



International Robotic Olympiad 2021

Land-based Robot Competition Rules (V1)

(Primary School Division)

General Rules		2
	Game Rules	2
	Robot Rules	2
	Other Points to Note	3
	Hand Generator (Attachment 1)	4
Individual competition rules		5
Category A: Single Motor Robot		
1.	Hand Generator Robot Horse Short Distance Run Competition	6
2.	Robot Horse Relay Competition	7
3.	Hand Generator Robot Sled Race	8
4.	Hand Generator Ladder Climbing Robot Competition	9
5.	Hand Generator Horizontal Bar Climbing Robot Competition	10
6.	Hand Generator Triathlon Robot Relay Competition	11
7.	Hand Generator Single Motor Robot Appearance Design Competition	13
8.	Hand Generator Bouncing Robot Short Distance Run Competition	15
9.	Hand Generator Bouncing Robot Appearance Design Competition	16
Category B: Multi-motor Robot		
10.	Robot Boxing Competition	18
11.	Robot Rugby Competition	20
12.	Robot Sheepdog Competition	22
13.	Robot Keep City Clean Competition	23
14.	Robot Ant Obstacle Avoidance Competition	25
15.	Robot Penalty Shoot-out Competition	27
16.	Multi Motors Robot Appearance Design Competition	13
Category C: Innovative Model Design		
17.	Life Inspired Innovative Model Design Competition	29





General Rules

Game Rules

1. Single motor category robots may use only one set of motor gear box.
2. Multi-motor category robots may use more than two sets of gear box but only two sets of them for walking.
3. All contestants should wear uniform during the competition.
4. Name list of the student contestants cannot be altered without the Organizer's permission.
5. Contestants not accompanied by their instructors or teachers are not allowed to take part in the competition.
6. Instructors or teachers cannot enter the restricted area to instruct students to play the game.
7. Judges have the right to give warning or disqualify the contestants, instructors or teachers who do not obey the rules or the decision of judges.
8. Only applications from half-day/whole-day formal Primary and Secondary Government schools, Aided/Direct Subsidized schools or Private schools will be accepted (non-tutoring centers or institutes). The responsible teachers must be employed by the respective schools.

Robot Rules

9. All participating robots may only move in walking mode except the worm robots.
10. Except for the servo motor robot category, all participating robots must use Tamiya70093 gear box (203.7:1, 58.2:1, 16.6:1) and its matching motor for competition. The gear ratio may only be adjusted in accordance to the manufacturer's instructions. Contestants are not allowed to modify the motor or the gear box in any way. Gearbox should be exposed and cannot be sealed. Transparent materials must be used if gear box is to be sealed. Before and after the game, sealed gear box must be disassembled for checking.
11. Prior to the matches, all participants must submit their robots for inspection by the judges. These robots are then kept in a designated location. When the matches begin, participants may take their robots away from the designated location to the game field for competition. These robots must be returned to the same designated location after the competition. All these participating robots will then be sent to the testing centre by the judges for motor performance check.
12. Participating robot and motor will be dissembled for further inspection if the performance of the motor is found exceeding that of the original motor. Participants will be disqualified if found not using original motor or additional devices are used for the competition and a three-year suspension penalty will be served to the participants and their schools.
13. All motors must pass the power consumption check. The motor cannot consume more than 280mA when 3V supplied by the power regulator.
14. The weight of the robot means the total weight including all accessories and parts (including batteries).
15. Participating robots must comply with the dimensions, weights and specific requirements set by the Organizer.
16. All robots cannot add on electronic control devices not approved by the Organizer. All wireless devices must be able to alter frequency or channels. Participants must immediately change the frequency or channel of their transmitters found interfering others otherwise they would be disqualified for the competition. Participants are suggested to use 2.4G wireless remote control devices. All approved models of electronic control accessories, wireless devices models and their suppliers would be announced on the website.
17. The competition aims to encourage participants to apply their science and technology knowledge to create and build their own robots. Through this process, their ability, skill set and experience of





building robots will further be enhanced. As such, any commercial robotic kits available in the markets are not allowed to be used in the competition. Except for screws, nuts, washer and gear box, the mechanical parts (including perforated plastic strip or metal strip) of the robots must be made by the participating students from raw materials themselves. No ready-made model nor toy be used as the major part of the robot. However, decorative accessories from ready-made toy components may be used but not exceeding 30% of the overall parts of the robot.

18. In the Hand Generator Category Competitions, **no more than two** student contestants are allowed to operate the hand generator (attachment I) and they can change at any time.
19. Pneumatic device cannot be used.

Other Points to Note

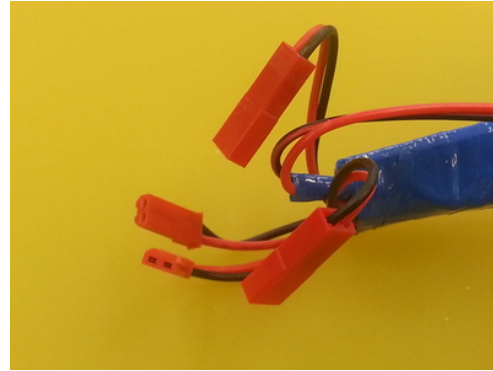
20. Except for specific competitions, participants must use the batteries (1.5V AA) provided by the Organizer in the International Competition. Participants will prepare their own batteries in the respective regional competitions.
21. All participants must use the hand generators (attachment 1) provided by the Organizer.
22. Registration number of the robot must be engraved or printed with permanent ink on its chassis.
23. The Organizer may check robots on their specifications any time after registration. Units found not meeting specifications would be disqualified for the competition.
24. The Organizer reserves the right to use all participating items for marketing and publicity purposes.
25. Violation of the above rules would lead to immediate disqualification of the competition and its result.
26. Complaints must be submitted by the responsible teacher within 30 minutes after the competition ended.
27. The Organizer reserves the right to modify the game rules. Please visit our website regularly for updated games rules.





Hand Generator

Attachment 1



Type 1 Generator: Hand Held Hand Generator

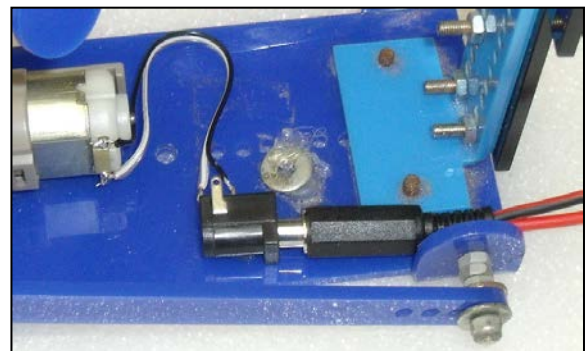
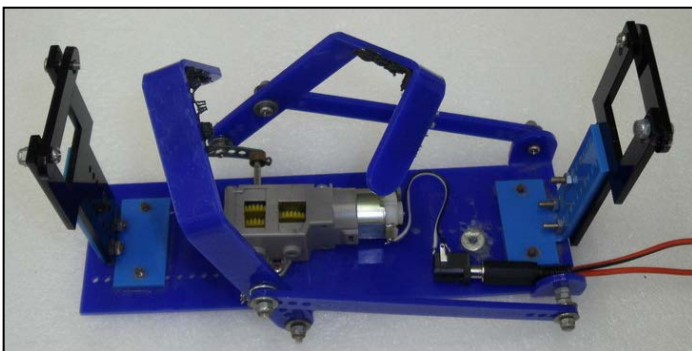
Switch the plugs to change the polarity and turning direction of handle



2.1mm plug and socket

Type 2 Generator: Desktop Hand Generator

Different types of 2.1mm socket



Each Single Motor Robot should be equipped with a 2.1mm socket for the plug of hand generator.





Individual competition rules

Category A: Single Motor Robot

1. Hand Generator Robot Horse Short Distance Run Competition
2. Robot Horse Relay Competition
3. Hand Generator Robot Sled Race
4. Hand Generator Ladder Climbing Robot Competition
5. Hand Generator Horizontal Bar Climbing Robot Competition
6. Hand Generator Triathlon Robot Relay Competition
7. Hand Generator Single Motor Robot Appearance Design Competition
8. Hand Generator Bouncing Robot Short Distance Run Competition
9. Hand Generator Bouncing Robot Appearance Design Competition

Category B: Multi-motor Robot

10. Robot Boxing Competition
11. Robot Rugby Competition
12. Robot Sheepdog Competition
13. **Robot Keep City Clean Competition**
14. Robot Ant Obstacle Avoidance Competition
15. Robot Penalty Shoot-out Competition
16. Multi Motors Robot Appearance Design Competition

Category C: Innovative Model Design

17. Life Inspired Innovative Model Design competition



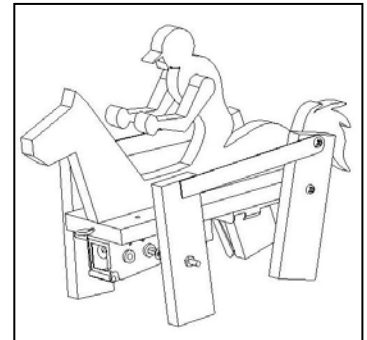


1. Hand Generator Robot Horse Short Distance Run Competition

Robots compete for speed in this game. A hand generator is used to provide power for the 4 legs robot horse. The robot that finishes 2M run with the shortest amount of time is the winner.

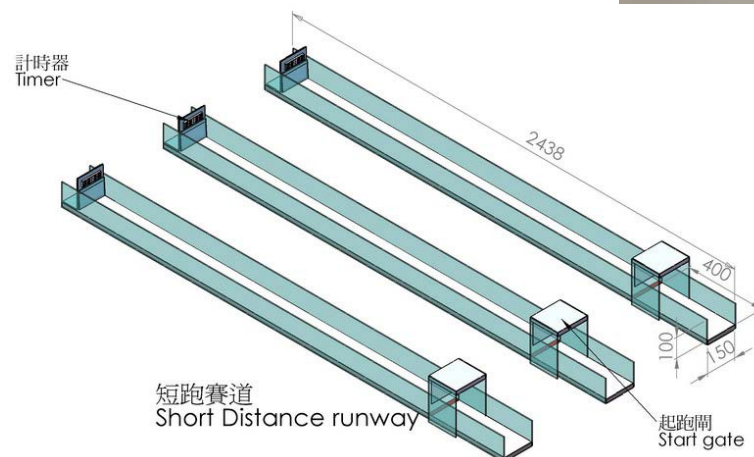
Robot Specification

1. The robot operates only with single motor and the power should only be supplied by the Desktop Hand Generator provided by the Organizer (*attachment 1*). The robot must be equipped with a 2.1mm socket for connection of the Desktop Hand Generator.
2. The size of the robot cannot exceed 300mm long, 150mm wide and 180mm tall (the length, width and height dimensions are not inter-changeable), nor overall weighs more than 500g.
3. The robot horse must have a horse appearance with a jockey and complete the game in walking mode.
4. The robot cannot have any installation that will change its original dimension during competition.



Game Field Specification

1. Level runway is used for the match. The track is 2000mm long. The start zone is 400mm long.
2. The runway has 3 tracks. Each track is 150mm wide.
3. A timer is placed at the end of each runway.



Game Rules

1. Each team plays twice and the best time is recorded. The team with the shortest amount of time to complete the game wins.
2. The power of the walking robot should only be supplied by the Desktop Hand Generator (attachment 1) provided by the Organizer. **Only the contestant himself/herself is to operate the Desktop Hand Generator and nobody is permitted to assist.**
3. The wire of Desktop Hand Generator is long enough so that contestants must remain behind at the start zone. Moving along the runway with the robot is prohibited. **Contestants may assign one student to help release the wire. Pulling the wire of Desktop Hand Generator is prohibited.**
4. **Contestants cannot touch the walking robot once it leaves the start zone. The competition is considered as incomplete if the robot stops moving or fails to reach the finish point within the 30 seconds game time.**



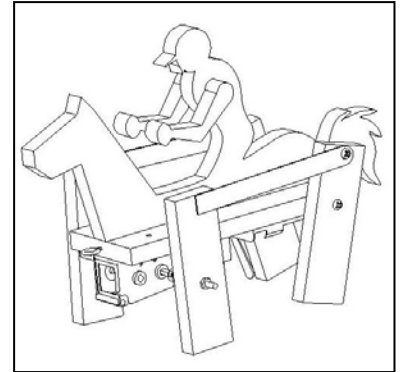


2. Robot Horse Relay Competition

4 legs robot horse relay competition is a team competition. The computer timer records the game time of the four robots in the team. The team with the shortest amount of total game time is the winner.

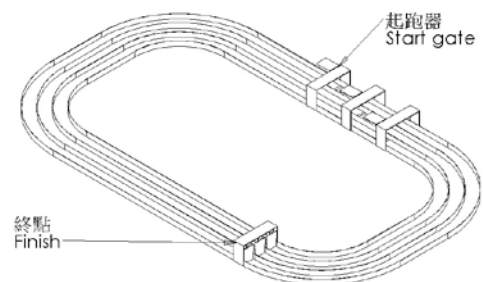
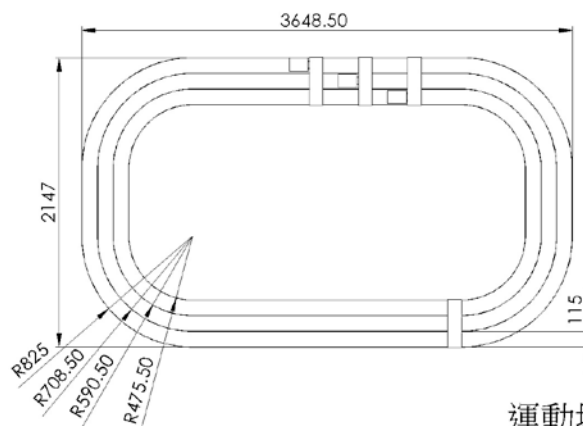
Robot Specification

1. The robot operates only with single motor and 2 pieces 1.5V AA alkaline batteries.
2. The robot **cannot** exceed 200mm long, 110mm wide and 150mm tall (length, width and height dimensions are not inter-changeable), nor weighs more than 500g (including batteries).
3. The robot horse must have a horse appearance with a jockey and complete the game in walking mode.
4. The robot cannot have any installation that will change its original dimension during competition.



Game Field Specification

1. The runway has three tracks. Each track is 115mm wide. The fence height is 45mm.
2. A 3648mm x 2147mm stadium runway is used for competition.



運動場式跑道
Stadium runway

Game Rules

1. Contestants can **choose to operate/place** the robot before or after the gate is open.
2. The computer opens the gate and the timer begins to count. **The gate will be closed automatically 3 seconds after the robot left the start gate.** When the first robot arrives at the destination, the computer records the time and opens the gate to release the second robot. When **the fourth robot arrives at the destination**, the computer adds up the total amount of time. The team with the shortest amount of run time wins.
3. Contestants cannot touch the robot once it **leaves** the start gate until the game is over. **The competition is considered as incomplete if the robot stops moving or fails to reach the destination within the 2 minutes game time.**
4. Robots run in anti-clockwise direction.
5. Each team plays twice and the best time is recorded.



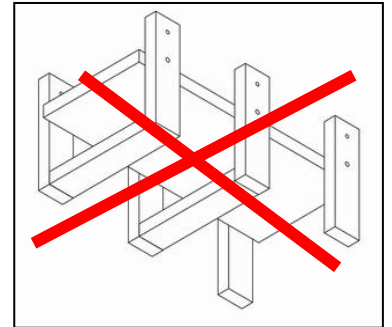


3. Hand Generator Robot Sled Race

This game primarily tests the strength of the robots. The robot is to move on a 4 leg walking mode. The robot that uses the shortest amount of time to pull the sled to the finish line is the winner.

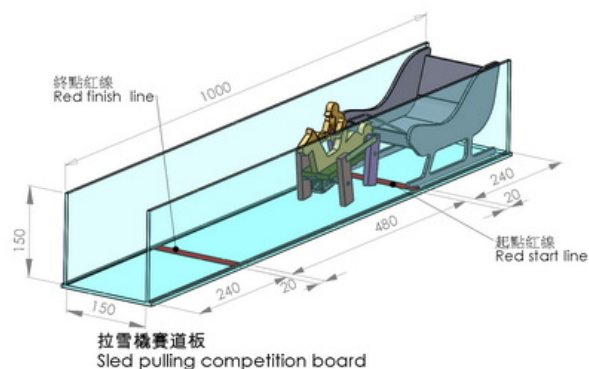
Robot Specification

1. The robot operates only with single motor. Contestants must use the Desktop Hand Generator (attachment 1) provided by the Organizer to supply power to the robot. Hence, the robot must be equipped with a 2.1mm socket for connection to the Desktop Hand Generator.
2. The size of the robot cannot exceed 200mm long, 150mm wide and 150mm tall (length, width and height dimensions are not inter-changeable), nor overall weighs more than 500g.
3. A **small hook** or a screw with 3mm diameter and not less than 15mm long will be installed at the middle of the tail end of the robot about 60mm to 100mm above ground for connecting the sled wire.
4. The robot must move on 4 legs in walking mode. The area of the sole of the foot must not exceed 25mm x 50mm. Each foot should leave the ground as it walks. The robot cannot have any part touching the ground permanently. **NO** 6 legs walking robot structure (sample as shown in right figure) be used.
5. The robot must be able to walk across an A4 size paper. The part which touches the ground should not have high viscosity (that means it will not stick up a piece of 80g A4 typing paper for more than 3 seconds).



Game Field Specification

1. A sled pulling competition board is used. The board is 1000mm long x 150mm wide x 150mm tall.
2. The sled weighs 351g.



Game Rules

1. The sled is placed with its legs close to the red start line. The judge signals the start of the game. The robot that pulls the sled to the red finish line with the shortest amount of time wins. In case of draw, the lighter weight robot wins.
2. The game time is 1 minute. In case the robot fails to pull the sled to the red finish line within the game time, the distance covered is measured. In case of draw, the lighter weight robot wins.
3. The robot loses the game if it fails to move at the beginning or during the match.





4. Hand Generator Ladder Climbing Robot Competition

Participant is to build a ladder climbing robot for the competition. The robot that finishes the game with the shortest amount of time is the winner.

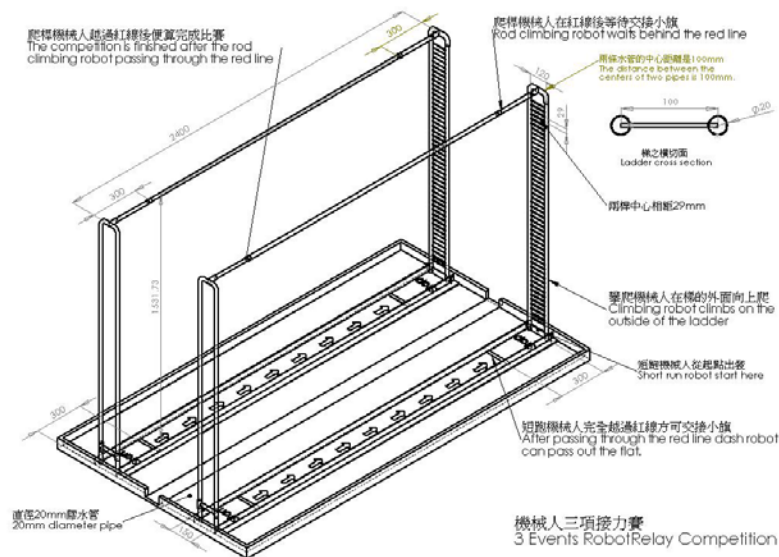
Robot Specification

1. The robot operates only with single motor. Contestants must use the Hand Held Hand Generator (attachment 1) provided by the Organizer to supply power to the robot.
2. The size of the ladder climbing robot cannot exceed 300mm long, 150mm wide and 180mm tall (length, width and height dimensions are not inter-changeable). The gross weight of the robot should not exceed 500g.
3. No robot should be powered by wheel actions (or rotate like a wheel) nor auxiliary wheel.
4. The robot must be equipped with a 2.1mm socket for connection of the Hand Held Hand Generator.



Game Field Specification

1. A Triathlon Relay court is used. The maximum outer width of the ladder is 120mm and inner width is 80mm.
2. An easy hanging device should be designed for the ladder climbing robot. Contestants cannot pull out the ladder to place the robot.



Game Rules

1. Each team may have a maximum of 2 members.
2. The game time is 1 minute. When the front end of the ladder climbing robot passes through the red line, the game ends.
3. Each team plays twice and the best time is recorded. The team with the shortest amount of game time wins.
4. If the robot fails to move, it may retry from the starting point. There is no limit on the number of re-try.



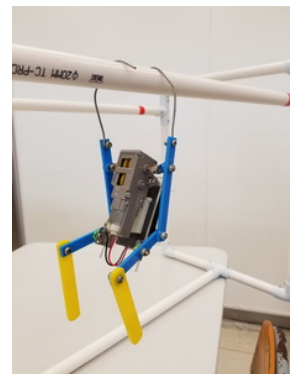


5. Hand Generator Horizontal Bar Climbing Robot Competition

Participant is to build a horizontal bar climbing robot for the competition. The robot that finishes the game with the shortest amount of time is the winner.

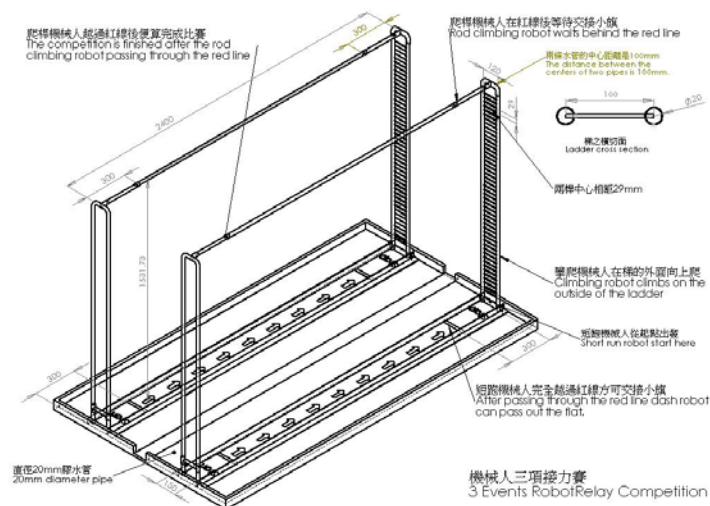
Robot Specification

1. The robot operates only with single motor. Contestants must use the Hand Held Hand Generator (attachment 1) provided by the Organizer to supply power to the robot.
2. The size of the ladder climbing robot cannot exceed 300mm long, 150mm wide and 180mm tall (length, width and height dimensions are not inter-changeable). The gross weight of the robot should not exceed 500g.
3. The robot is to advance along the horizontal bar using the forearms only (in a 'hand over hand' movement) bringing the legs to swing. Except the two hands, the robot is not allowed to have any auxiliary support hanged on the bar or to use auxiliary wheels.
4. The robot must be equipped with a 2.1mm socket for connection of the Hand Held Hand Generator.



Game Field Specification

1. A Triathlon Relay court is used. An easy hanging device should be designed for the horizontal bar climbing robot. Contestants cannot pull out the horizontal bar to place the robot.



Game Rules

1. Each team may have a maximum of 2 members.
2. The game time is 1 minute. When the front end of the horizontal bar climbing robot passes through the red line, the game ends.
3. Each team plays twice and the best time is recorded. The team with the shortest amount of game time wins.
4. If the robot fails to move during the match, it may retry from the starting point. There is no limit on the number of re-try.





6. Hand Generator Triathlon Robot Relay Competition

This competition involves teams each formed by a set of 3 different robots racing in a triathlon relay. The team that finishes the competition with the shortest amount of time is the winner.

The first part is 4 legs robot short distance run; the second part is ladder climbing; the third part is horizontal bar climbing.

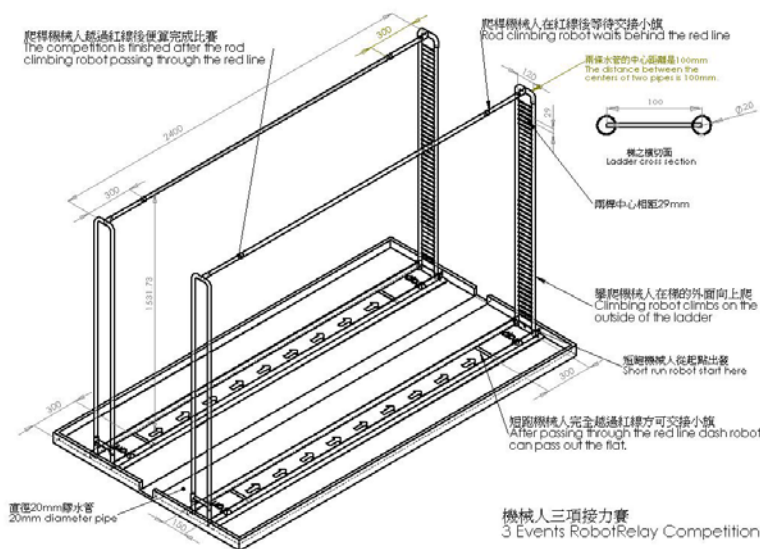
Robot Specification

1. Each robot operates only with single motor. Contestants must use the Hand Held Hand Generator (attachment 1) provided by the Organizer to supply power to the robot. Only one Hand Held Hand Generator is used for all three robots.
2. Dimensions and weight of respective robots for this competition refer to the game rules on 4-leg robot short distance run, ladder climbing robot and horizontal bar climbing robot respectively.
3. The robot cannot be powered by wheel actions (or rotate like a wheel) or auxiliary wheel.
4. The plug of the Hand Held Hand Generator (attachment 1) is unplugged and transferred from one robot to the next during the relay hence each robot must be equipped with a 2.1mm socket for connection of the Hand Held Hand Generator.



Game Field Specification

1. A Triathlon Relay court is used. The maximum outer width of the ladder is 120mm and inner width is 80mm.
2. An easy hanging device should be designed for the ladder climbing robot and the horizontal bar climbing robot. Contestants cannot pull out the ladder and the top bar to place the robots.





Game Rules

1. Each team may have a maximum of 6 members.
2. The game time is 3 minutes. The first robot (4 legs short distance running robot) begins from the starting point. Once the front end of the first robot touches the red line at the end of the track, the plug of the Hand Held Hand Generator is unplugged and transferred to the second robot (the ladder climbing robot). The ladder climbing robot starts climbing up on the exterior of the ladder to the top. The plug of the Hand Held Hand Generator is unplugged and transferred to the third robot (the horizontal bar climbing robot) when the front end of the second robot passes through the red line. When the front end of the horizontal bar climbing robot passes through the red line, the game ends.
3. If the robot fails to move during the match, it may retry from the starting point of that particular race. There is no limit on the number of re-try.
4. Each team plays twice and the best time is recorded. The team with the shortest amount of time to complete the game wins.



7. /16. Hand Generator Single Motor Robot Appearance Design Competition / Multi Motors Robot Appearance Design Competition

The robot appearance design competition encourages students' expression of creativity. The loose game rules allow more esthetic and creative approach to the design of robot appearance.

Competition Category

1. Single Motor Robot Category permits the use of single motor in the mechanism design.
2. Multi Motor Robot Category permits the use of two sets or more motors in the mechanism design.
3. Each school may nominate up to two walking robots for each category in this competition

Game Rules

1. The participating robots may not take part in any other competitions.
2. Robots that took part in last year's competition cannot re-enter the same game this year.
3. The robot including its peripheral decorations cannot exceed 425mm X 300mm X 230mm (the length, width and height dimensions may be interchanged).
4. The robot under Single Motor Robot Category operates only with one motor and the power can only be provided by the Hand Held Hand Generator.
5. The robot must be able to complete its basic maneuver.
6. The contesting student may submit an A4 size introduction on the design concept and features (annex 1) in the specified format. However, the contents must not reflect or imply in any way the name of contestant or school. No presentation is required on the day. Failure to comply may lead to disqualification of the item.

Evaluation Criteria

Appearance / Dynamics	Creativity	Production skills	Application of material	Total
25%	30%	25%	20%	100%





Robot Appearance Design Competition

Product Introduction

Category: *Single Motor* / *Multi Motors*

Contest Registration No. : _____

Product Introduction :

Design concept:

Materials application:

Problems encountered:

Solution:

Note: The content must not reflect or imply in any way the name of contestant or school. Failure to comply may lead to disqualification of the item.



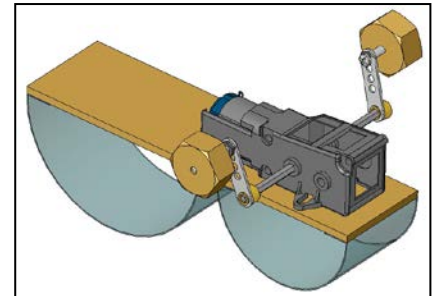


8. Hand Generator Bouncing Robot Short Distance Run Competition

The bouncing robot moves by swinging the centre of gravity. It is one of the simplest moving actions in the nature. The robot that finishes 2M run with the shortest amount of time is the winner.

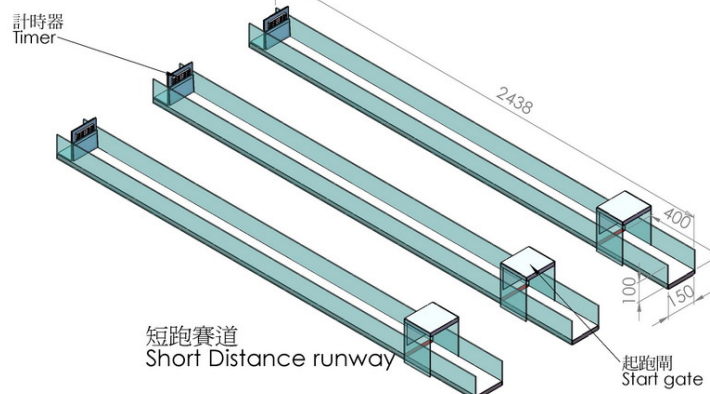
Robot Specification

1. The robot operates only with single motor. Contestants must use the Desktop Hand Generator (attachment 1) provided by the Organizer to supply power to the robot. Hence, the robot must be equipped with a 2.1mm socket for connection of the Desktop Hand Generator.
2. The size of the robot cannot exceed 300mm long, 150mm wide and 180mm tall (length, width and height dimensions are not inter-changeable), nor overall weights more than 500g.
3. The robot should move by swinging the centre of gravity.
4. The robot cannot have any installation that will change its original dimension during competition.



Game Field Specification

1. Level runway is used for preliminary rounds. The track is 2000mm long. The start zone is 400mm long.
2. The runway has 3 tracks. Each track is 150mm wide.
3. A timer is placed at the end of each runway.



Game Rules

1. Each team plays twice and the best time is recorded. The team with the shortest amount of time to complete the game wins.
2. The power of the robot should only be supplied by the Desktop Hand Generator (attachment 1) provided by the Organizer. **Only the contestant himself/herself is to operate the Desktop Hand Generator and nobody is permitted to assist.**
3. The wire of Desktop Hand Generator is long enough so that contestants must remain behind the start zone. Moving along the runway with the robot is prohibited. **Contestants may assign one student to help release the wire. Pulling the wire of Desktop Hand Generator is prohibited.**
4. **Contestants cannot touch the robot once it leaves the start zone. The competition is considered as incomplete if the robot stops moving or fails to reach the destination within the 30 seconds game time.**





9. Hand Generator Bouncing Robot Appearance Design Competition

The bouncing robot appearance design competition encourages students to full use their creativity. The loose game rules allow more esthetic and creative approach to the design of robot appearance.

Competition Category

It is the Single Motor Robot Category and permits the use of single motor in the mechanical design.

Game Rules

1. The participating robots may not take part in any other competitions.
2. Robots that took part in last year's competition cannot re-enter the same game this year.
3. The robot including its peripheral decorations cannot exceed 425mm X 300mm X 230mm (the length, width and height dimensions may be interchanged).
4. The robot should move by swinging the centre of gravity and the power can only be supplied by the Hand Held Hand Generator.
5. The contestant may submit an A4 size introduction on the design concept and features (annex 2) in the specified format. However, the contents must not reflect or imply in any way the name of contestant or school. No presentation is required on the day. Failure to comply may lead to disqualification of the item.

Evaluation Criteria

Appearance / Dynamics	Creativity	Production skills	Application of material	Total
25%	30%	25%	20%	100%





Hand Generator Bouncing Robot Appearance Design Competition Product Introduction

Category: *Single Motor Bouncing Robot*

Contest Registration No. : _____

Product Introduction :

Design concept:

Materials application:

Problems encountered:

Solution:

Note: The contents must not reflect or imply in any way the name of contestant or school. Failure to comply may lead to disqualification of the item.



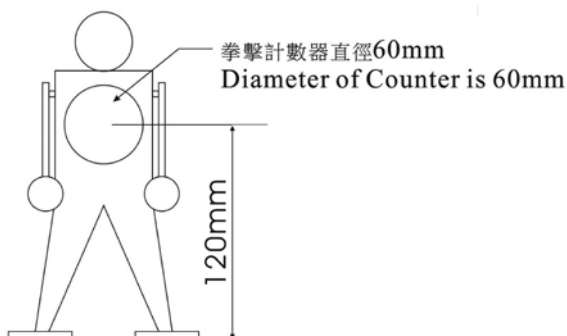
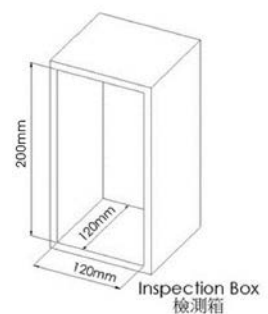
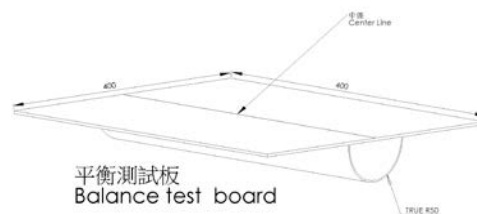
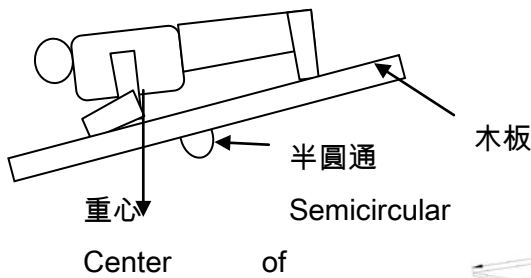
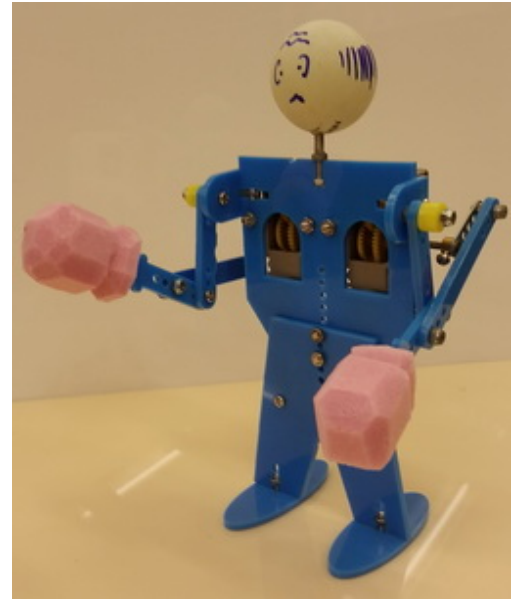


10. Robot Boxing Competition

This game tests the power of the robot as well as players' controlling skill and team work. The team that knocks down the opponent with the most scores within the time limit wins the game.

Robot Specification

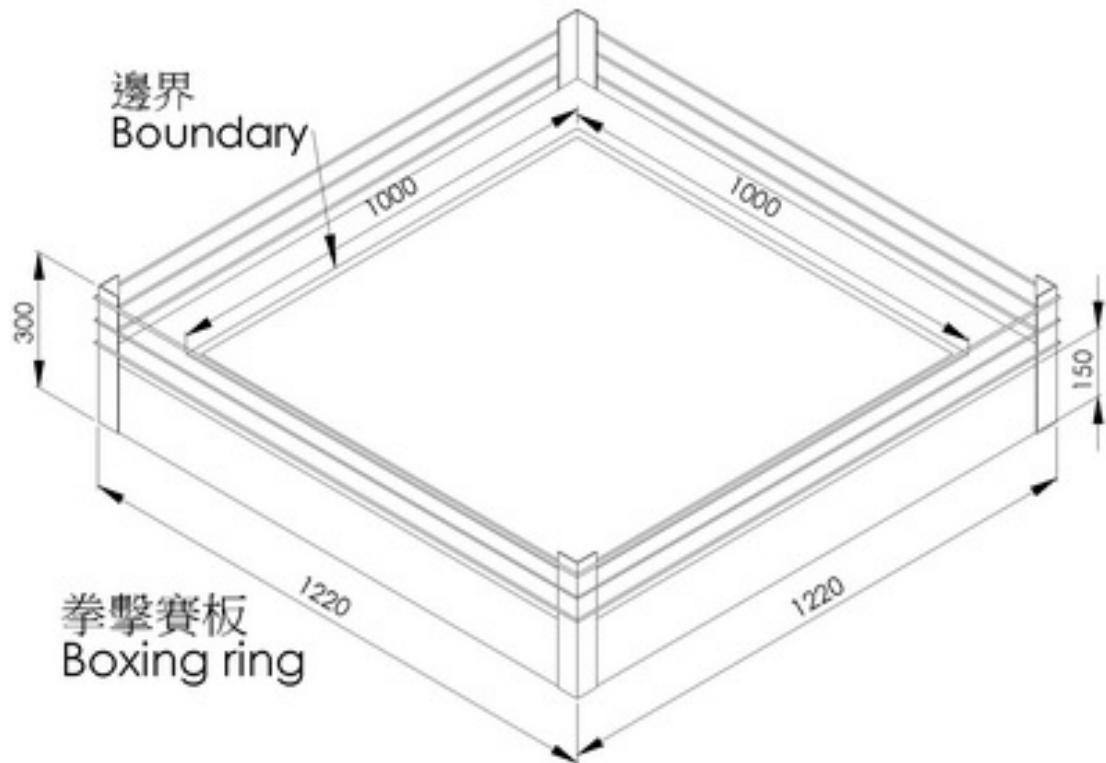
1. The robot may use up to 2 sets of gear boxes for boxing. Lever or Linkage can be applied to help the robot move. The robot must have a head and two hands in boxing gloves.
2. The robot is controlled by wired manual controller with power supplied by not more than six pieces 1.5V AA alkaline batteries.
3. The height of the robot must be between 190-200mm. A score counter with a 60mm diameter is installed on the chest of the robot 120mm above the ground. The score counter and magic tape will be provided by the Organizer. **The front panel of the score counter is not allowed to be shielded by any objects (including the fists/gloves or arms of the robot itself).**
4. Before the game the robot will be placed inside an inspection box for dimension check to ensure no part of the robot is protruding out of the box. The inner base of the box is 120 x 120mm and the height is 200mm. The total weight of the robot cannot exceed 1.5kg. **The area of each foot cannot exceed 60x400mm.**
5. The robot must pass the center of gravity test. The robot, with both arms curled in front of the body, is placed horizontally on a board with a semicircular pipe underneath. The center of gravity of the robot must be at the upper part of its body. That is the upper part of the robot's body slants down (see diagram below).
6. The wire of the robot must be long enough for the robot to move around.





Game Field Specification

The boxing ring is 1220mm long, 1220mm wide and 300mm tall.



Game Rules

1. Each team assigns one robot for the competition. The robot is controlled by one member.
2. The robots are placed at the center of boxing ring with 150mm apart from each other. The judge checks the robots to ensure there is no movable dangerous mechanism in the design before game start.
3. A winner is determined in a 2-minute match. 1 point is scored if the score counter on the chest of the robot is hit. The score counter will only take record after every 5-second interval to avoid scoring by continuously throwing punches. Each successful knock down the opponent scores 3 points. No score if the opponent falls down itself. At the end of the match, the sum of the scores will be taken from the points recorded in the score counter of the opponent and the scores from each successful knock down the opponent. The robot with the most scores wins.
4. In case of draw, the lighter weight robot wins.
5. The judge will warn the team that continually dodges the opponent and refuses to attack. The team will be disqualified upon receiving the second warning.
6. Both robots stop combat if a robot falls down. The match continues after the judge has put up the fell down robot. The robot **loses the match if it** fails to move or punch anymore.
7. There is a red line **on the floor** along the boundaries of the boxing ring. A warning will be served when the robot steps outside of the red boundary line. The opponent will be **awarded** 1 point after 3 warnings are served.
8. The Panel judges' decision is final.

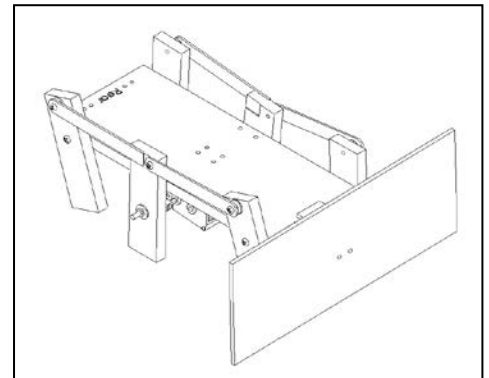


11. Robot Rugby Competition

This is a team competition. Each team has 2 robots plus one reserve robot. Students are encouraged to work as a team to build robots with efficient walking actions **using micro:bit boards as wireless control**. During the game, the two competing team players use their “pushing board” to push the ball into their opponent’s goal. The team with the most scores wins.

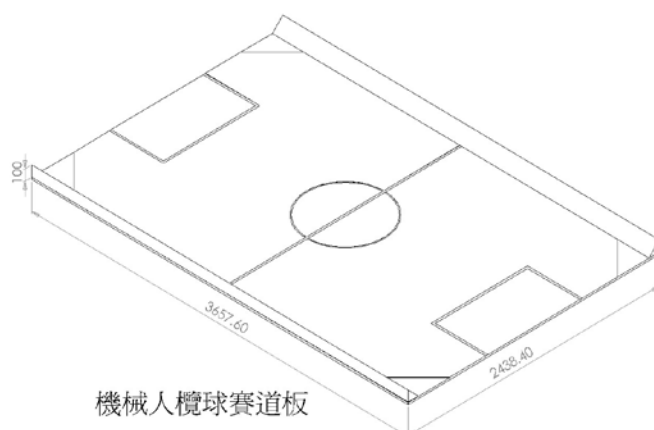
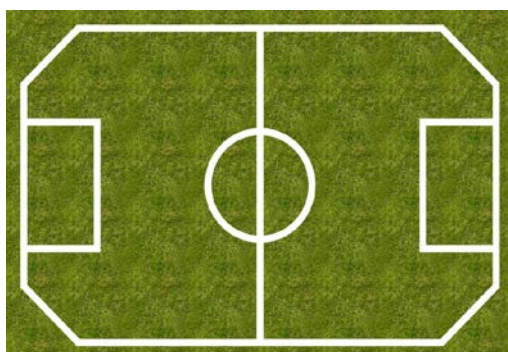
Robot Specification

1. Each team consists of two robots. The size of each robot cannot exceed 300mm long, 200mm wide and 240mm tall (length, width and height dimensions are not inter-changeable) nor weighs more than 1.5kg.
2. A flat pushing board is installed on the front end of the robot for pushing the ball. The size of the board cannot exceed 200mm wide and its highest point above ground level should not exceed 180mm.
3. Contestants are allowed to move along with the robot outside the football court.
4. Contestants may only use 1 piece of micro:bit board and 1 piece of expansion board (no restriction on expansion board model) as transmitter to wireless control the robot. There is no restriction on the batteries used (participants are to prepare for their own batteries).
5. The robot is equipped with 1 piece of micro:bit board as receiver and 1 piece of expansion board (no restriction on expansion board model) as motor actuator. No more than 4 pieces 1.5V AA alkaline batteries be used.



Game Field Specification

1. Football court is used for the competition.
2. The area of playing field is 3658mm (12ft) × 2438mm (8ft), with a 100mm tall 45 degree triangular fence on two sides. A rubber spongy rugby is used for the competition.





Game Rules

1. Robots may only push the ball **and not hold the ball** (the pushing board cannot be concave).
2. The game has two halves, the first and second, each lasts for 2 minutes. The first stage of the match is conducted on a round-robin basis. The winning team gets 3 points, losing team 0 point and each team 1 point in case of a draw. The next stage will be conducted on a knockout basis.
3. Choice of **goal** and **opening** kick-off is determined by a toss of coin. Each team has an **opening kick-off** opportunity in the first or second half of the match respectively. The **team taking the kick-off first** places the robots inside the **center** circle and the opposite team places their robots outside the **center** circle afterwards.
4. The timer begins to count when the referee calls the game to action. The team taking the kick-off must kick the ball within five seconds **otherwise** the ball goes to the opposite team. All other robots may only move after the kick-off.
5. **The soccer court is not equipped with goal frames.** The team pushes the ball passing the opponent's **goal line** gets 1 point. The team not scoring re-starts the game from the midfield and the timer does not pause. The team with the most scores at the end of the match wins.
6. **If it is unable to determine a winner at the end of the match, it will be treated as tied in the round-robin match.** If it tied at the end of the knockout match, an extra time of 2 minutes is added to determine a winner via 'sudden death'. Each team sends 1 robot for the extra time match. **If it is still unable to determine a winner at** the end of the extra time match, each team sends 2 robots to take turn for the **spot kick*** and time of each **goal** is recorded. The team with the most goals wins. In case of draw, the **team with the shortest** amount of total goal scoring time wins. Second round will be taken if they still draw until a winner is identified.
7. **Spot kick*:** the ball is positioned at the center circle and the robot is given 1 minute, with no limit on the number of attempts, to kick the ball into the open goal (i.e. without a defending robot) until a goal is scored and its time recorded.
8. If the ball is tangled for over 10 seconds, the referee may pause the match and separate the robots 300mm away from the ball and re-start the match.
9. Players can move along with their robots. Once the match starts, players are not allowed to touch the robots or the ball until either the ball **goes into the opponent's goal** or the match ends.
10. A **goal directly from the opening kick-off** will not be counted. Robots can push the opponents and the ball together to the **goal line**.
11. During the match, request should be made to the referee for repair or replacement of robot. Upon approval, the robot should be removed and placed back to the field by the referee. The timer does not pause and the match continues. The robot on returning to the field **at where it left** should wait for the referee's permission to move and continue to play.
12. The Panel judges' decision is final.



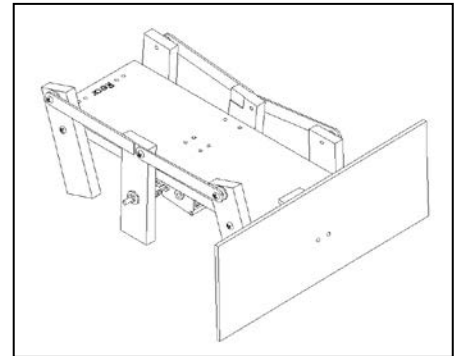


12. Robot Sheepdog Competition (this item will be replaced by Robot Keep City Clean Competition in 2022)

This game tests contestants' ability to control robot sheepdogs to drive the sheep (white ping-pong) into the sheepfold and expel wolves (orange ping-pong) from the sheepfold.

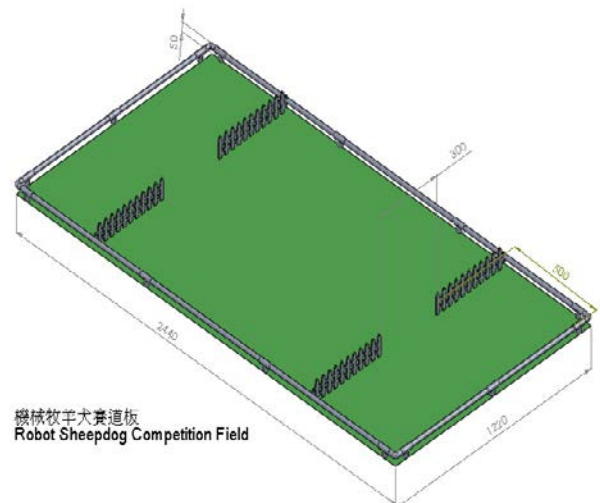
Robot Specification

1. Each team has one robot only. The size of the robot cannot exceed 300mm long, 200mm wide and 240mm tall (length, width and height dimensions are not inter-changeable) nor weighs more than 1.5kg.
2. The robot may use up to three sets of gear boxes, in which only two sets are for the walking action. It must move with walking action.
3. The robot is controlled by wired manual controller using not more than six pieces 1.5V AA alkaline batteries.



Game Field Specification

1. This game uses a robot sheepdog playing field. There will be 50 white ping-pongs and 25 orange ping-pongs.
2. The area of playing field is 2440mm × 1220mm with 50mm tall fencing surrounding the four sides.



Game Rules

1. The robot attempts to drive as many sheep (white ping-pong) as possible into the sheepfold and expel the wolves (orange ping-pong) from it within the 2 minutes game time. Each sheep in the sheepfold scores 5 points and 10 points are deducted for each wolf in the sheepfold.
2. Two teams play together. A robot may not damage or obstruct opponent's robots. The judge will serve warning to the offending robot. The robot will be disqualified after two warnings and asked to leave the playing field immediately.
3. During the competition, a robot may receive repair off the field upon the judge's permission. The robot should only be placed back to where it left by the judge and continues the game. Timer does not pause and no extra time will be given.





13. Robot Keep City Clean Competition (Demonstration Item)

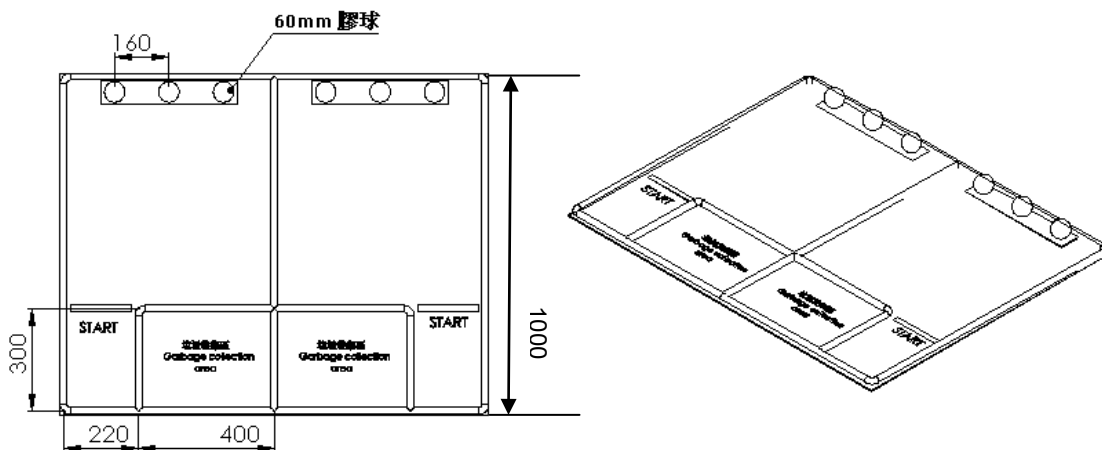
The aim of this game is to promote public concern of city cleanliness. Plastic balls (garbage) are placed at designated locations of the competition field. Participant is to control the robot to grip and transfer all the plastic balls (garbage) to the garbage collection area with the shortest amount of time.

Robot Specification

1. The size of the robot cannot exceed 300mm long, 200mm wide and 300mm tall (length, width and height dimensions are not inter-changeable). Total weight not more than 1.5kg.
2. The robot may use up to two sets of gear box for walking.
3. The robot may use up to two 9g servo motors for the gripper device.
4. Contestant may only use 1 piece of micro:bit board as transmitter to wireless control the robot. There is no restriction on the batteries used (participants are to prepare for their own batteries).
5. The robot is equipped with 1 piece of micro:bit board as receiver and 1 piece of expansion board (no restriction on expansion board model) as motor actuator. No more than 4 pieces of 1.5V AA alkaline batteries be used.

Game Field Specification

1. A keep city clean board is used for this game.
2. 3 plastic balls of 60mm diameter are placed in straight line on the board (see diagrams above)





Game Rules

1. The robot is placed in the START position prior to the game begins and it may advance upon receiving the judge's signal.
2. Contestant has 3 minutes to grip and transfer the 3 plastic balls (garbage) placed at the designated locations to the garbage collection area. Only 1 plastic ball at a time is allowed for each transfer. After the 3-minute game time is over, only the balls inside the garbage collection area will be counted, each ball score 2 points.
3. The judge will immediately remove the plastic ball which falls outside of its own playing field during transfer and no score will be counted.
4. Each team plays 2 rounds and the sum of all the scores is recorded. If the scores are the same at the end of the game, the team with the shortest amount of time to finish the game wins.



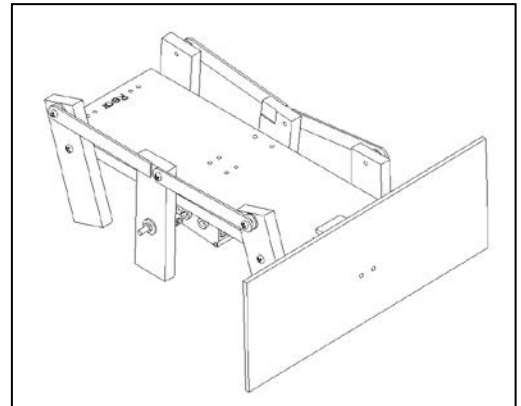


14. Robot Ant Obstacle Avoidance Competition

Oblique platform, drawbridge and cylindrical obstacle are placed in the obstacle avoidance game field. The participating robot is required to navigate through the oblique platform, drawbridge and cylindrical obstacle to reach the destination in the shortest amount of time to win. This game tests the ultimate performance of the robot as well as the navigation control ability of the players.

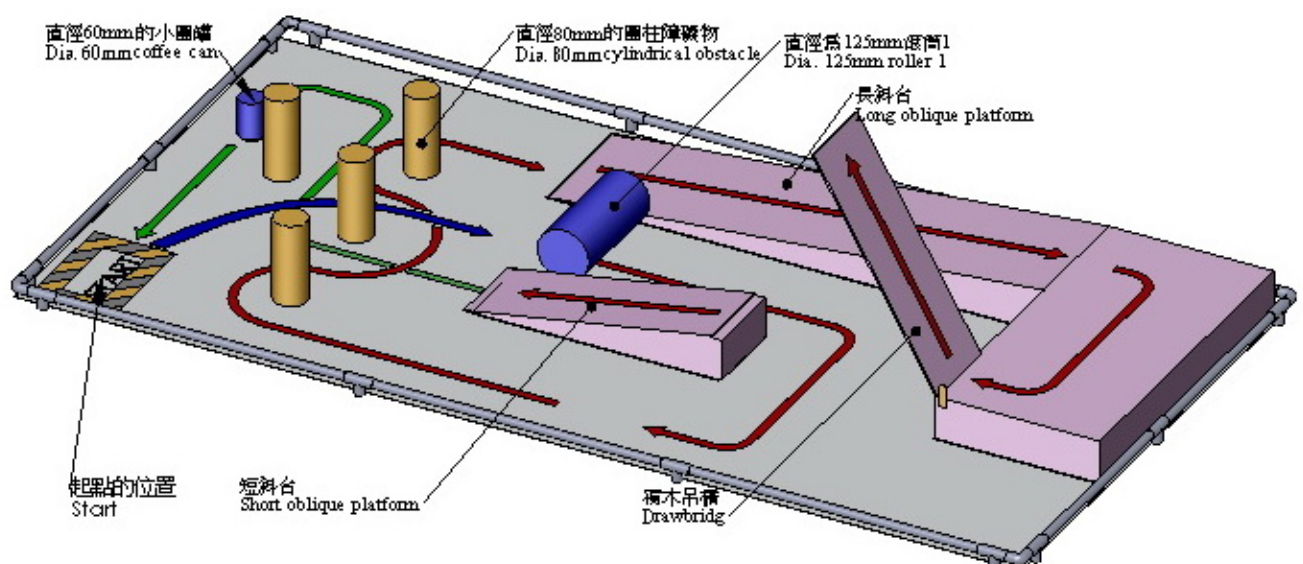
Robot Specification

1. The size of the robot cannot exceed 300mm long, 280mm wide and 240mm tall nor weighs more than 1.5kg (excluding the wired controller).
2. The robot is controlled by wired manual controller using not more than six pieces 1.5V AA alkaline batteries.
3. The robot can use only two gear boxes for walking motion.



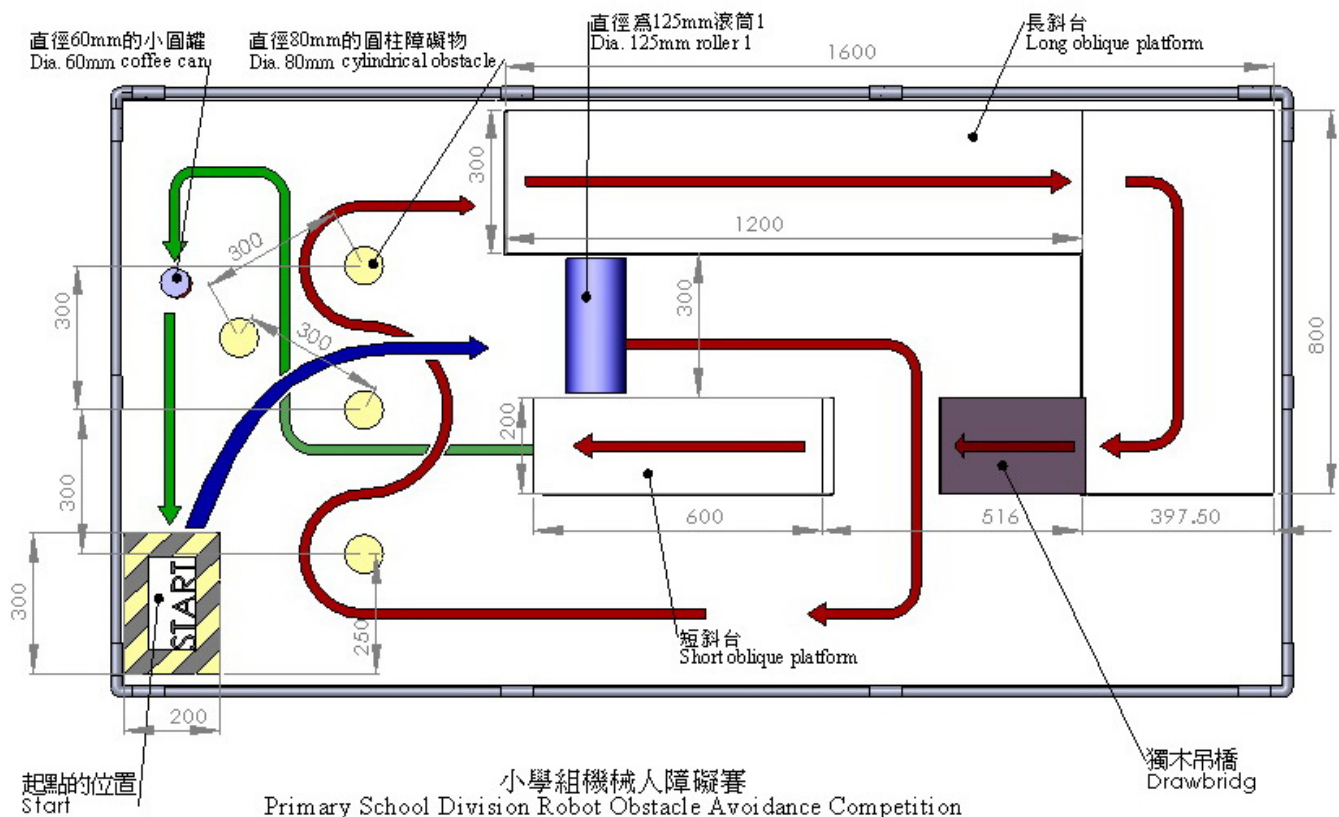
Game Field Specification

1. This game uses the primary division land and water robot obstacle avoidance playing field (diagram referred).
2. The area of land playing field is 2238mm × 1019mm with 100mm tall fencing on the four sides.
3. Obstacle includes: I) a can (an empty coffee can) with diameter of 60mm, 90mm high and weight 50g. II) Cylindrical obstacle with diameter of 80mm and high 150 mm. III) A roller (1.25 Liter soft drink bottle) with diameter of 125mm and 280 mm high.
4. The length of oblique platform is 1200mm, the width is 300mm and the highest point is 100mm. The length of drawbridge is 600mm and the width is 200mm (diagram referred).



小學組機械人障礙賽
Primary School Division Robot Obstacle Avoidance Competition





小學組機械人障礙賽
Primary School Division Robot Obstacle Avoidance Competition

Game rule

1. The robot is placed at the “START” position prior to the game begins. It may move upon the judge signals start of the game and the timer begins to count.
2. The robot has to travel along the designated route. The robot first follows the blue path and pushes away the roller 1. It then follows the red path and passes through under the drawbridge. After bypassing 3 80mm in diameter cylindrical obstacles, it moves up to the end of the long oblique platform and reaches the horizontal platform where the drawbridge is in an upright position. **A helper will lower the drawbridge** and the robot is to walk across it. If the robot falls down from the drawbridge, it has to walk across the drawbridge again. After going down the short oblique platform, the robot follows the green path bypassing the cylindrical obstacles and reaches the 60 mm diameter empty coffee can. When the robot pushes the coffee can to the destination, the game ends.
3. The game time is 3 minutes. Robots that fail to complete the game, the distance completed is recorded and the game time is recorded as 3 minutes.
4. Once the game begins players cannot touch their robot or steer it by pulling the wire until the competition ends. 10 seconds will be added for each offence.
5. During the competition, request should be made to the referee for repair of the robot. Upon approval, the robot should only be removed from and placed back to the field by the referee. The timer does not pause and the match continues. The robot on returning to the field at where it left should wait for the referee’s permission to move and continue to play.
6. Each team plays twice and the best time is recorded. If none of the robots has finished the game, the one with the longest distance completed wins.



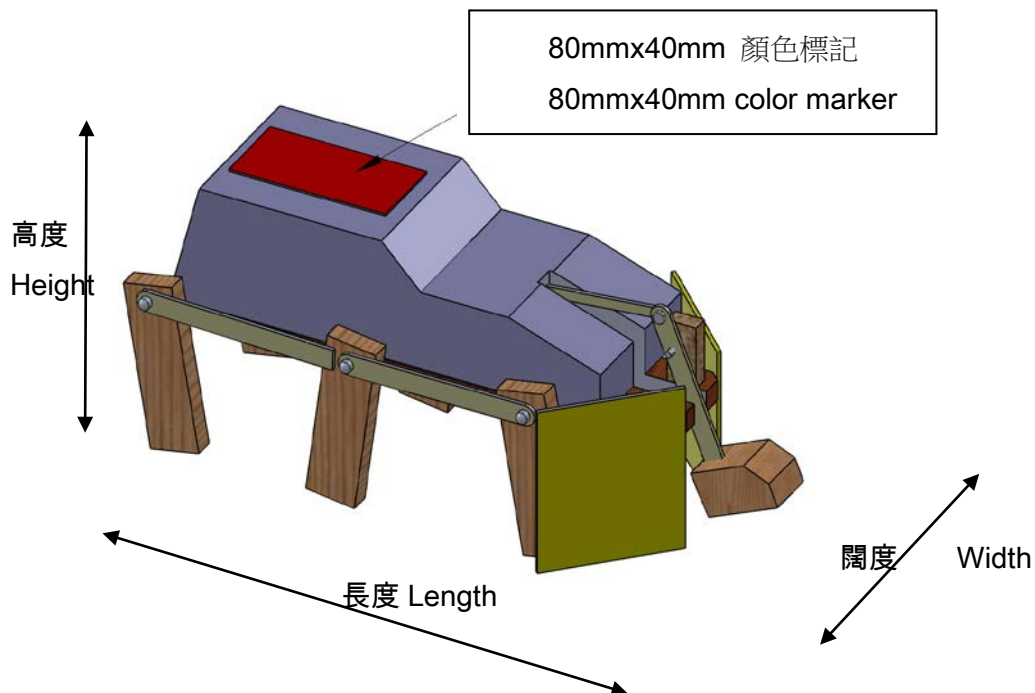


15. Robot Penalty Shoot-out Competition

The penalty shootout is a method of determining a winner in football matches that would have otherwise been drawn or tied. Contestant controls the robot to make five penalty kicks. The team with the most scores is the winner.

Robot Specification Competition

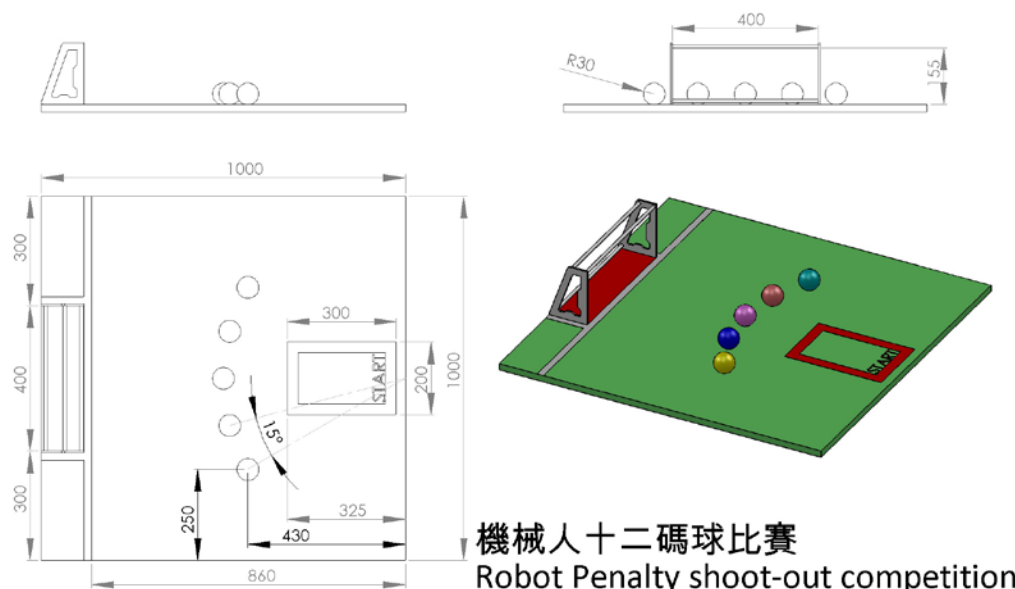
1. The size of the robot cannot exceed 300mm long, 200mm wide and 240mm tall (length, width and height dimensions are not inter-changeable) nor weighs more than 1.5kg (including batteries and receiver).
2. The robot may use up to three sets of gear boxes and must move in a walking mode.
3. A flap is installed on each side of the robot front end, slanting backward at 30-45 degree from the gear box to prevent the robot front legs from kicking the football. The opening between the two flaps at the robot front end should not be more than 30mm wide. Therefore, the foot or board for kicking the ball may not be larger than 30mm (diagram referred). The direction of kicking the ball must be in the same direction as the robot is walking forward.
4. The robot is controlled by wired manual controller using not more than six pieces 1.5V AA alkaline batteries.
5. The robot must kick the ball with its foot or board in a swing (not rotation) action between its left and right flaps.





Game Field Specification

1. This game uses a penalty shoot-out playing field.
2. Five 60mm rubber balls will be arranged in the form of an arc on a rack (diagram referred).



Game Rules

1. The robot is placed in the start position prior to the game starts and it may move to kick the ball upon receiving the judge's signal.
2. Contestant has 4 minutes to finish 5 penalty kicks. Each goal scores 2 points. **A goal will be counted** if the ball crosses the **line in front of the goal** even it rebounds. However, **it is not a goal** if the ball rebounds from the goal posts.
3. The robot kicks the ball only once per each penalty kick. Two or more attempts to kick the ball for each penalty kick is not allowed.
4. **The judge will immediately remove the ball(s) from the field that is/are either accidentally touched by the robot or hit by the ball that is kicked by the robot.**
5. Each team continuously plays 2 rounds and the sum of all the scores is recorded. If the scores are the same at the end of the game, the team with the shortest amount of time to finish all kicks wins.





17. Life Inspired Innovative Model Design Competition

The competition encourages students to transform the everyday objects into cute and delightful characters using their imagination and creativity.

Game Rules

1. The participating article may not take part in any other competitions.
2. Article can be made with daily life appliances, such as faucets, brushes, wrenches, etc. The article can only use up to three different appliances and there is no limit on the quantity used. The article should try to retain the original appearance of the appliance as much as possible and reduce using add-on parts.
3. The article including its peripheral decorations cannot exceed 500mm X 500mm X 500mm. Peripheral decorations is optional.
4. The contestant may submit an A4 size introduction on the design concept and features (annex 3) in the specified format. However, the contents must not reflect or imply in any way the name of contestant or school. No presentation is required on the day. Failure to comply may lead to disqualification of the item.

Evaluation Criteria

The original shape of the article should be kept as much as possible and use of additional parts should be minimised.

Appearance /Dynamics	Creativity	Production skills	Application of material	Total
25%	30%	25%	20%	100%

Examples: French artist Gilbert Legrand using his imagination and creatively by painting or adding small details to our everyday domestic objects and turn them into cute characters and give them new life..... a tap becoming a running lady, a brush seen as a Native American, a toilet brush conjures a lion





Life Inspired Innovative Model Design Competition Product Introduction

Category: _____

Contest Registration No. : _____

Product Introduction :

Design concept:

Materials application:

Problems encountered:

Solution:

Note: The content must not reflect or imply in any way the name of contestant or school. Failure to comply may lead to disqualification of the item.

