

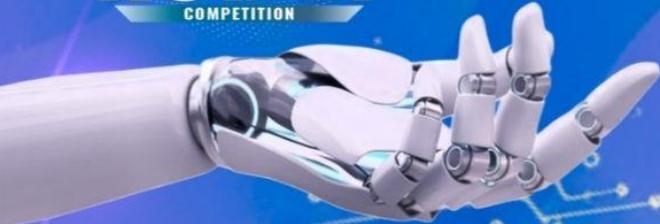


DIRECTORATE GENERAL OF  
VOCATIONAL AND TECHNICAL  
EDUCATION



# 18th INTERNATIONAL MEB ROBOT COMPETITION

**LINE FOLLOWING BASIC LEVEL  
CATEGORY GUIDE**



TÜBİTAK C\*TIKA

2026

## CONTENTS

<b>1. GENERAL INFORMATION ABOUT THE COMPETITION.....</b>	<b>3</b>
1.1. PURPOSE.....	3
1.2. THEME .....	3
1.3. PARTICIPANT REQUIREMENTS AND TEAM STRUCTURE .....	3
1.4. THE CRITICAL IMPORTANCE OF READING THE GUIDELINES.....	3
<b>2. TECHNICAL SPECIFICATIONS AND CONSTRAINTS OF THE ROBOT .....</b>	<b>5</b>
2.1. SIZE AND WEIGHT RESTRICTIONS .....	5
2.2. PERMITTED MATERIALS AND COMPONENTS.....	5
2.3. SOFTWARE AND CONTROL REQUIREMENTS.....	6
<b>3. COMPETITION AREA AND TASKS.....</b>	<b>7</b>
3.1. SHAPE AND DIMENSIONS OF THE COMPETITION AREA/TRACK .....	7
3.2. DESCRIPTION OF TASK OBJECTS AND COMPONENTS.....	9
<b>4. COMPETITION FORMAT AND EVALUATION CRITERIA .....</b>	<b>10</b>
4.1. APPLICATION AND REPORTING PROCESS.....	10
4.1.1. <i>Line-Following Robot Movement Video</i> .....	10
4.1.2. <i>Robot Visualisation</i> .....	11
4.2. COMPETITION STAGES .....	11
4.2.1. <i>Preliminary Round</i> .....	11
4.2.2. <i>Ranking Competitions</i> .....	11
4.2.3. <i>Final Round</i> .....	14
4.3. COMPETITION DURATION AND BREAK USAGE.....	15
<b>5. ETHICAL AND OTHER RULES.....</b>	<b>15</b>
5.1. DISQUALIFICATION AND PENALTY SITUATIONS .....	15
5.2. APPEAL PROCEDURE.....	16
5.3. WARNINGS AND ETHICAL RULES FOR COMPETITORS .....	16
5.4. SAFETY MEASURES.....	16
5.5. AUTHORITY OF THE COMPETITION ORGANISING COMMITTEE .....	16
<b>6. CONTACT .....</b>	<b>17</b>
6.1. QUESTION AND ANNOUNCEMENT TRACKING CHANNEL .....	17
6.2. COMPETITION COORDINATION INFORMATION .....	17
<b>7. ATTACHMENTS.....</b>	<b>18</b>
7.1. COMPETITION CARD.....	18

## LINE-FOLLOWING BASIC LEVEL CATEGORY COMPETITION RULES

### 1. GENERAL INFORMATION ABOUT THE COMPETITION

#### 1.1. Purpose

Line-following robots are designed to autonomously follow a black line on a white surface or a white line on a black surface. In industrial settings, these autonomous line-following robots are used for continuously transporting goods from one location to another. The task involves marking the path line that the robots will follow on the surface. The key factors ensuring that line-following robots do not lose the line are correct programming, hardware control, and speed.

Autonomous line-following robots in this category attempt to complete the route in the shortest time and without errors by following the white lines on the black track. The basic level line-following robot category also aims to popularise R&D processes at secondary education level. In this process, students are expected to access information, use this information effectively, analyse the problems they encounter and produce solutions, gain access to new technologies, and develop their coding skills through group work.

#### 1.2. Theme

Autonomous line-following robots in this category begin the competition simultaneously with the automatic opening of the gate. The objective is to follow the white lines on the black track and complete the course faster and without errors than the opponent.

#### 1.3. Participant Requirements and Team Structure

Secondary school students can participate in this category. Teams can consist of two students and one supervising teacher. Supervising teachers are not allowed to enter the competition area. Only the two students on the team can enter the competition area. One student is responsible for setting up and starting the robot at the starting point; the other teammate waits at the finish point. If the robot veers off course, the student waiting at the starting point may intervene.

#### 1.4. The Critical Importance of Reading the Guidelines

The International MEB Robot Competition is a contest that brings together young talents' technical knowledge, engineering skills, and creativity. In the Line-Following Basic Level

Category , competing teams are expected to design robots with the mobility to successfully complete their tasks on a specially prepared course.

However, reaching the top in this exciting competition does not depend solely on the robot's physical strength or coding skills. The real success of the competition lies in the robot's technical competence, along with the ability to carefully read and understand the guidelines covering rules and procedures.

The Application and Category Guidelines are more than just a technical guide; they are an integral part of the competition itself. Careful reading should be considered a fundamental skill of vital importance in modern engineering projects.

Therefore, the prepared guidelines clearly specify technical constraints specific to the Line Follower Basic Level category, such as the robot's dimensions, weight, propulsion motor, and electronic system limits. Failure to comply with these rules will result in the robot being disqualified from the competition, regardless of its performance.

The scoring systems included in the guidelines detail the order and precision with which tasks must be performed. Teams that read the guidelines thoroughly can optimise their robots according to the task strategy that will yield maximum points and gain an advantage over their competitors.

As the competition process is dynamic, last-minute changes to the rules or applications may occur. Therefore, it is critical that competitors do not rely solely on their initial reading but regularly follow the announcements on the International MEB Robot Competition website and the content in the Basic Level Line Follower category.

All teams applying to the Line Follower Basic Level category of the 18th International MEB Robot Competition must read the Application Guide (accessible from the "Organisation" menu at <https://robot.meb.gov.tr>), which contains the competition applications and general rules for the category.

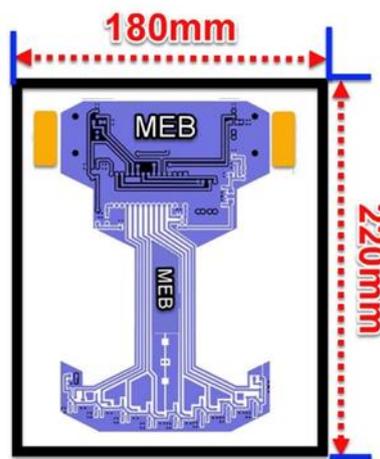
Understanding the guidelines is as challenging and important an engineering task as designing the robot. Diligence in this task is the first step towards success.

## 2. TECHNICAL SPECIFICATIONS AND CONSTRAINTS OF THE ROBOT

### 2.1. Dimension and Weight Constraints

Robots competing in the Line-Following Basic Level category at must not exceed 220 mm in length and 180 mm in width. A 1% tolerance is acceptable for dimensions. (Including wheels)

The maximum weight, including the battery, must not exceed 500 grams, though a 2% tolerance in weight is permissible.



*Figure 1. Basic level robot dimensions*

### 2.2. Permitted Materials and Components

**Control board:** Any microcontroller or ready-made microcontroller boards (excluding those with Wi-Fi and Bluetooth) may be used.

**Motor driver:** Ready-made Motor Shields (Motor Driver Modules) or motor drivers you have prepared using any electronic components can be used.

**DC motor:** A 6-12V plastic-cased DC motor with an L reducer must be used.

**Wheel:** A wheel with a diameter not exceeding 65 mm and a thickness not exceeding 30 mm shall be used. Competitors may manufacture wheels with these specifications or use ready-made wheels with these specifications.

**Line Sensor Board:** A maximum of 8-channel analogue or digital line sensor boards may be used.

**Sensor for automatic door:** A digital or analogue sensor with a minimum detection distance of 2 cm must be used to detect when the door is open.

**A battery box and a caster wheel** may be used optionally.

Robots participating at the basic level must have 2 motors and 2 wheels.

Vacuum motors or fans cannot be used.

The operating voltage of the robots during the competition must not exceed 16 volts.

Batteries must be leak-proof, non-spillable electrolyte type (gel cell, lithium, Lipo, NiCad, or dry cells).

Robots must be wireless and autonomous. The robot must not contain Wi-Fi, Bluetooth, or RF modules.

### 2.3. Software and Control Requirements

Robots in the Line Following Basic Level Category must operate autonomously. The robot will move when the automatic gate on the course opens. The robot must detect and understand that the gate has opened. If the robot does not move autonomously after the gate opens, it will be penalised with 40 seconds for failing to start. The competitor is given two attempts to start. On the second attempt, manual operation is permitted. Robots that fail to start twice will be disqualified.

There will be no metal gear inspection on the robots. Motors must have plastic-bodied L reducers.

### 3. COMPETITION AREA AND TASKS

#### 3.1. Shape and Dimensions of the Competition Area/Track

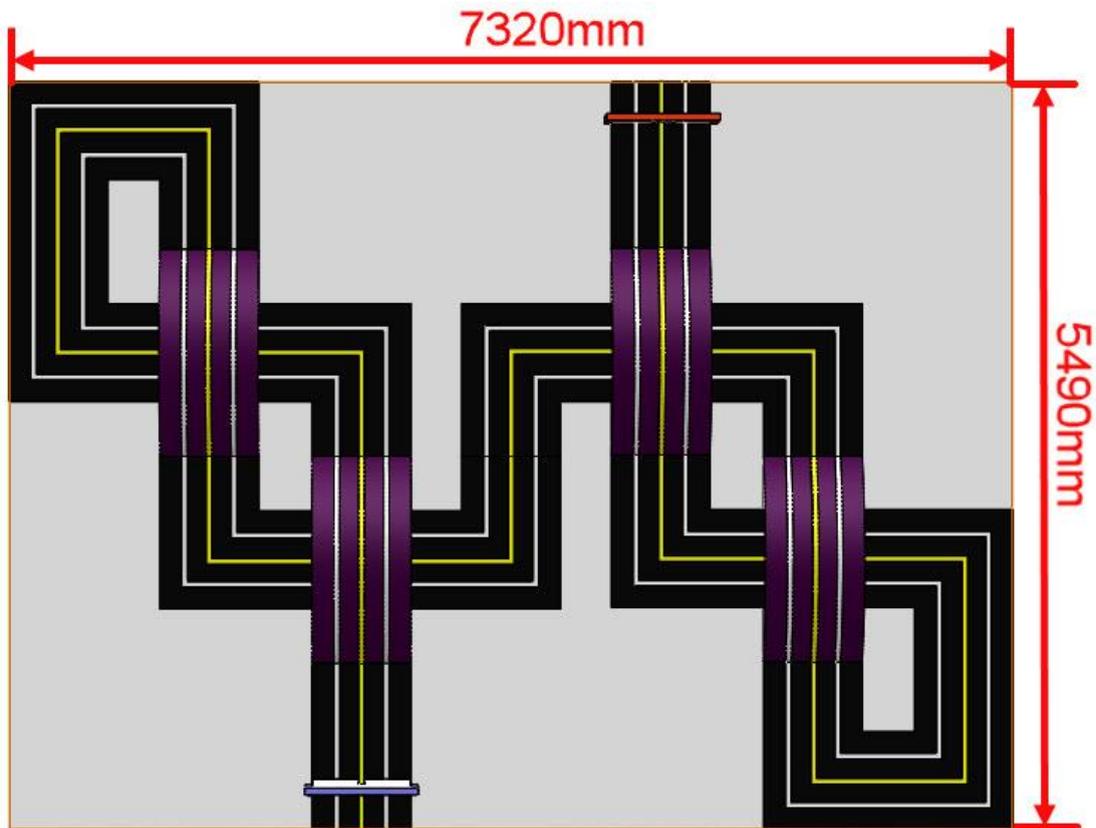
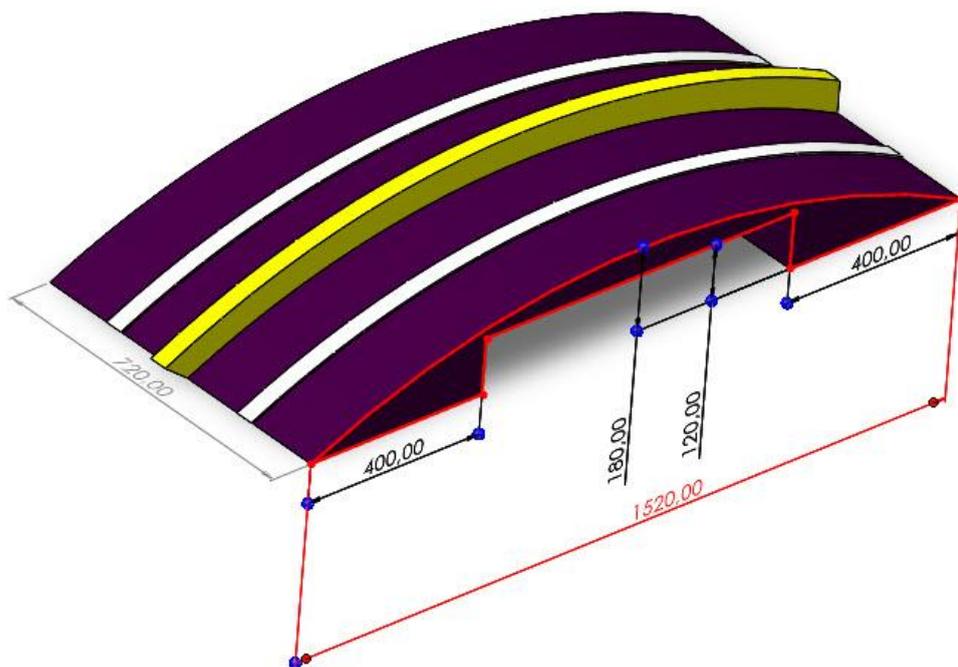


Figure 2. Shape of the competition track



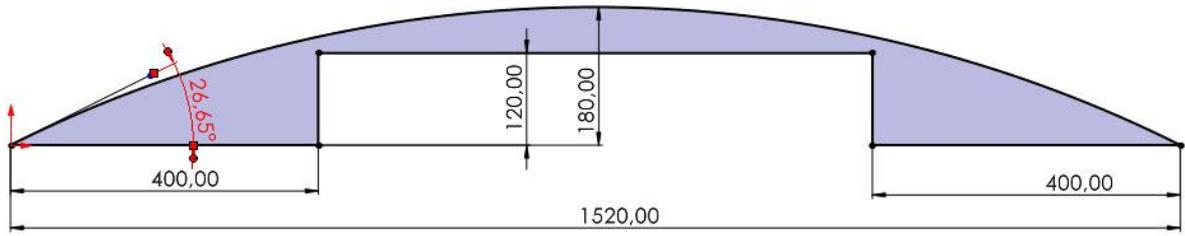


Figure 3. 3D view and dimensions of the bridge

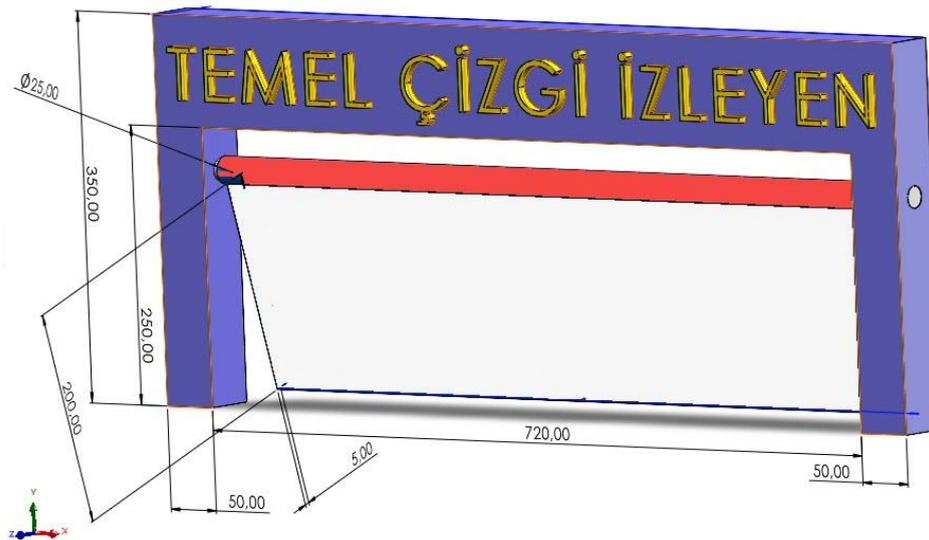


Figure 4. Dimensions of the automatic door

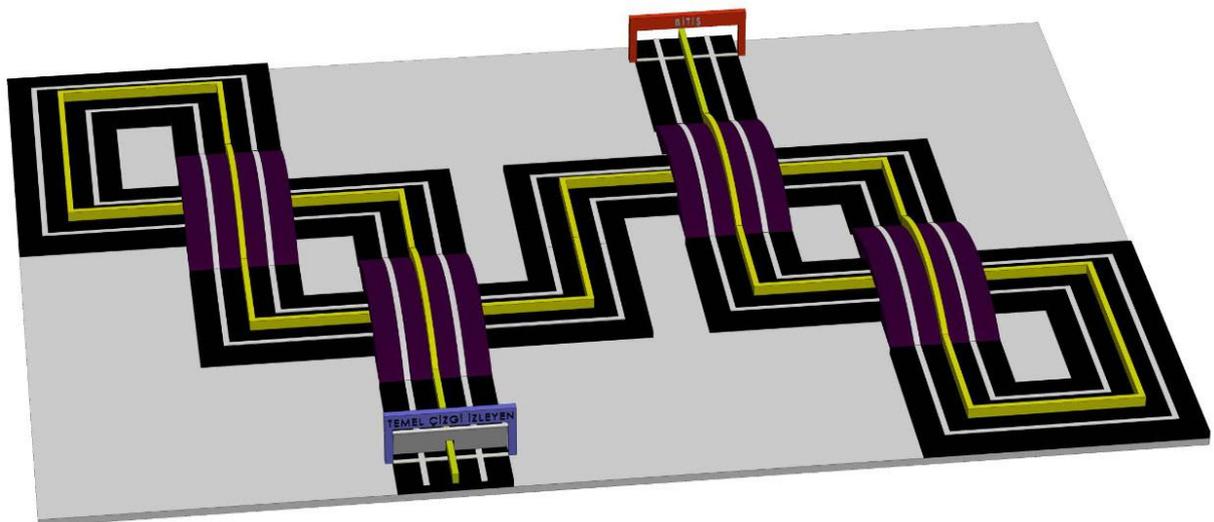


Figure 5. 3D view of the competition track

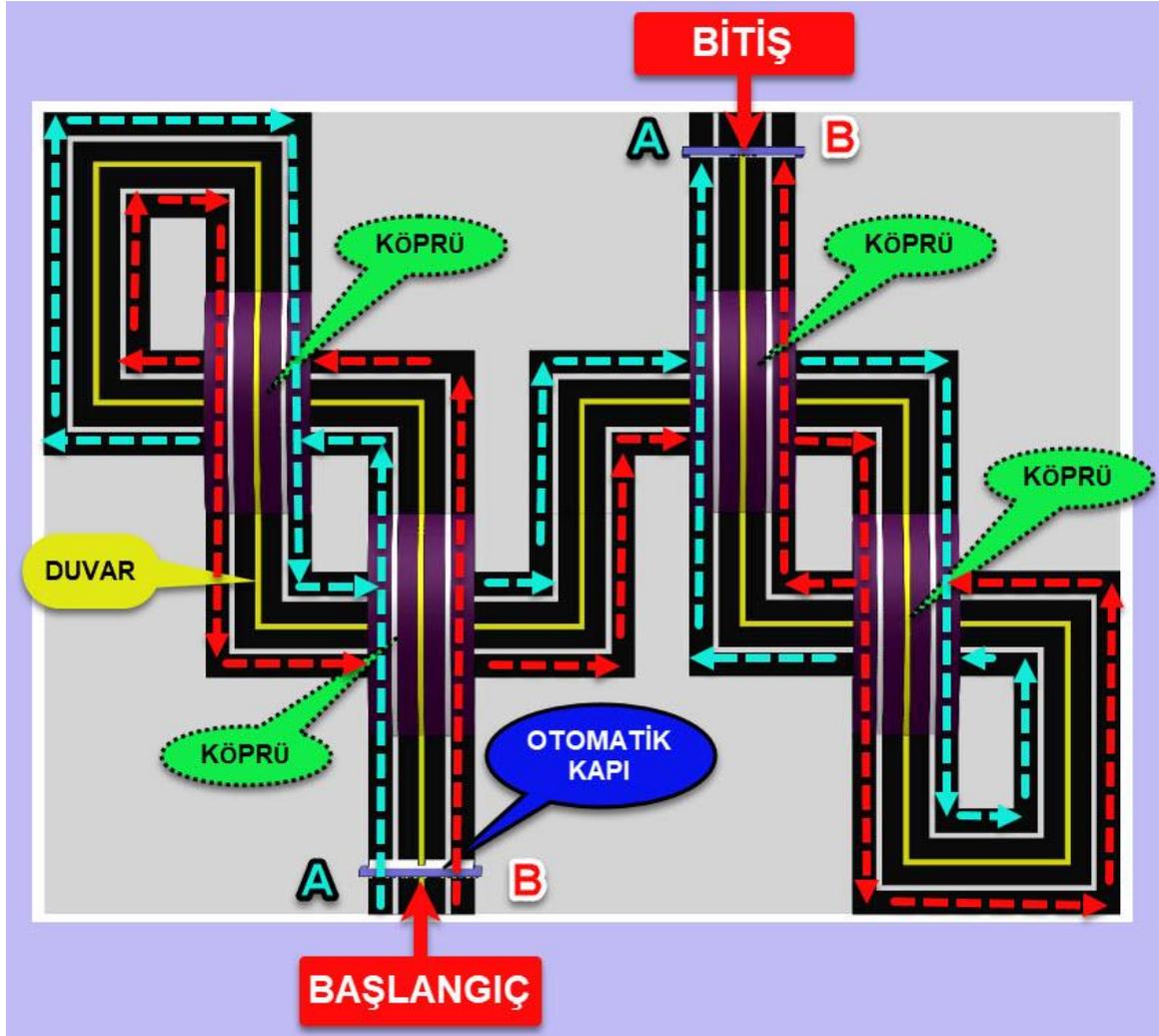


Figure 6. Movement directions of the robots

### 3.2. Description of Task Objects and Components

#### Information about the Competition Track

1. The roads are black with white lines. The road width is 720 mm.
2. The road is made of 5 mm thick black matt deco material (Forex Panel Decota-PVC Foam). The joints of the road sections are covered with black matt foil.
3. The road lines on the black surface are made of white matt foil with a thickness of  $20 \pm 2$  mm.
4. There are four bridges on the track, each approximately  $27^\circ$  angled, 1520 mm long and 720 mm wide (see Figure 3).

5. The road on the bridge is made of black matt deco and has a  $20\pm 2$  mm thick white road line on it.
6. The opening section of the automatic gate located behind the starting line is white in colour, and the gate dimensions are shown in Figure 4.
7. At the finish line edges, there are sensors, 10 mm high, for each robot individually..
8. The exact centre point of the competition track is separated by a 10 mm wide, 50 mm high material along the road. A wall is placed to prevent robots from colliding with each other. This wall will be yellow in colour.
9. The starting line is positioned 300 mm ahead of the front of the decot.
10. The automatic gate is positioned at the end of the starting line.
11. The finish line is located 300 mm inside the end of the track.
12. There are two stopwatches consisting of p10 panels to measure the robots' track completion times. The stopwatches start counting when the automatic gate opens and stop when the robot passes the sensor located at the finish line.
13. There will be two identical tracks in the competition area. These tracks will be named Track-1 and Track-2. The dimensions of these tracks are identical.

#### 4. COMPETITION FORMAT AND EVALUATION CRITERIA

##### 4.1. Application and Reporting Process

The headings Programming Language, Approximate Budget, and Materials Used in Robot Construction included in the robot production report will not be considered within the scope of the evaluation. The evaluation process will be conducted based on the Line-Following Robot Movement Video, which demonstrates the robot's mobility and ability to perform its basic tasks, and on robot visuals.

##### 4.1.1. Line-Following Robot Movement Video

Participating teams are required to upload a **movement video** demonstrating that their robot meets the specified criteria. The conditions for the video are outlined below:

- The video duration must be **at least 1 minute and no more than 3 minutes**.

- The video must clearly show the robot performing the following movements on a track:
  1. At least one 90° turn,
  2. At least one curved turn,
  3. Demonstration of the robot moving when an obstacle/door in front of it is opened.  
(Use of a door is not mandatory; it is sufficient for the robot's starting point to be clearly visible.)
- During video recording, **the robot's name and the school's name** must be displayed in the centre of the track **in uppercase letters and in a legible manner**.
- The video must be filmed at an angle that clearly shows the robot's movements, in 720p resolution, and in landscape orientation.
- The video to be prepared as part of the application will be uploaded to the YouTube platform and the link address will be entered in the 'Video URL' section of the production report.

#### 4.1.2. Robot Image

As part of the application, **three photograph** clearly showing the robot will be uploaded to the system.

1. **The robot's name and the school's name** must be clearly legible and preferably **in capital letters** on the photograph.
2. The photograph must be taken in such a way that it clearly shows the overall structure and design of the robot.

#### 4.2. Competition Stages

##### 4.2.1. Preliminary round

Preliminary rounds will be conducted among teams that upload the robot movement video and robot image in accordance with the specified criteria.

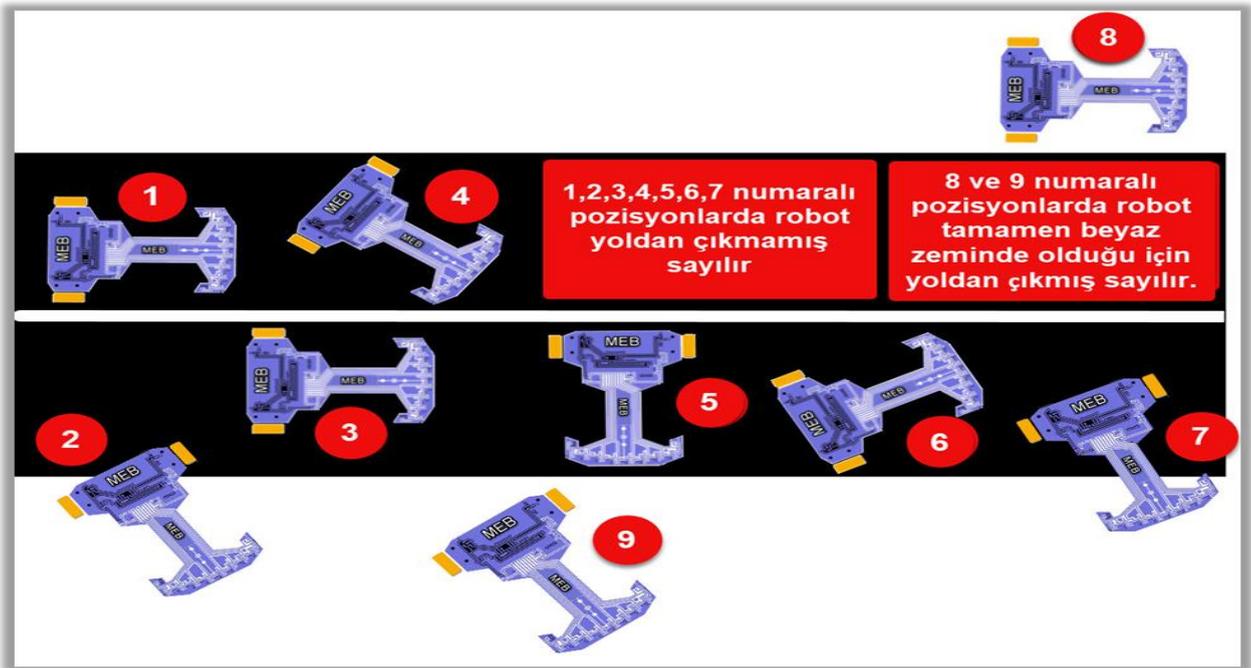
##### 4.2.2. Ranking Competitions

1. In the ranking competitions, each robot competes in pairs. The track on which the robots will race is determined by computer draw (Track-1 or Track-2). At the same time the draw also determines which of the tracks A and B each robot will compete on.

2. Before the race begins, the robots' dimensions are tested in a test box. (The test box measures 220 x 180 x 65 mm).
3. The weight of robots that pass the test box is measured and recorded by the referees. The weight measurement includes the battery. If any irregularity is detected, the robot is disqualified.
4. The robots complete one lap on the track. They are ranked based on their total completion times.
5. The robots' race completion times will be recorded using the stopwatches on the track. The stopwatches will start counting when the automatic gate at the starting line opens. When the robots complete the track and cross the finish line, the stopwatches will stop counting, ending the race.
6. The automatic gate opens with a referee signal. A robot that fails to start within 10 seconds of the gate opening will be penalised with 40 seconds. Competitors have two start attempts.
7. Robots must move along the track in accordance with the direction of movement shown in Figure 6.
8. It is essential that the robots follow the line. The robot leaving the track means that the robot's body has completely left the black surface. During the robot's movement, if any part of the robot is on the black surface, the robot continues the race.
9. If the robot collides with the wall at the centre of the track ( ), no intervention is made. If the robot continues on its path, it is waited for. If the robot collides with the wall and stops or gets stuck, it is picked up from that point and placed behind the starting line to continue the race. In this case, the stopwatch continues to count. This right is given to competitors once. If the robot leaves the track a second time or remains stationary on the track, it is considered to have failed to complete the track and is disqualified.
10. If the robot collides with the side or middle wall while passing under the bridge, no intervention is made. If the robot continues on its path, it is waited for. If the robot collides with a wall and stops or gets stuck, it is picked up from that point and placed behind the starting line to continue the race. In this case, the stopwatch continues to

count. This right is given to competitors once. If the robot leaves the track a second time, it is considered to have failed to complete the track and is disqualified.

11. If the robot leaves the track (i.e., the robot's body completely leaves the black track and lands on the white ground), the robot is placed behind the starting line and the race continues. A 20-second penalty is given for leaving the track. This situation is applied to a competitor once. If the robot leaves the track a second time, it is considered to have failed to complete the track and is disqualified.



**Figure 7:** The robot's positions on the track

12. If the robot leaves the track a second time (as determined by the referee), the competition ends. The other robot is expected to complete the track, and its completion time is recorded.
13. If the robot fails to climb onto any of the bridges on the track or falls off a bridge, it is disqualified.
14. During the competition, a 10-second waiting period is given for robots that stop on the white line in any section of the track. Robots that remain stationary are disqualified. It is forbidden for competitors to intervene when a robot is stationary.

15. Robots that leave their own track area and collide with another robot by entering its track area during the competition are disqualified. The other robot's time is determined by restarting the competition.
16. The robots' ranking times are determined by adding their race completion times to any penalty times incurred.
17. The total time is calculated as [(stopwatch time + total penalty time)].
18. At the end of the qualifying rounds, robots are ranked based on their best times. The top 32 robots in this ranking qualify for the final rounds.
19. In the event of a tie in total time, the robot with the fewest penalty points advances to the next round.
20. If the total time and penalty points are equal, the robots' weights are considered, and the lightest robot advances to the next round.
21. If the tie remains unbroken in the above cases, the total age of the competing students is considered. The robot of the team with the youngest age gains priority in the ranking.

#### 4.2.3. Final Round

1. The 32 robots with the best times qualify for the final. The robots that qualify for the final compete in pairs in an elimination format. The robot that completes the track first qualifies for the next round. The track on which the robots will compete is determined by computer draw (Track-1 or Track-2). The draw also determines whether the robots will compete on the A or B route. In the final competitions, the robots compete once.
2. The rules for exiting the track during the elimination round apply in the final races.
3. The final competitions will be held using a pair-by-pair elimination system. Out of 32 robots, 16 will advance to the second elimination round. In the second round, these 16 robots will again be paired, and 8 robots will advance to the next round. In the third elimination round, these 8 robots will be paired, and 4 robots will advance to the semi-finals. The two winning robots from the semi-finals will advance to the grand final, while the two eliminated robots will compete for third place. The grand final will determine the first and second place robots.

### 4.3. Race Duration and Break Usage

After being called onto the field, each competitor must reach the table referee within 5 minutes. Robots must complete the course within 2 minutes after the referee's starting signal.

Competitors are not granted any time for breaks, maintenance, or repairs.

## 5. ETHICAL AND OTHER RULES

### 5.1. Disqualification and Penalty Situations

1. Competitors who fail to comply with the rules specified in the application guide, engage in unethical behaviour, or violate the technical specifications shall be disqualified.
2. Robots must not leave a permanent mark or trace on the track or cause damage. Robots that damage the track will be disqualified.
3. Robots may use an energy source such as a battery or battery pack. They may not use liquid flammable energy sources.
4. During the competitions, no changes may be made to the robots other than changing the rubber tyres and batteries. Any physical appearance changes, such as changing the robot body, will result in the robot being disqualified.
5. During competitions, robots will be disqualified if the QR code affixed to the registration desk is removed, relocated, or damaged.
6. Robots that do not match the competitor robot photos registered in the system at the referee's desk will be disqualified.
7. When electronic components need to be replaced, they may be replaced with components of the same type in the same location. The QR code must not be damaged during component replacement. Otherwise, the robot will be disqualified.
8. The QR code must be affixed to the robot body. It must not be affixed to removable materials. In such cases, the referee will disqualify the robot if there is an issue with it.
9. During the construction phase, modifications to the track dimensions may be made provided they do not compromise the overall structure.
10. During competitions, any objections made due to the illuminated scrolling text, cameras, and lighting around the track shall be deemed invalid.

11. The Competition Organising Committee reserves the right to amend the rules as deemed necessary.

## 5.2. Appeal Procedure

Appeals must be submitted to the competition organisation via the system **within 30 minutes** of the conclusion of the relevant round.

Appeals submitted outside the specified timeframe **will not be considered**.

Appeals are evaluated by the competition committee, and the decisions made **are final**.

## 5.3. Warnings and Ethical Rules for Competitors

During the competition, **it is strictly prohibited to interfere with the referees and technical advisors from the stands or outside the competition area**.

It is prohibited to interfere with students on the field in any way from the stands.

Supervising teachers and team officials must comply with the competition rules and general rules of courtesy.

Supervisors and teams who fail to comply with the rules or exhibit inappropriate behaviour towards referees or the organisation **may be disqualified from the competition by decision of the organising committee**.

## 5.4. Safety Measures

Competitors are required to bring their robots to the competition area in **secure transport boxes**.

Competitors may not interfere with any robots or tracks in the competition area **other than their own**. Competitors who violate this rule **will be disqualified immediately**.

## 5.5. Authority of the Competition Organising Committee

The Competition Organising Committee **has the authority to revise the competition format** as deemed necessary.

These changes will be communicated to competitors through official channels and are binding for all teams.

## 6. COMMUNICATION

### 6.1. Question and Announcement Tracking Channel

All announcements made during the competition must be followed through the official platforms designated by the competitors.

**Rankings, pairings, and new competition dates and times** following the completion of competition rounds will also be announced via these platforms.

### 6.2. Competition Coordination Information

Communication regarding the competition will be provided through the official email address, telephone number, and responsible unit to be announced.

Competitors must use only these official communication channels.

## 7. ATTACHMENTS

### 7.1. Competition Card

18. ULUSLARARASI MEB ROBOT YARIŞMASI TEMEL SEVİYE ÇİZGİ İZLEYEN KATEGORİSİ MÜSABAKA KARTI							
<b>TARİH SAAT:</b> ..../.... /2026 .... /....	TUR << TUR >>		<b>MÜSABAKA NO</b> «MacKodu»				
<b>I.ROBOT</b> «BİRİNCİYARISMACI»	ROBOT NO ROBOT ADI		<b>II. ROBOT</b> «İKİNCİYARISMACI»				
GELMEDİ FARKLI Robotu sistemdeki fotoğrafıyla kontrol ederek işaretleyiniz.	GELDİ AYNI			GELMEDİ FARKLI Robotu sistemdeki fotoğrafıyla kontrol ederek işaretleyiniz.	GELDİ AYNI		
		<b>AĞIRLIK</b>					
A PİSTİ O	SAHA	1 O	2 O	B PİSTİ O			
	<b>I.ROBOT</b>		<b>II.ROBOT</b>				
Start yapamama cezası	40	40	Diskalifiye		40	40	Diskalifiye
Yoldan çıkma cezası	20	Diskalifiye		20	Diskalifiye		
Köprüden düşme	Diskalifiye		Diskalifiye				
Yol üzerinde duraklama (30sn )	Diskalifiye		Diskalifiye				
KRONOMETRE SÜRESİ							
TOPLAM SÜRE							
Yarışma ile ilgili özel bir durum oluşmuşsa aşağıya yazınız.							
HAKEMLER (İMZA)							
KONTROL HAKEMİ	MÜSABAKA HAKEMLERİ			MASA HAKEMİ			
	1.HAKEM	2.HAKEM	3.HAKEM				
Bu kart, tur bitiminde TEMEL SEVİYE ÇİZGİ İZLEYEN Baş Hakemine teslim edilecektir.							