



Cart Rolling Ball Maze Solving

League : Junior / Senior
Participant : 1 team 6 orang

Game description

Cart rolling ball maze solving aims to arrive at the destination point to arrive quickly by taking all the points in a row and the mission is to bring some marbles to the cart given in the game. The priority mission of solving the rolling ball maze is the fastest to complete by picking up all the points in a row and not dropping the marbles in the cart. So when driving a robot fast and accurate is important. Mechatronics is related to the production of knowledge and programming of robots using the principle of dynamics, so that the basics of understanding robots are sufficient to understand the robot itself about the needs and the laws of physics applied to robots and sensor adjustment technology, as well as programming skills.

Conditions of competition: -

1. Participant

1.1. The competition is open to participants from Indonesia and the Indonesian Foreign participants through the following categories :

1.1.1. **Cart Rolling Ball Maze Solving Junior Open Category** [age < 12 years old]

This category is open to all types of robot products.

1.1.2. **Cart Rolling Ball Maze Solving Senior Open Category** [age 12 - 19]

This category is open to all types of robot products.

1.2. Each team consists of a maximum of six (6) participants including:

1.2.1. Competitors must have at least one (1) participant and a maximum of six (6) participants.

1.2.2. Each participant (except assistant teacher/team manager) is only allowed to register/ join a team only.

1.3. Team registration must be done online at the website.

1.4. Eating & drinking are not provided.

1.5. The Robot Kit is not provided by the committee.

2. Robot

2-1. Robot type: No restriction

2-2. Construction (On site)

Participant has to construct all machinery parts of robot except the controller and while measuring the machine the assigned size has to be followed.

2-2-1. Built on-site The robot should be built on-site by the participant during the construction time except for the robot controller

2-2-2. Size:

Robot should be smaller than 18cm x 22cm(W x L)

The size of the cart for carrying marbles is smaller than 18cm x 18cm x 3cm (W x L x H).

2-2-2-1. Size measurement

- 1) Self-Check: Participant can check size of the robot in testing time of constructing zone.
- 2) Official inspection: Before the competition, referee will check the size of the robot.
- 3) Ways of Measuring: When the power of robot start to move will start to measure the equipment and participant cannot give any objection toward the judge.
- 4) Modify: If the size is over there is a minute to modify in front of the judge. If there didn't finish the job in given time it will be disqualified as overcharge size regulation.
- 5) Before checking on measuring the instrument and shape if the size is changes it will be disqualified.

2-2-2 Sensor of the Robot: No restriction

2-2-3. Power

2-2-3-1. Robots should work with an independent electric power supply; it cannot be a combustible device.

2-2-3-2. there is no limitation on type of battery or voltage.

2-2-4. Operation: No restriction

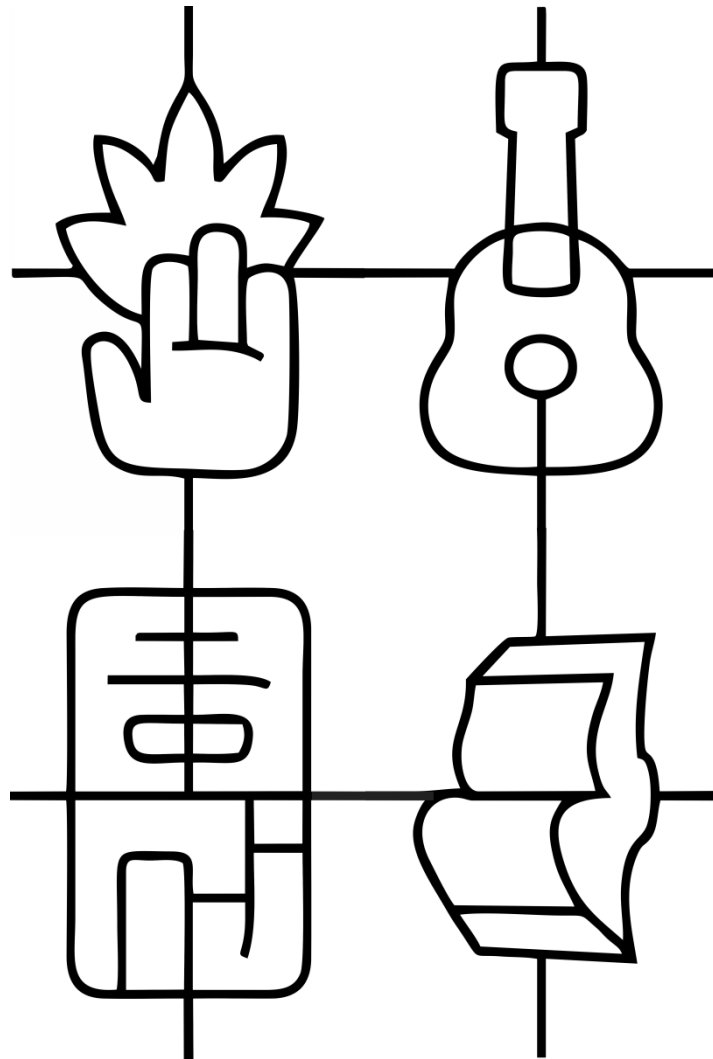
2-3. Robot must move autonomous by the program except the starting point and it cannot be operate by the outside.

3. Competition Site

3-1. Official Site: It must be an approval from IISRO Committee

3-2 .Size and Composition: Size has to be 160cm X 120 cm ($\pm 10\%$ and more than two blocks has to be connected.

EX



<Above the picture is example connection with bridge, arrangement, mission and line will be announce in the competition>

3-2-1. Connection

The size of competition has to be 25cm ($\pm 10\%$) and bridge is connected with straight line and curve field is stick with tapes and paper sheets.

3-2-2. Site error prohibited range

The gradient of site has to less than 2 ($\pm 10\%$) and there might be gap or bumpy which can be less than 3mm.

3-2-3 Prevention to stop falling robot

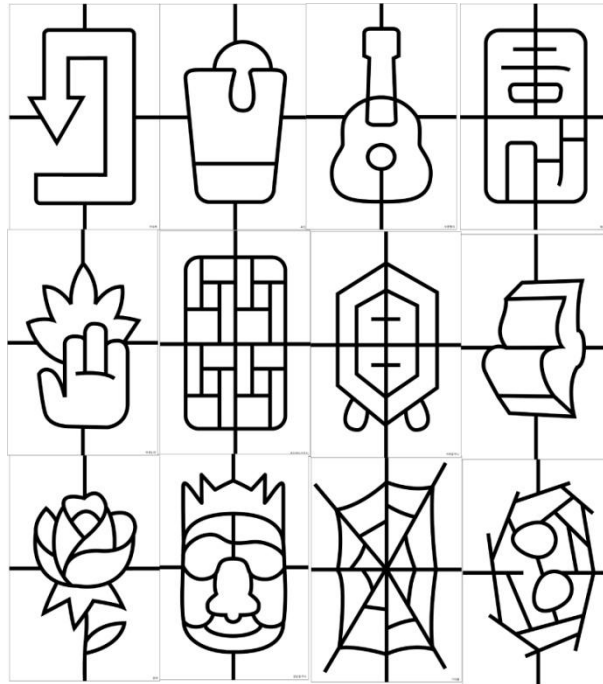
There will be no special structure for prevention to stop falling.

3-3 Field

It is cover with glossy coat sheet paper, advertisement, logo from the organizers.

3-3-1 Mission Map

It is constructing with intersection to Straight to Straight and Straight to curve and fix with sheets and tape in the field.



< Mission map is use as following example in Cart Rolling Ball Cart Rolling Ball Maze Solving 2022>

3-3-2 Line

The color of line is black width of 2cm ($\pm 10\%$)

3-3-3 Installation of measuring instrument

In order to measure the time , starting and ending point measuring instrument will be installed, according to mission the direction can be changed, structure that is connected to the field can be used.

4. Competition progress

4-1. Way of Game Method

Game will be result in two second of row and each time difference will be a rest time to check and repair once more.

4-2. Construction and practice time

Construction and practice time is less than 2 hours and it will post in competition day.

4-2-1. Allocation of competition site

It will allocate based on number of participant and level of difficulty of the game.

4-2-2 Production and Practice

Participants can do the practice until the end of posted production but before the game is prohibited.

4-3. 1st Run

After the construction and practice time the 1st run will begin.

4-3-1. Preparation of the game

All of the participant has to take the robot out and be ready from referee and volunteer's instruction.

4-3-2 After the game standby

When participant is finish with their game, they have to stay and watch all of the participant game until end of the competition day.

4-4 Repair Time

After the end of 1st run, the entire participant has 30minutes repair and practice time.

4-5. 2nd Run

After the repair time, 2nd Run will start to begin in the match.

4-5-1. Preparation of the game

All of the participant has to take the robot out and be ready from referee and volunteer's instruction.

4-5-2 Stand by

All of the participants finish with their game; they will go back to their seats.

5. Competition

5-1. Performing the mission

Course of run and order of carrying is not designated but participant can decided freely.

5-2. Start

They have to wait of sign from the referee and measuring instrument had started it will be the starting point. If they didn't start from the sign has to restart again.

5-2-1 Miss Start

If there was a miss start regarding the starting signs, time counted from 5 and the

robot doesn't start it will be miss start and there will be one more chance to the team.

5-2-2 Restart

There will be second chance (including first start make 3 times), if the team miss following with the chances, it will be miss start and impossible to start the move.

5-3. Arrival

Line installed in measuring instrument of the robot or arriving at intersection of the point(Robot needs to install the line of measuring instrument or stop at intersection point) had to stop the time measuring the instrument.

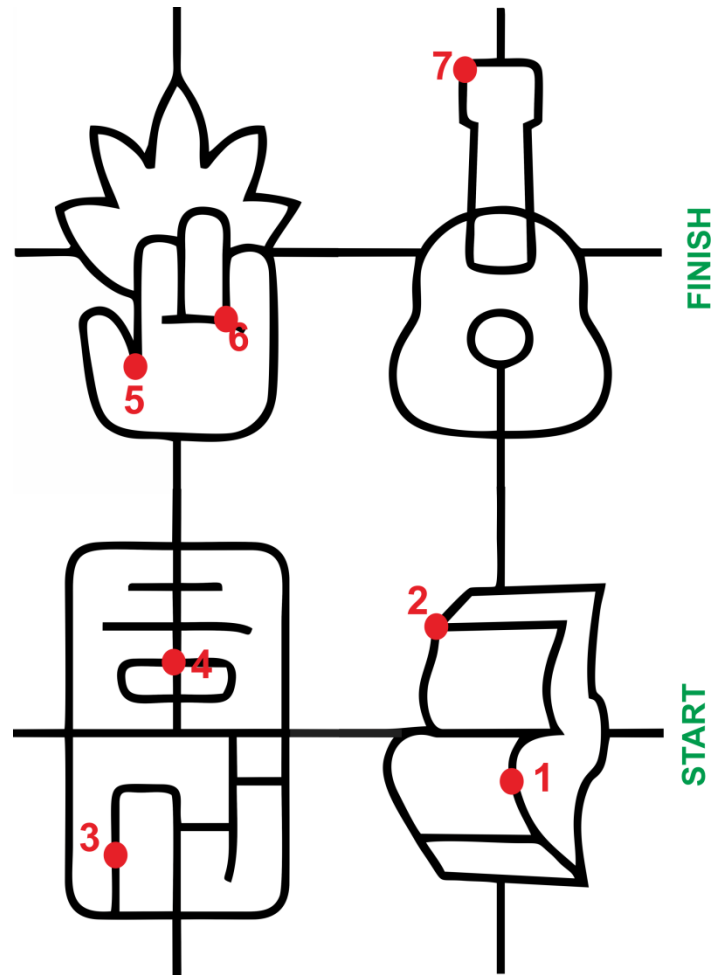
5-3-1 Mission

Robot arrives at the finishing point the referee counts until 3 second it will be admitted to reach the final stage of the game.

5-4 Limited Time

If teams do not complete the mission in two seconds, the match will be over and result will before the finishing point.

Ex) Example of the Mission



5-5 End of Competition

If robot could not continue match, referee will announce the match is over.

5-5-1 Robot Stop

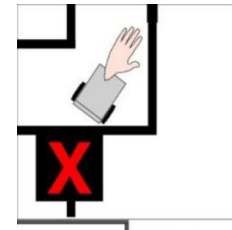
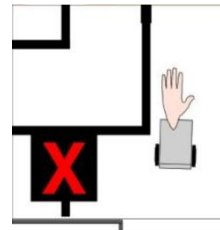
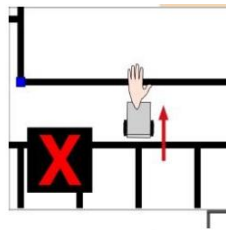
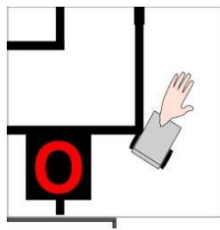
If the robot doesn't move the referee will count 10 seconds and if the robot still could not move call it a stop and count the points before reaching the end point.

5-5-2 TKO (technical knockout)

During the match, robot had been stopped over the structure and obstacle and could not start with the motion referee will decide the match cannot restart the reason of repeat motion of robot and it will be announce TKO and result will be admitted before the TKO.

5-5-3 leaving the line

If the robot is not on the line the match will be stop and before coming to this area resulted will be admitted.



<Decision of Line admittance>

< Decision in Leaving the line>

5-6 Due to disqualification of ending the match

During the match, when participant violate the rule or making interruption the match will be ended but result will be not admitted.

5-6-1 Robot Touch

During the match, participants touch the robot without judge and supervisor authorization it will be robot touch and disqualified.

5-6-2 Repair time during the match

During the match, additional, remove, exchange, changing the toll is prohibited but during the standby to repair the robot the participants has additional battery then the team will be disqualified.

5-6-3 Sensor turning

Before the competition, there was a sensor turning situation happen then it will be disqualified.

5-7 Rematches

During the match when it had been black out and breakdown of measuring instrument happens referee and coach can make a decision to do rematch.

6. Scoring the Result

6-1. Ranking decision article

Mission points and time record of the target, stop mission of finishing line.

6-2. Mission point

When the game finished, finally in the destination they will look over the object and decided the success of result. Some of target will be close to area and it's hard to look then it will be failure. The entire decision is upon the referee.

6-3. Time record

Time record is based on the measuring instruments.

6-4. Final score

Better score out of 1st and 2nd run will be the final score.

6-5 Order of priority to result

Groups will be divided according to the group and their record will be compare and result has to be decided, the arrival point if they succeed the stop mission the result will be on the top.

Number of success point > Time record > Success of stop mission> Compare to time result

6-5-1 Order of priority according to present

If is same result in the present time then the referee needs to look the other time of the record and decided the result.

6-5-2 Order of priority according to Tie-Breaker

In order to sum up the best result from first and second chance, if it's a tie it will be 1st to be in best rank.

※ Common

1. Seat and electricity use

1-1. Seat

IISRO Committee chooses participant's seat and it's not negotiable. Failure to obey may lead to cheating will give a penalty to the team.

1-2 Electricity use

Two participants are seated in one table. One power socket is given per each participant. Participants are allowed to bring and use multi-tab

2. Computer use

Participant who needs the computer to use in competition, they need to bring it but notebook which had battery inside is prohibited. Mostly in competition sites the electricity is not that stabled so computer which does not assist the battery could happen in serious accident toward the participant.

3. Match place environment

3-1. Light interference

Participant should be prepared to control robots under electrical lightings, sun- lights, and photographing.

3-2. Signal interference

Participant should be prepared to control robots under electrical signal interference by electrical material, communication device.

4. Carry restriction and prohibition

4-1. Carry restriction

Participant can carry storage devices including MP3 player, PMP but make sure that it is switched off before entering the playfield. If this misbehavior is found, he is disqualified.

4-2. Carry prohibition

Participant cannot carry storage devices including USB memory, and any material related with robot and manual. Also it is not allowed during competition. If this misbehavior is found, he is disqualified.

5. RFID card: Must wear around neck to participate.

6. Uniform: Participants has to wear the official inform to participant in the tournamen

7. Material prohibit

7-1. During the match

No material is allowed during competition. Material must be delivered to students before competition begins. If this misbehavior is found, he will be asked to leave.

7-2. Lunch time

If lunch time is included during the match, you are not allowed to carry any materials out of playfield. Also you are not allowed to bring any materials in the playfield after lunch time.

8. Cheating

If cheating is found, warning is given at the first time, and disqualification is given at the second time.

8-1 Leave

8-1-1. Communication with spectators or other participan

8-1-2. Use of part of robot that is not authorized before matc

8-2. Warning (gain two warning lead to leave)

8-2-1. Touching or damaging other participant's robot, laptops, or belongings

8-2-2. Not obeying referee or marshal. Disrupting order

9. Site arrangement

Referee and supervisor can assign practice playfield and restrict practice time per participant / team to manage equal and fair practice time.

10. Match result confirmation

Participant should be prepared to control robots under electrical lightings, sun-lights, and photographing

11. Duplication of participate

It is possible to participant in each event but it is assigned in same day, it is upon to the participant. But there will be no extra time.

12. Others

Committee will decide other unspecified rules and notify on match day. It is not allowed to object.