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

INTERNATIONAL
MoNE
ROBOT
CONTEST

RULES

Objective

Line follower robots are designed to able to follow white line on black ground or vice versa autonomously. They are commonly used for carry the 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

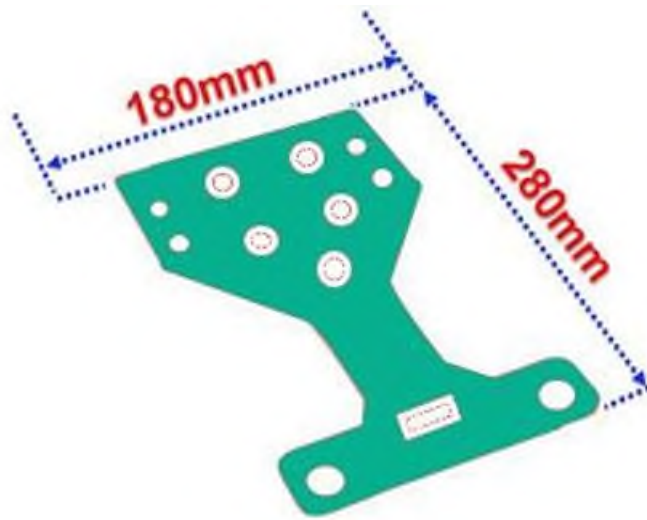Robot has max.280mm lenght and 180mm width.(include wheels)

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 vacum motor is forbitted

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

2

TRACK

Informations

1. Lines are indicated by white color with black ground.

2. Tracks which has dimensions 1560x3050mm are made by black and white opaque PVC foam. Joints between parts that made up the track are covered with black opaque foil.

3. Lines are made by using white opaque foil with 20±2 mm width

4. Roads consist of white lines on black ground.

5. There are 11 turns which are 90^0 turns.

6. There are 2 curves which have 240mm radius

7. There is one curve which has 250mm radius

8. There is a bridge which has 10^0 slope and 1000mm lenght.

9. Start/finish line is placed 400mm far from starting place.

10. Time sensors are used 10mm above at out of track and located bothe edges of start/finish line.
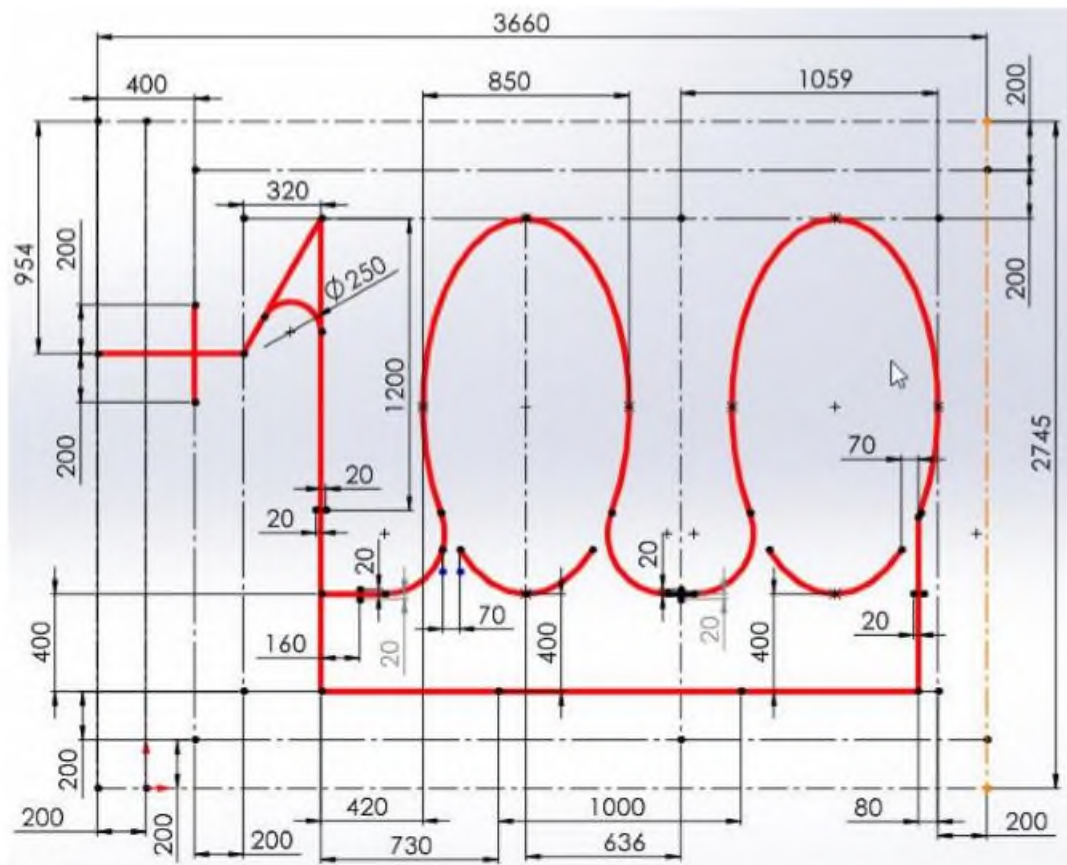
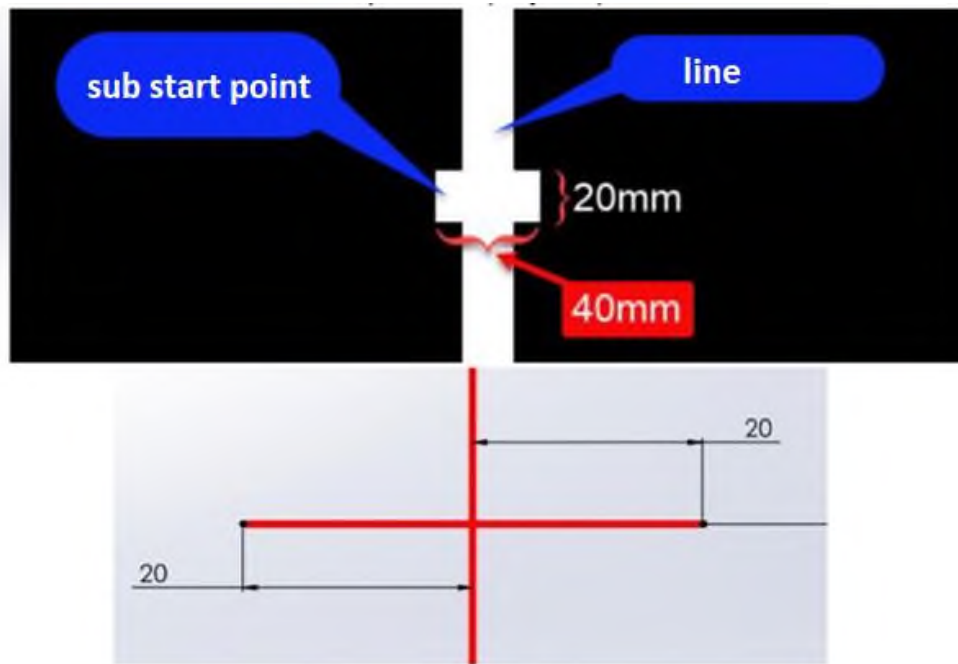### Track shape and dimensions

Figure 2 Track dimensions

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

3

Figure 3 Sub start line dimensions
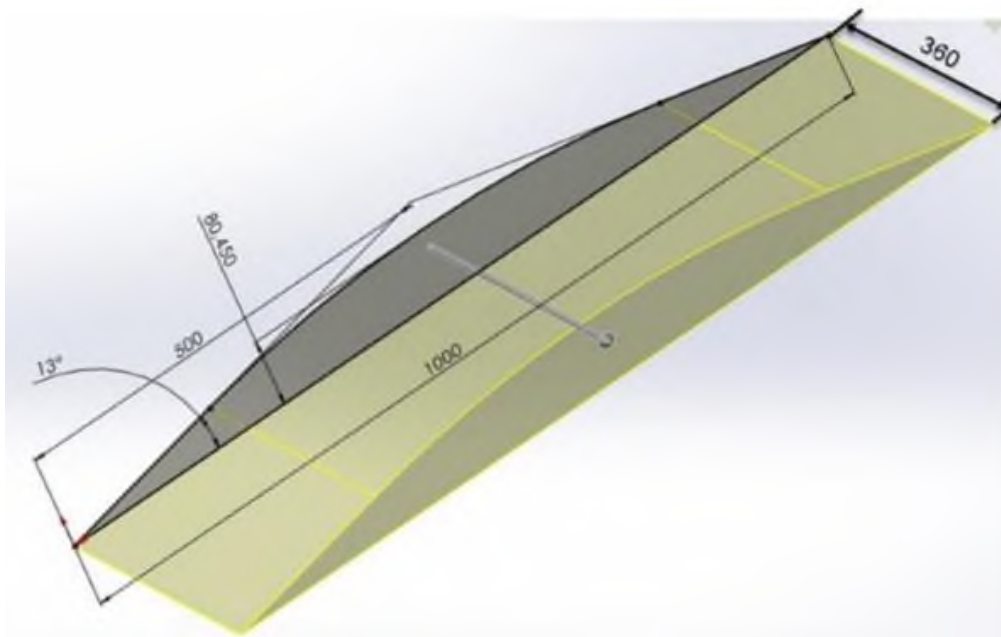
Figure 4 Bridge dimensions

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

4
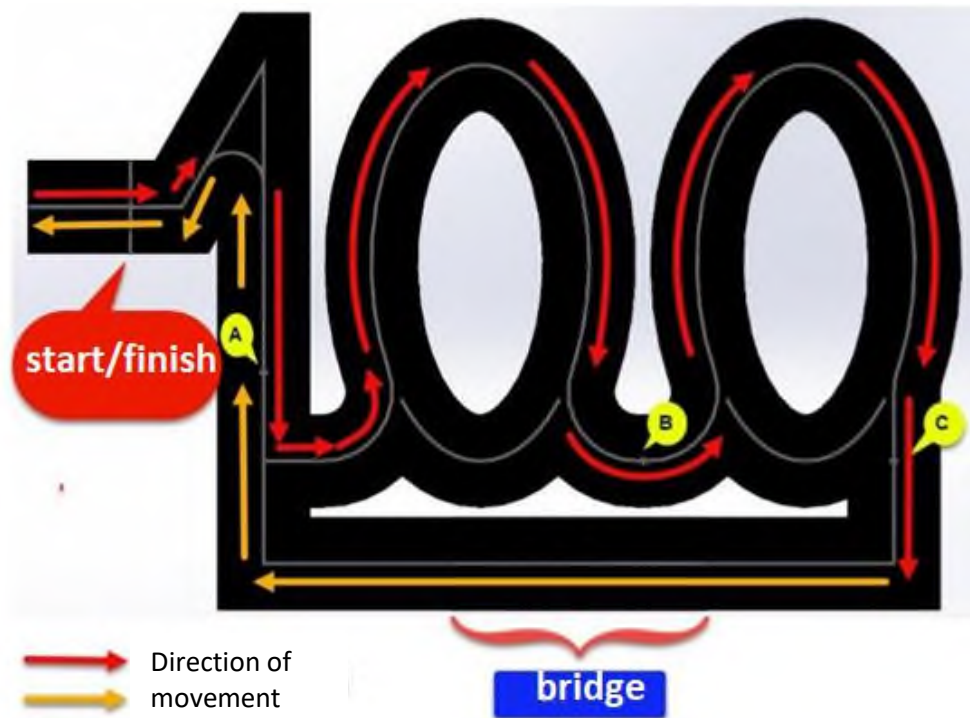
Figure 5 Movement directions and sub starting lines

Figure 6 3D view

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

5
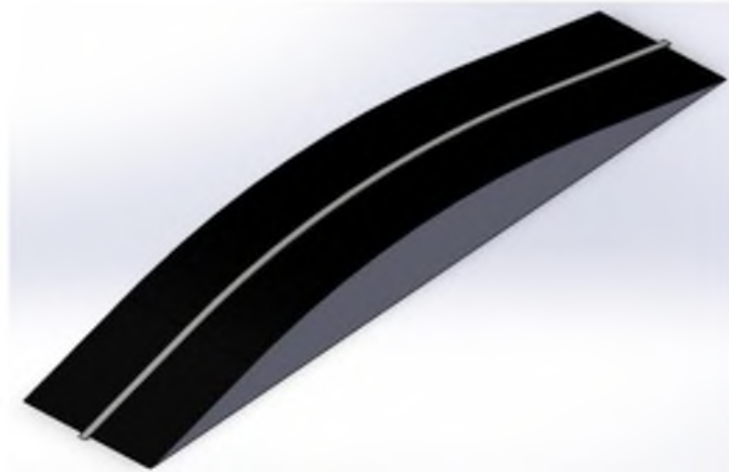
Figure 7 Bridge 3D view

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 choronometer.

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 manualy 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

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

6

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 climbe 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 permenantly 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 forbitted.

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 dismounted,changed or damaged , robot will be disqualified.

6. If robot doesn't matched 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 disqualifed.

8. QR code must be sticked on robot body but not on detachable parts. Otherwise robot will be disqualified.

9. Track dimensions can be changed slightly without changing pattern

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

7

10. Any objections due to led panels , lights, camera flashes etc will be refused.

11. Competition organisation comittee has rights to make all kinds of modifications about the rules of contest in case of necessaries.

Figure 8 3D view

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

8

Figure 9 Dimensions

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES
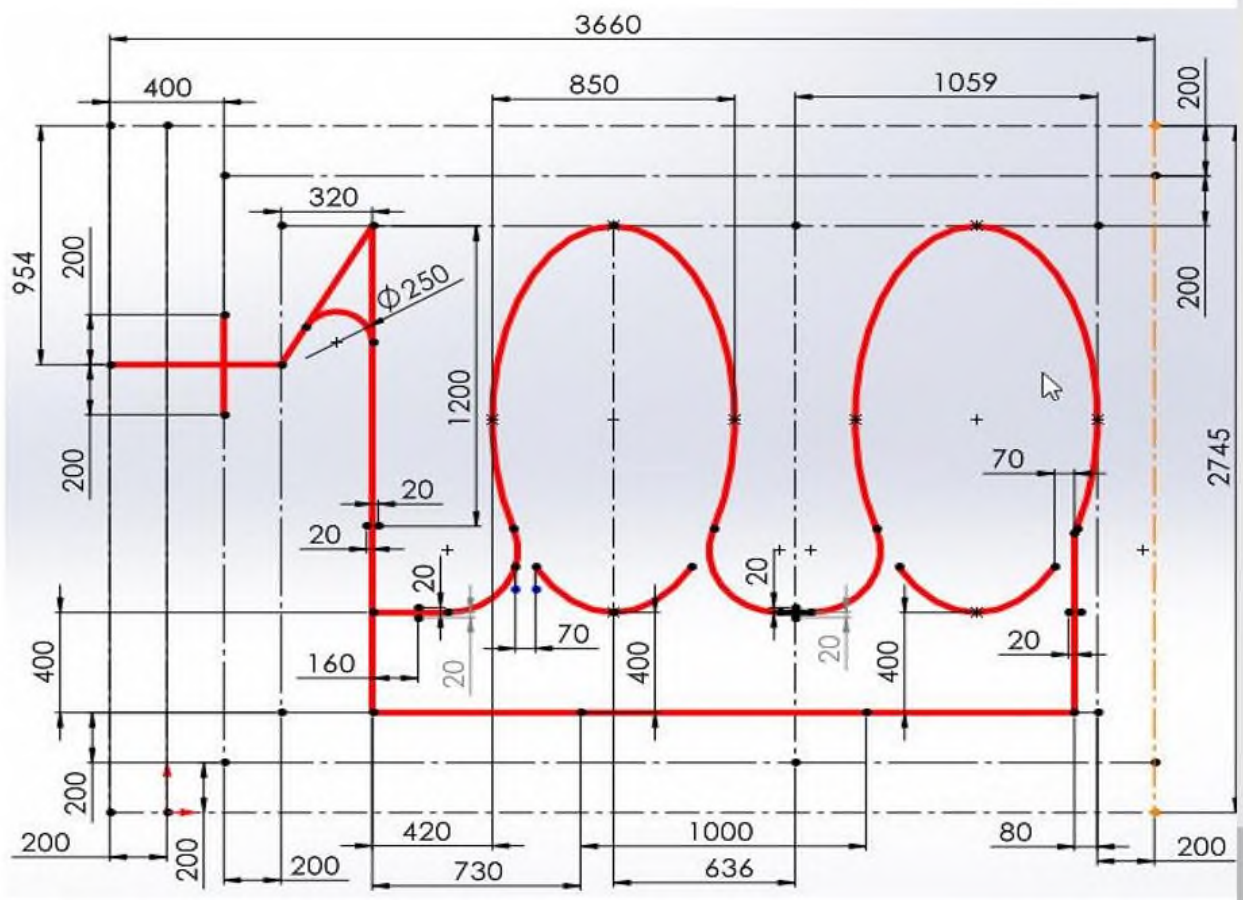
9
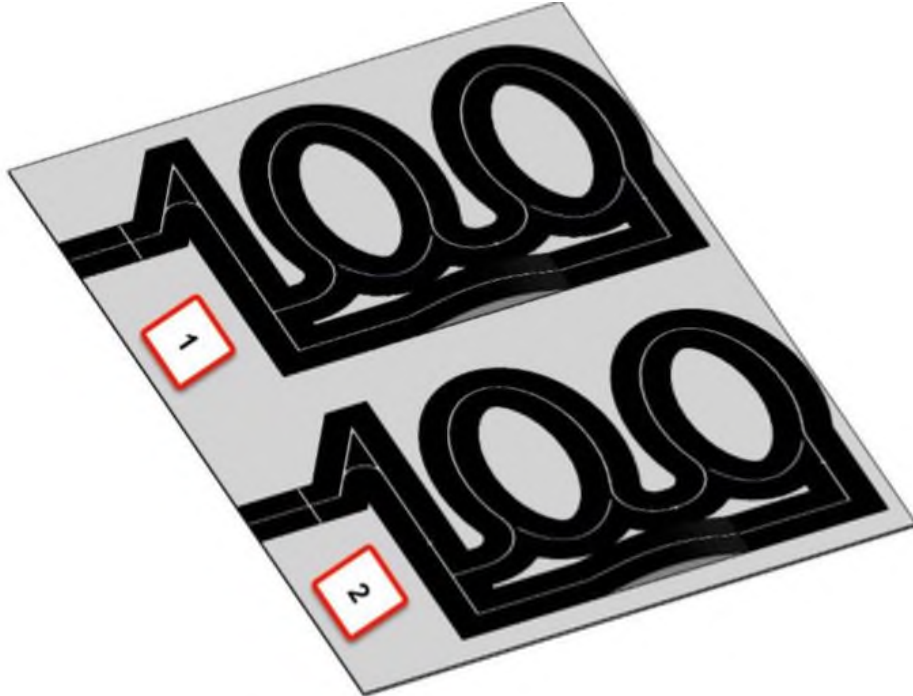
No	robot name	false start penalty 10 sn		out of track penalty 5 sn		out of track penalty Total	chronometer time	total time
		no.of penalty	sum	no. of penalty	sum			
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								
16								
17								
18								
19								
20								
21								
22								
23								
24								
25								
26								
27								
28								
29								
30								
31								
32								
33								
34								
35								
36								
37								

The General Directorate of Technical and Vocational Education
15th INTERNATIONAL MoNE ROBOT CONTEST
LINE FOLLOWER BASIC CATEGORY RULES

10