



REPUBLIC OF TURKIYE
MINISTRY OF NATIONAL EDUCATION
The General Directorate
of Technical and Vocational Education

15th INTERNATIONAL MoNE ROBOT CONTEST

LINE FOLLOWER BASIC CATEGORY RULES



RULES

Objective

Line follower robots are designed to be able to follow white line on black ground or vice versa autonomously. They are commonly used to carry goods from one place to another in industry. It is just enough to draw only lines on ground of plant to do this. The most important points for line follower robots are correct program, hardware control and speed.

In this category, autonomous line follower robots try to finish courses in shortest time and faultless by following white line on black ground or black line on white ground.

Aim is to finish the course in best time and with minimum penalty points

Robot dimensions

Robot has max.280mm length and 180mm width.(include wheels)

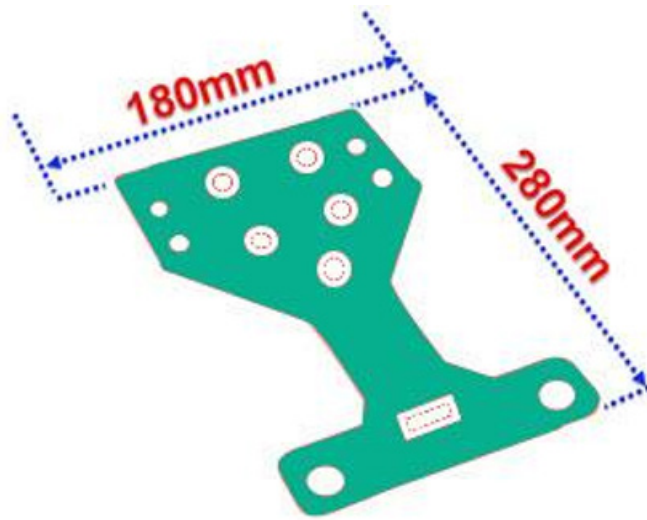


Figure 1 . Robot dimensions

Equipments

Control board: Any microcontroller board or user products

Driver module: Commercial motor driver shields or user products

DC motor : 6-12V 250rpm DC drive plastic gear Motor

Wheels : max diameter 65mm and width 30mm. Competitors can built their own wheels or can use commercial products.

Sensor array board with max. 8 sensors

Battery box and ball caster can be used.

Robots must have 2 motors and 2 wheels.

Using vacuum motor is forbidden

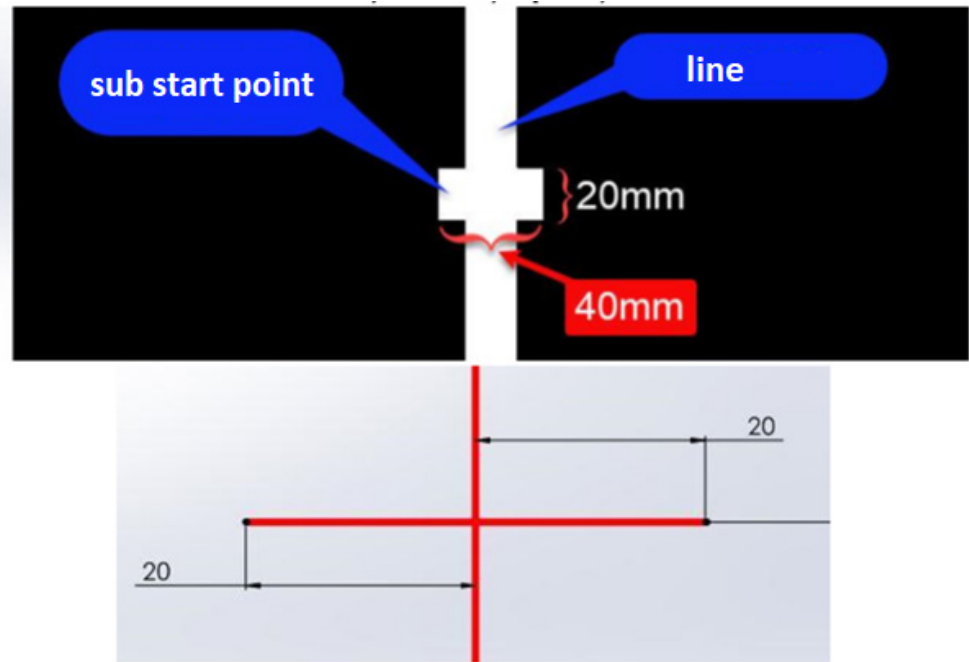


Figure 3 Sub start line dimensions

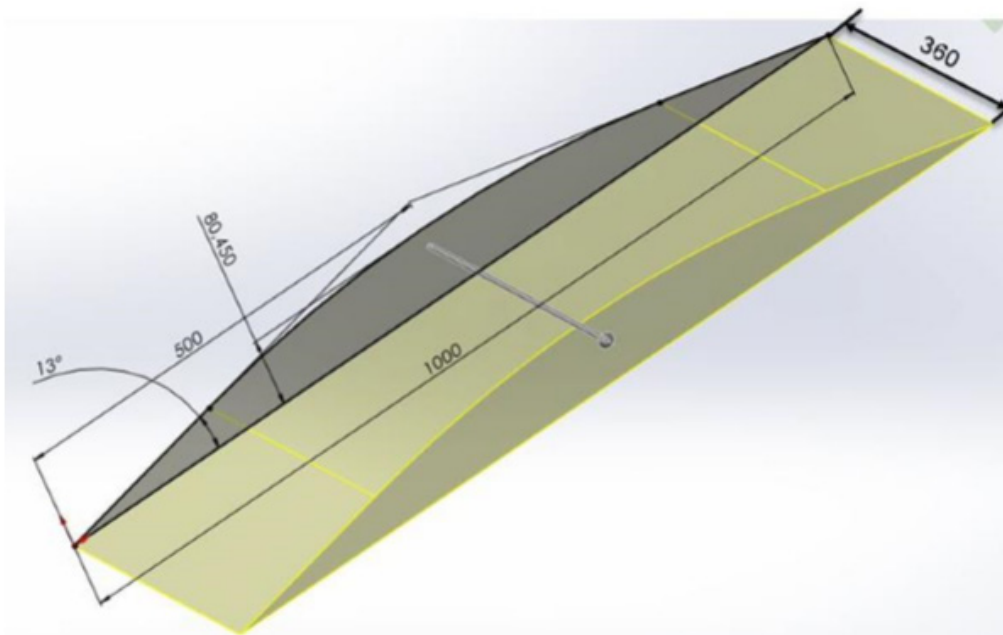


Figure 4 Bridge dimensions

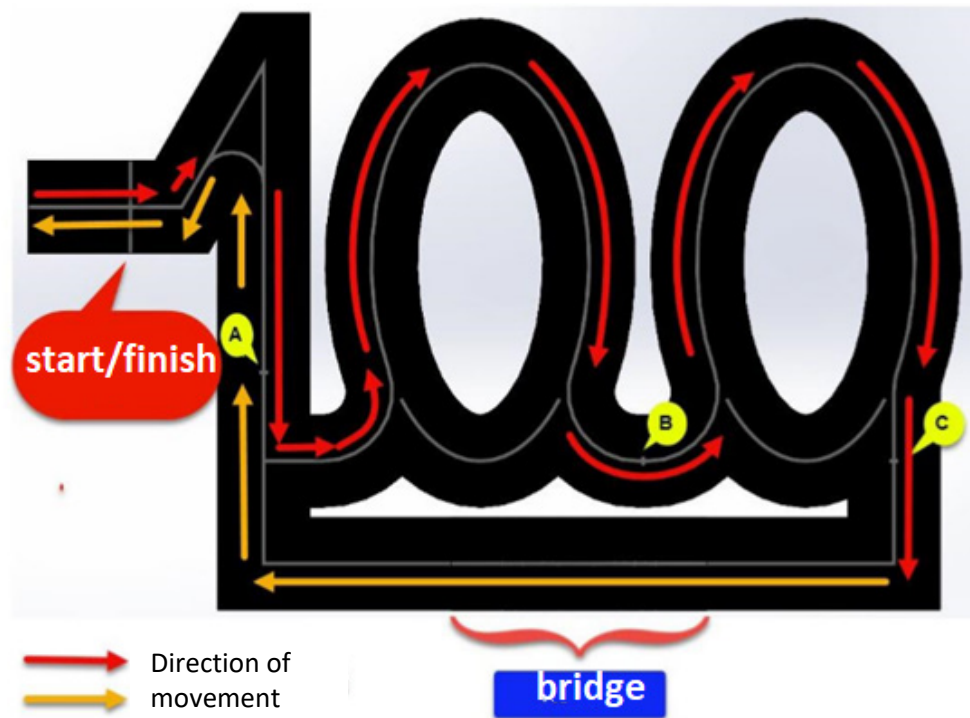


Figure 5 Movement directions and sub starting lines



Figure 6 3D view

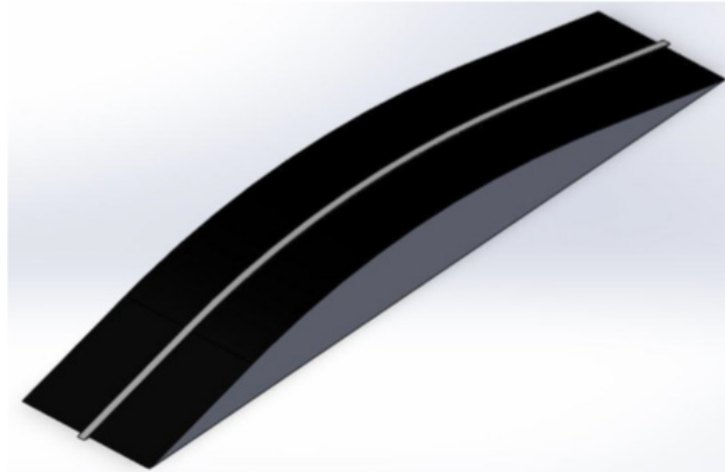


Figure 7 Bridge 3D view

Qualification Races

1. Each robot will run one by one. The order of competitors is determined by computer.
2. Before the race, robot is tested by using test box (Test box dimensions: 280x180x65mm)
3. Robots complete one lap on the track.
4. Race will be held against the time. Lap time will be recorded by chronometer.
5. Sensors are used to determine lap start and end. When the robot passes through the starting line, chronometer will start by the help of sensors. When robot passes through start/finish line after one lap, chronometer is stopped.
6. Time penalty (10sec) is given to the robot which couldn't start and the robot takes the starting position again. The robot has 5 rights for starting. (for each unsuccessful start will be punished seperately with 10sec time penalty)
7. The robots must move on the track in the direction of movement shown in Figure 5.
8. The weight of the robots passing the test box is measured. It is recorded by the judges. Weight measurement includes battery. In case of a contrary situation, the robot is disqualified.
9. Robots must follow the lines. When the robot goes off the road, the body of the robot descends from the black road onto a completely white background.
10. When the robot loses the line and not find the track again, it will be put back manually on the sub starting line. Time doesn't stop in this case.
11. In order to complete the sections between the starting lines, the robot must touch the next starting line.
12. If the robot goes astray between the start/finish line and the sub start line "A", it is placed behind the sub start line "A" and the competition continues. In this section, the robot is penalised 10 seconds. (This situation is considered as going astray.)
13. If the robot goes off the road anywhere between the intermediate starting line A and the sub start line "B", it is placed behind the sub start line "A" and the competition continues. In



- this section, the robot is penalised 5 seconds. (This situation is considered as going off the road.)
14. If the robot goes off the road anywhere between the sub start line “B” and the sub start line “C”, it is placed behind the sub start line “B” and the competition continues. In this section, the robot is penalised 5 seconds. (This situation is considered as going off the road.)
 15. If the robot goes off the road anywhere between the intermediate starting line C and the sub start line “A”, it is placed behind the sub start line “C” and the competition continues. In this section, the robot is penalised 5 seconds. (This situation is considered as going off the road.)
 16. If the robot goes off the road anywhere between the sub start line “A” and the start/finish line, it is placed behind the sub start line “A” and the competition continues. In this section, the robot is penalised 5 seconds. (This situation is considered as going off the road.)
 17. If the robot cannot climb the bridge, it is waited for 5 seconds and robot is placed at the sub start line “C”. In this section, the robot is penalised for 5 seconds. (This is considered as going off the road.)
 18. If the robot goes off the road for the fifth (5th) time, it is disqualified.
 19. Robots will be listed according to time scores.
 20. Total time score: [(Choronometer time + sum of penalties)]
 21. If scores are equal, robot which has less penalties has priority.
 22. If there is still equality, then lighter robot has priority.
 23. If there is still quality, sum of team members ages, lower age team has priority.
 24. First 32 robots can go next round. Robot which gets best score in this round will be winner.

Other Rules

1. Any time for break or maintenance will not given.
2. It is not allowed to put any sign or mark permanently on the track or to damage it. Robots which damage the track will be disqualified.
3. Robots can use an energy source such as battery or battery pack. Flammable or liquid type energy sources are forbidden.
4. No any modification is allowed during the race except changing wheels and batteries. If physical changes such as changing body is determined, robot will be disqualified.
5. If QR code is dismantled, changed or damaged, robot will be disqualified.
6. If robot doesn't match with its photo, it will be disqualified.
7. If it is necessary to change electronic component, same component should be used on same place. QR code must not be damaged during this process. Otherwise, robot will be disqualified.
8. QR code must be stucked on robot body but not on detachable parts. Otherwise robot will be disqualified.
9. Track dimensions can be changed slightly without changing pattern



10. Any objections due to led panels , lights, camera flashes etc will be refused.
11. Competition organisation committee has rights to make all kinds of modifications about the rules of contest in case of necessities.

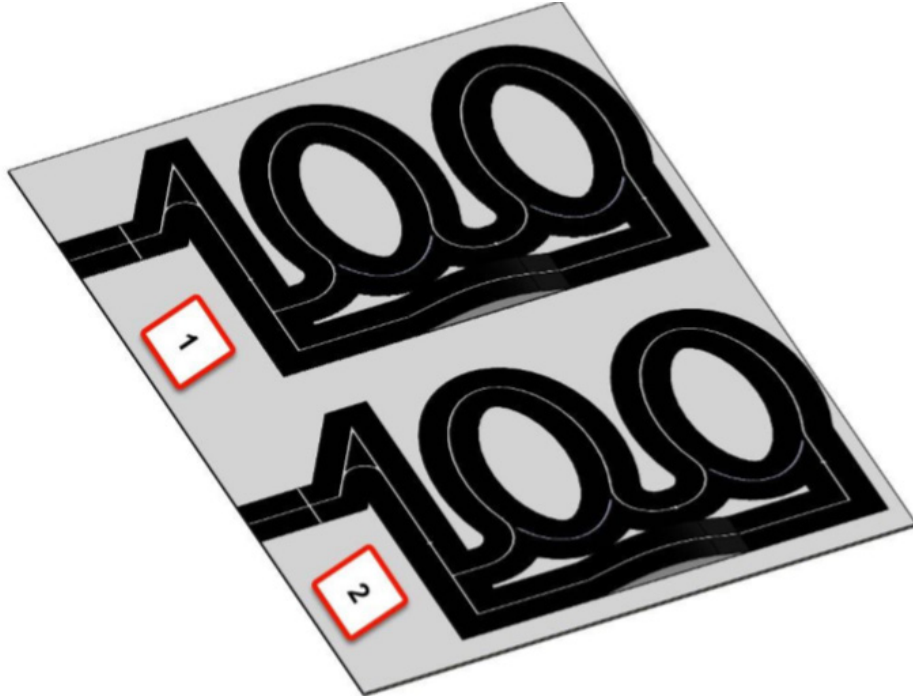


Figure 8 3D view

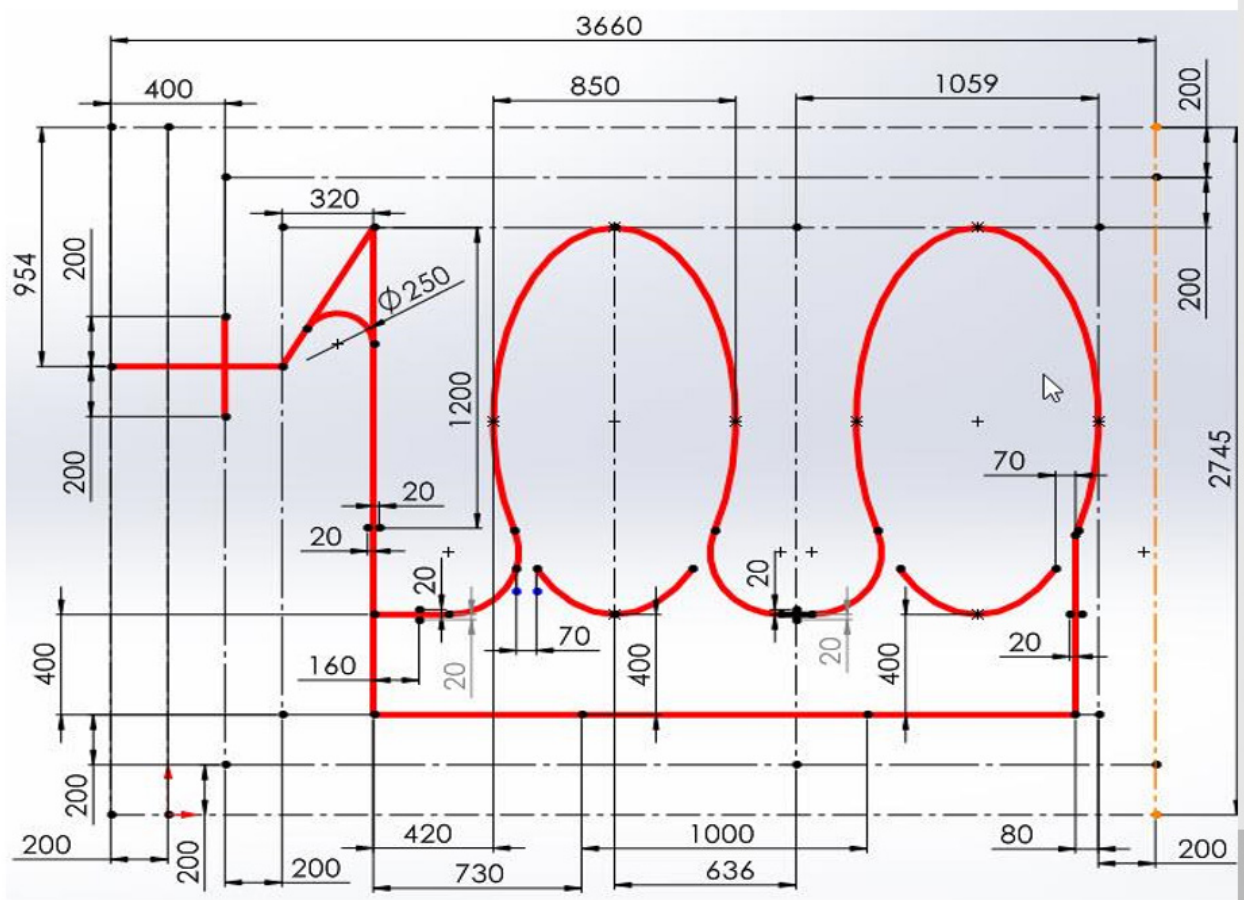


Figure 9 Dimensions



No	robot name	false start penalty 10 sn		out of track penalty 5 sn		out of track penalty Total	chronometer time	total time
		no.of penalty	sum	no. of penalty	sum			
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								