10 minutes**, during which teams may rest, adjust strategies, and make substitutions.
- An **official timekeeper** shall be appointed for every match. The timekeeper is responsible for stopping and restarting the game clock when necessary. The clock shall be stopped during substitutions, during the transportation or assistance of an injured or malfunctioning robot, during any officially declared time-out, and during any other situation where stopping the clock is deemed appropriate by the referee or timekeeper to ensure fairness and safety.
- If a team is not ready to resume play immediately after the halftime interval, an **additional grace period of 5 minutes** shall be granted. If the team remains unprepared after this additional time, the team shall be **disqualified from the match**, and the opposing team shall be declared the winner.

ii. Kick-Offs

- At the start of the match and after every goal, play shall be restarted with a kick-off. The team awarded the kick-off is allowed to position its robots freely **within its own half of the field or anywhere inside the centre circle**.
- The defending team is permitted to position its robots anywhere within its own half of the field; however, **no defending robot is allowed inside the centre circle** before the kick-off is taken.
- Robots may be positioned either manually by the team's designated human handler or autonomously through commands sent from the remote computer system. The ball must be placed **exactly at the centre point of the centre circle** before play begins.
- Once the referee gives the official signal to start, the kick-off must be taken. The ball must be **kicked or passed toward the kicking team's own half**. The kicking team must execute the kick within **5 seconds** of the referee's signal. Failure to do so will result in possession of the ball being awarded to the opposing team.

iii. Winning the Game

- A goal shall be considered valid when the **entire ball passes completely over the goal line**,

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either on the ground or in the air, **between the goalposts and beneath the crossbar**, as illustrated in Figure 16.

- The winner of the match shall normally be determined by the **total number of goals scored** by each team during regulation time. However, if at any point during the match one team leads the opposing team by **more than 10 goals**, the match shall be terminated immediately, and the leading team shall be declared the winner.
- If both teams have scored an equal number of goals at the end of the second half, the match shall proceed to **extra time** following a **5-minute break**. Extra time shall consist of **10 minutes of play**.
- If the match remains tied after extra time, the winner shall be determined by a **penalty shootout**. Each team shall take **three (3) penalty kicks**, following the special penalty procedure. Only one robot from the attacking team (the kicker) and the goalkeeper from the defending team shall be allowed on the field during each penalty kick.
- A penalty kick shall be considered complete when any one of the following conditions is met:
 - the goalkeeper gains control of the ball within the penalty area,
 - the ball leaves the penalty area,
 - or **30 seconds** have elapsed since the kick was taken.
- If the score remains tied after three penalty kicks, additional penalty kicks shall be taken **one at a time**, alternately by each team, until a winner is determined.

iv. Interruptions

- Interruptions refer to specific events during the match that require a procedural action, such as substitutions, repairs, fouls, or fallen robots. In general, **the game clock shall continue running during interruptions**, unless a team manager explicitly requests a **time-out** and the referee approves it.

v. Substitutions

- Each team is permitted to make **up to three (3) substitutions during active play**. In addition, **unlimited substitutions** are allowed during halftime.
- During the match, substitutions may only be made **when an interruption or a foul occurs**. The team manager must clearly announce the intention by calling **“Substitution”** to inform the referee. Substitution may either be carried out immediately during the interruption or postponed until the **next available interruption or foul**.
- The game clock shall **not be stopped** for substitutions. After the substitution is completed, the

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match shall restart with **all robots and the ball returned to exactly the same positions** they occupied at the moment play was interrupted.

vi. Repair and Stop

- Each team is allowed a maximum of **two (2) repair time-outs** per match for the purpose of repairing malfunctioning or damaged robots.
- Repair requests may only be made during **interruptions or fouls**. To initiate a repair, the team manager must call **“Time-out”** and receive approval from the referee. Once approved, the team is granted up to **2 minutes** to carry out repairs.
- During an official repair time-out, the **game clock shall be stopped**. At the end of the repair period, regardless of whether repairs are fully completed, play shall resume with all robots and the ball placed **exactly as they were positioned at the time of the interruption**.

vii. Fallen Robot

- If a robot falls in such a manner that it **blocks the goal**, obstructs play, or otherwise **significantly affects the course of the game**, the referee shall immediately halt play.
- Upon the referee’s call, all remaining robots must stop moving. The fallen robot shall either be **returned to an upright position** or **removed from the field** if it is damaged or unable to continue safely.
- The ball shall be placed in the **exact location** where it was at the moment play was stopped. Once the referee signals the restart, play shall resume and all robots may move freely.

viii. A Goal Is Scored

- Whenever a goal is scored by either team, all robots shall be repositioned in preparation for the next kick-off in accordance with the kick-off rules. The **game clock shall not be stopped** following a goal.

ix. Ball Outside the Field

- If the ball completely crosses the goal line after last touching an attacking robot, a **goal kick** shall be awarded to the defending team. If the ball crosses the goal line after last touching a defending robot and no goal is scored, a **corner kick** shall be awarded to the attacking team.
- If the ball completely crosses the sideline, either on the ground or in the air, a **throw-in** shall

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be awarded to the opposing team.

x. Stalemate

- A stalemate shall be declared by the referee when the ball remains stationary for **more than 5 seconds** and no robot is able to play it.
- If the stalemate occurs inside the penalty area, a **free kick** shall be awarded to the defending team, and the attacking team must remain **behind the halfway line**. In this situation, the referee may reduce the waiting time to **3 seconds** to expedite play.
- If the stalemate occurs outside the penalty area, a **free kick** shall be awarded to the attacking team. Free balls and free kicks placing applies.

Fouls:

A foul shall be called by the referee when a robot or team violates any of the following rules. Depending on the location and nature of the foul, the referee shall award either a **free kick** or a **penalty kick** to the opposing team.

i. Handling

- Handling refers to any situation in which a robot, other than the goalkeeper inside its own penalty area, controls the ball in an illegal manner.
- During movement, a robot must not hold, trap, or surround **more than one-third ($\frac{1}{3}$) of the ball's diameter** from any viewing angle. When the robot is stationary, it must not hold more than **one-half ($\frac{1}{2}$) of the ball's diameter**. In all cases, the ball must be able to **roll naturally** while being controlled by the robot.
- If a robot violates any of these handling restrictions, the referee shall call a **handling foul**. A **free kick** shall be awarded to the opposing team if the foul occurs outside the penalty area. If the handling foul occurs inside the penalty area, a **penalty kick** shall be awarded. The goalkeeper is exempt from this rule **only when inside its own penalty area**.

ii. Collision

- When two robots from opposing teams are disputing possession of the ball, meaning that both robots are simultaneously touching the ball, **no additional robot from either team may intervene** in that contest. Any attempt by a third robot to assist or interfere shall be

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considered a foul.

- If more than one robot attempts to intercept or block an opponent robot that is actively dribbling the ball, and this action results in unfair advantage or obstruction, the referee shall award a foul to the offended team.
- Any collision between robots of opposing teams, whether intentional or accidental, may be penalized if it directly affects the game or presents a risk of damage. If such a collision occurs **outside the penalty area**, a **free kick** shall be awarded to the affected team. If the collision occurs **inside the penalty area**, a **penalty kick** shall be awarded.
- It is permitted for a robot to push the ball and an opposing robot backward **only if the pushing robot remains in continuous contact with the ball** during the action.

iii. Kicking

- All robots must be designed and programmed to ensure that kicking actions can be executed **safely**, without threatening or damaging other robots.
- Robots must avoid kicking other robots. If physical contact cannot be avoided, the contact must be **soft and controlled**. If, in the opinion of the referee, a kicking mechanism causes unsafe or excessive force, a foul shall be called and the robot shall be **temporarily expelled from the field**.
- The team shall be given **up to 10 minutes** to repair or modify the robot to eliminate the unsafe behavior. If the problem is not resolved within this time, the robot shall **not be allowed to re-enter the match**.
- *Note:* The stronger a kicking mechanism is designed to be, the finer and more precise the control of its activation must be.

iv. Goalkeeper Push

- An attacking robot is permitted to push the goalkeeper **only when the ball is positioned between the attacking robot and the goalkeeper**.
- Pushing the goalkeeper **together with the ball into the goal** is strictly prohibited. When an attacking robot pushes the front of the goalkeeper, it must **immediately move away** after the initial contact.
- If the goalkeeper continues to be pushed, or is forced into the goal or penalty area in an illegal manner, the referee shall call a foul and award a **free kick** to the defending team.

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v. Obstruction

- At all times, the **goalkeeper is the only defending robot permitted inside the goal area**.
- If any additional defending robot enters or remains in the goal area while the ball is inside the defending team's penalty area, the referee shall call an **obstruction foul**. In such cases, a **penalty kick** shall be awarded to the attacking team.

vi. Offside

- At any given time, only **one attacking robot** is permitted to be inside the opposing team's goal area.
- If a second attacking robot enters the goal area, that robot shall be declared **offside**, and a **free kick** shall be awarded to the defending team.

vii. Touch

- If any human team member touches a robot **without the referee's permission**, a foul shall be called and a **penalty kick** shall be awarded to the opposing team.
- Only **one designated person per team** is permitted to touch robots, and only when explicit permission is granted by the referee.

viii. Illegal Collision

- Any collision that causes a robot to lose possession of the ball, fall over, or overturn another robot shall be considered an **illegal collision** and shall be penalized accordingly by the referee.

Actions (Restart Procedures):

- The following actions define how play shall be restarted after interruptions, fouls, or stoppages. Where robots must be repositioned, this may be done either manually by the designated human handler or autonomously via remote control commands.
- Unless otherwise stated, all robots not directly involved in the restart must remain at least **1.2 meters away from the ball**. Play shall only resume after the referee signals with a whistle.

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i. Free Kick

- When a free kick is awarded, all robots must immediately stop moving. The referee shall place the ball at the **nearest available free-ball mark**.
- The team awarded the free kick may position **one robot** near the ball. All other robots must remain at least **1.2 meters away**. Upon the referee's signal, play shall restart and all robots may move freely.

ii. Penalty Kick

- When a penalty kick is awarded, all robots must immediately halt. The referee shall place the ball at the **center of the penalty arc** corresponding to the penalty area in which the foul occurred.
- The attacking team may position **one robot as the kicker** behind the ball. All other robots, including attackers and defenders, must move **behind the halfway line**. The defending team may position the goalkeeper anywhere within the penalty area, provided that **at least one part of the goalkeeper touches the goal line**.
- Upon the referee's signal, play resumes. If a goal is scored, play shall restart with a kick-off.
- This procedure ensures that the attacking team receives the intended advantage while also simplifying and speeding up the penalty kick process.

iii. Free Ball

- When a free ball is awarded, the referee shall reposition the ball as quickly as possible at the **nearest free-ball mark**.
- All robots must remain at least **1.2 meters away** from the ball until the referee signals the restart of play.

iv. Throw-In

- A throw-in is a method of restarting play when the ball has completely crossed the sideline. A goal **cannot be scored directly** from a throw-in.
- When a throw-in is awarded, the referee or assistant referee shall retrieve and return the ball to the field as quickly as possible. There shall be **no stoppage of the game clock**.
- During the throw-in, defending robots must remain at least **1.2 meters away from the thrower** and **0.7 meters away from the receiver**, as illustrated in Figures 21 to 23. The

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thrower must not touch the ball again until it has been touched by another robot. The ball is in play immediately once it re-enters the field.

v. Corner Kick

- A corner kick is awarded when the ball crosses the goal line after last touching a defending robot and no goal is scored.
- The ball must be placed **inside the corner arc** at the nearest corner. A robot from the attacking team shall take the kick. All defending robots must remain at least **1.2 meters away from the ball** and stay behind the designated boundary line.
- The kicker must not touch the ball again until it has been touched by another robot. The ball is in play once it is kicked and moves. A goal **may be scored directly** from a corner kick.

vi. Goal Kick

1. A goal kick is awarded when the ball crosses the goal line after last touching an attacking robot and no goal is scored. A goal may be scored directly from a goal kick, but **only against the opposing team**.
2. The defending team shall take the kick from any position within the penalty area. All opposing robots must remain outside the penalty area until the ball is in play. The ball is considered in play once it has been kicked and moves **beyond the penalty area**.
3. When a goal kick is awarded, all robots must stop moving. All robots except the defending goalkeeper must leave the goal area. The defending team may position the ball and the goalkeeper freely within the goal area. Upon the referee's signal, play shall restart and all robots may move freely.

Size	: 1.0m x 0.3m x 0.5m (Width, depth, height) 3cm x 3cm crossbar at the top of the goal box (white)
Frame material	: Wooden (white colour)
Goal internal colour	: Navy blue and Yellow (1 set each)

[Type here]

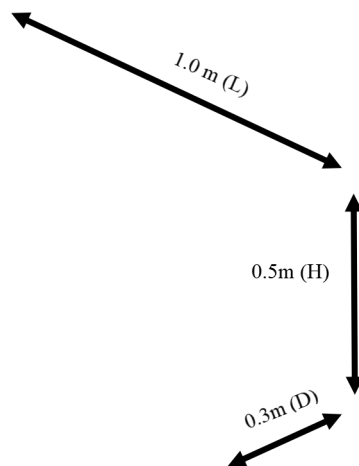


Figure 7: Soccer and Avoidance Challenge goal post size

Ball Specification:

- Type: Stress Therapy Foam Balls
- Material: Rubber
- Size: 6.5 mm – 6.6mm
- Colour: Orange



Figure 8: Stress therapy foam ball for Soccer Challenge

Score:

- A goal is valid only if at least half of the ball passes the goal line as judge by the referee.
1 point is awarded for every valid goal.
- A goal is invalid if the ball is kick over the goal bar, as it is considered out of boundary.

[Type here]

- In case if a foul occurs simultaneously with a valid goal as judged by the referee, the goal will be counted then followed by the foul. However, if the valid goal happens after the foul, the goal is not counted.
- Any objection on the referee's decision must be made before the game play continues during the match. Every objection must be supported with a clear video proof. Any objection that is brought forward after the game continues will not be entertained as referee's decision is final and valid.
- If one team wins opponent team exceeds 10 points, the team will be the winner directly
- Winner of the match is awarded 3 marks, draw awards both teams 1 mark, and losing team of the match will now be awarded any marks.
- Team with the highest marks will be announced as the winner of the challenge.
- Tie breaker will be based on the most goals obtained during the challenge.
- In case of teams with same marks and same goals obtained in the challenge, tie breaker is based on the biggest score difference in any match played in the challenge.

6. Conclusion

RoboSot is one of the categories in FIRA Malaysia Cup that challenged all competing teams to develop a fully functioning wheeled robot if not by modifying an existing robot such as TurtleBot 3 Burger manufactured by ROBOTIS company or B2 Mini manufactured by Bizbot Technology to perform difficult tasks. The challenges introduced in the RoboSot category slowly pathed the participating teams towards building wheeled robots that could interact with the environment using various sensors and well-developed programming. The evolution of challenges would eventually require interaction among robots to perform tasks that need effective problem solving and decision making strategies autonomously.