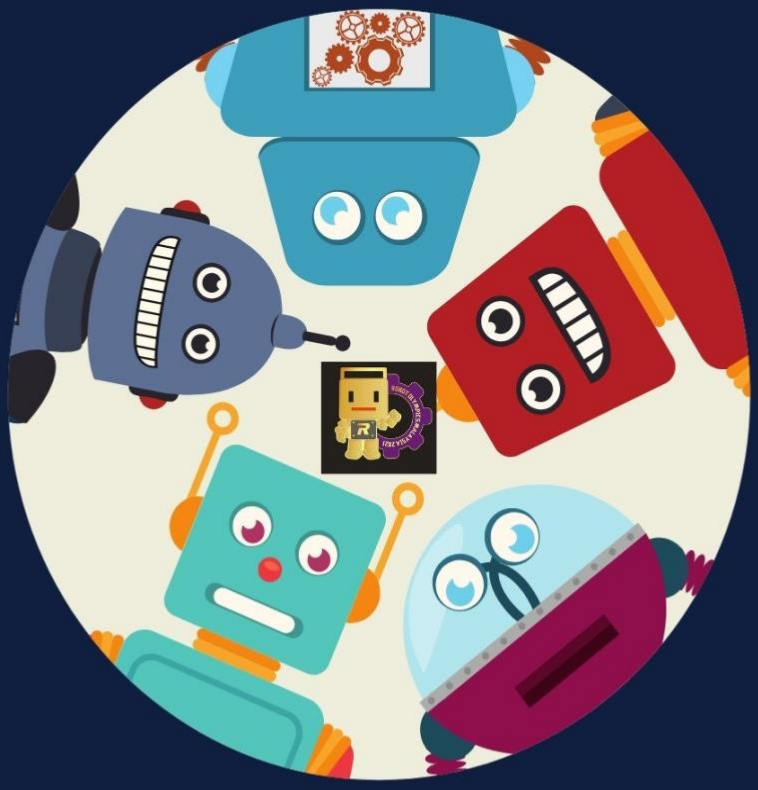
MINISTRY OF EDUCATION MALAYSIA

SMJK YOK BIN

ILMU OBOR KEMAJUAN

ROBOT OLYMPICS MALAYSIA VIRTUAL RUN 2021

# HUMANOID ROBOT MARATHON



**REGISTRATION: 1-31 MAY 2021**

**(HTTP://GG.GG/ROMVR2021)**

**CATEGORY : PRIMARY SCHOOL & SECONDARY SCHOOL**

**FEES: RM50.00(T-SHIRT + MEDAL + KEY CHAIN + E-CERT)**

**LIVE ROBOT MARATHON : 19 JUNE 2021 (ONLINE)**

**TIME: 10.00 AM**

https://yokbin-channel.wixsite.com/website. +60176730929

# "GEAR UP FOR YOUR FUTURE"

# NOW, A ROBOT MARATHON, SERIOUSLY ……

## INTRODUCTION

Humanoid robots are now used as research tools in several scientific areas. Researchers study the human body structure and behaviour (biomechanics) to build humanoid robots. On the other hand, the attempt to simulate the human body leads to a better understanding of it. Humanoid robots are being developed to perform human tasks such as personal assistance, through which they should be able to assist the sick and elderly, and doing dirty or dangerous jobs. Humanoid robots, especially those with artificial intelligence algorithms, could be useful for future missions.

## RULES AND REGULATIONS

### 1. AIM

To build a two-legged or four-legged humanoid robot for the race! The robot with the fastest trip time will be the winner.

### 2. DEFINITION OF A HUMANOID WALKING/ RUNNING ROBOT

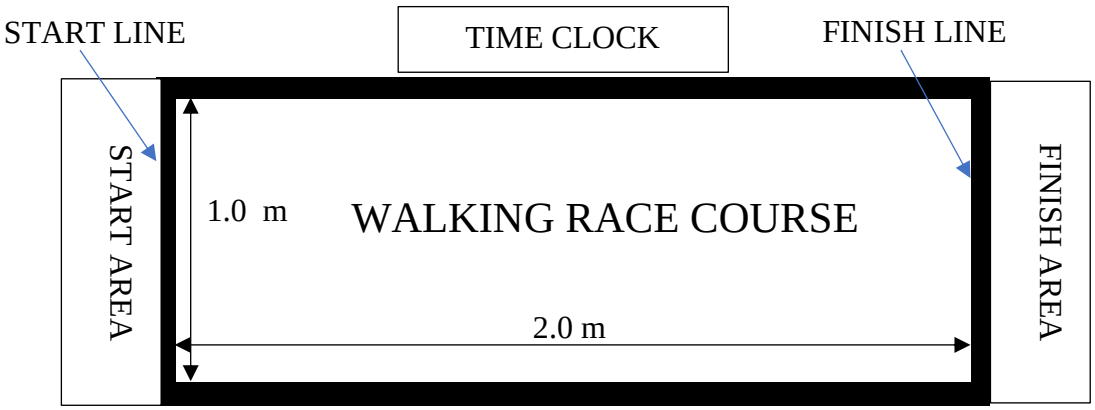
- The two-legged or four-legged robot must have a humanoid shape or look.
- All legs must operate in a cyclical fashion.
- No wheels or rotary wheel-like appendages will be permitted for locomotion.
- The ground contact point on the foot cannot completely rotate around some point/axle that is in direct contact with the leg during a step cycle. As an example, if the leg is attached to a wheel or an axle and all it does is rotate around in a circle, and when the leg hits the ground it causes the robot to move forward, this is not legal for this race.
- If the drive motor continuously rotates in one direction, leg motion must oscillate back and forth through some form of a cam and/or mechanical linkage.
- The entire weight of the robot must be completely supported by the robot's legs.
- All legs/appendages that are in contact with the ground must be either used for locomotion or balancing.

- All legs/appendages that are used to assist in balancing the robot, or locomotion, must separate (lift/hop/move) off the ground at some point during each walk/step cycle. i.e. they cannot slide/roll across the ground.
- If the robot falls over, external appendages (such as arms) can be used to help the robot get back on its feet.

## 3. ROBOT SPECIFICATIONS

- Robots must be autonomous
- No human-operated (wireless) remote controls will be permitted except to start and/or stop the robot.
- The maximum length, width, height, and weight of a robot are not specified in this race. The only requirement is that the robot must remain completely on the course during the event. It is the designers' responsibility to design the robot to accomplish this task.
- Propulsion must be electrical in nature. No pneumatic, combustion, or other exotic propulsion devices will be permitted. All power must be carried on board the robot.
- The race officials shall make the sole decision as to the suitability of a robot for this race. The official's decision on this matter is final and is not subject to dispute.

## 4. COURSE SPECIFICATIONS




The overall dimension of the walking race course is 1.0 m wide by 2.0 m in length. The course can be made from any material as long as it is flat, smooth, and there are no seams, edges or cracks.

The entire course is bordered by 2.5 cm wide black tape.

### 4.1 START/FINISH AREA

The Start Area and Finish Area are at both ends of the walking race course as in Diagram. The entire robot must be placed in the Start Area behind the border, outside of the walking race court. This area is not compulsory to be bordered.

### 4.2 WALKING RACE COURSE

The course will be 2.0 m in length and 1.0 m in width. The Main Track includes the 2.5 cm wide black Track Sides.

### 4.3 TRACK SIDES

The race course will be bounded on each side with a 2.5 cm wide black tape.

### 4.4 WALL

There is no wall in the walking race course.

## 5. RACE PROCEDURE

A robot must begin completely in the Start Area, proceed to the Finish Area. The run ends when at least one of the robot's feet touch the surface of the Finish Line in the Finish Area or after 2 minutes (120 seconds).

### 5.1 SETUP

- Five minutes prior to the start of the competition, an "On Deck" call will be made. At the end of the five minutes "On Deck" call, all robots must be ready to compete when they are called.
- The entire robot must be behind the front edge of the Start Area at the start of the race. The front edge of the Start Area is defined as the border between the Start Area and the race course. This is also known as the Start Line.
- No part of the robot is allowed to extend past (outside) the Start Area.

### 5.2 PROCEDURES

- Contestants must prepare their own digital time clock and position it as in the diagram.
- Contestants must start their own robot **once whistling** by the Referee. The race official's time clock is started.

- The time clock of the contestants will begin when the **most forward part/edge of the first leg or foot** crosses the Starting Line. Any other part of the robot (such as: arms, body, head, etc) that crosses Starting Line before the first leg **will not start the time clock**.
- Once the time clock has started, no contestant may touch the track or the robot; assist or interfere with the robot in any way.
- The robot must remain on the course at all times.
- If the entire part of the robot exit the walking race course from either side of the entire course, the race is ended, and the time clock is stopped. The total distance robot travelled will be recorded.
- If partial parts of the robot went out of bounds during the race and is returning back within the walking race course, the race is valid.

### 5.2.1 ROBOT REACH THE FINISH LINE WITHIN 2 MINUTES

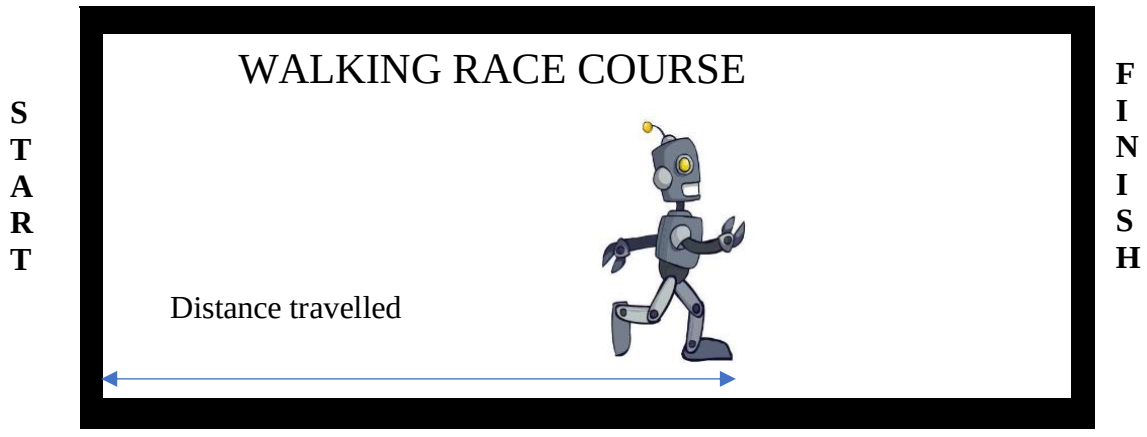
- The time clock of the contestant will stop when one of the robot's feet touch the surface of the Finish Line in the Finish Area. The contestants stop their robot.

- Any other part of the robot (such as: arms, body, head, etc) that crosses Finish Line before the first foot will not be used to stop the time clock.

### 5.2.2 ROBOT DOES NOT REACH THE FINISH LINE WITHIN 2 MINUTES

- The contestants must stop the robot when long whistling by the Referee, when the race officials' time clock is 2 minutes (120 seconds). The contestants stop their time clock.

- The distance travelled is measure using a measuring tape, from the race course area to the **most forward part/edge of the first leg or foot**



## 6. TERMINATION

- The robot's operator can terminate the race at any time. Termination includes physically touching the robot or using a human-operated wireless remote control device.

- If the operator terminates the robot's run prior to the starting of the time clock, then the robot will be allowed to restart the race.
- If the robot's operator terminates the robot's run after the start of the time clock, then the robot's run is terminated. The clock stops, and the distance the robot travelled at that point is recorded.
- The robot's operator is allowed to turn off the robot after it has reached the Finish Area, or after it has gone out of bounds.

## 7. RESTARTS

- If the operator terminates the robot's run prior to the starting of the time clock, then the robot will be allowed to restart the race.
- Robots will NOT be allowed to restart a run if they have any electrical, optical, acoustic, mechanical, or software failures after the start of the time clock.

## 8. SCORING/RANKING

- This is very simple, the robot with the fastest (i.e. shortest) time wins the race. All other robots will be ranked based on time. The fastest is awarded 1st place, 2nd place goes to the next fastest robot, and so on.

- There are times when not all robots complete the course. Ranking for these robots will be based on the total distance travelled, not on time, when the race time is over.

- The robot that travelled the farthest will be ranked higher than the robot that travelled a shorter distance.

- All robots that have completed the race will be ranked higher than robots that have not completed the course.

## 9. ADDITIONAL RACES

Additional races may be conducted at the discretion of the race officials. Additional races will not be conducted if there is not sufficient time for all of the robots to complete the additional races. If additional races are conducted, the robot's best overall score will be used in the final ranking.

## 10. VIOLATIONS AND PENALTIES

Any contestant violating any of the rules in this race will be disqualified.

## 11. RULES COMMITTEE

The event committee, rules committee, and race officials reserve the right to clarify, augment, or modify these rules in the interests of fair play. Changes should be published prior to the event. But in some rare circumstances a change in the rules may be implemented during event if it is found that someone is trying to violate the spirit of the rules by using a technicality in the rules that was unforeseen by the rules committee. Any changes will be made in the interest of fair play for all of the contestants.

## 12. ALL DECISIONS BY THE RACE OFFICIALS ARE FINAL

The rules committee should be consulted prior to the event if a robot has some unique feature that might be questionable according to the published rules. All inquiries will be kept confidential. The rules committee will provide an answer if the unique feature is permitted to be used, guidance in the design of the unique feature to remain in compliance of the rules, or in some cases, changes in the written rules to specifically address the unique feature.