REPUBLIC OF TURKEY

MINISTRY OF NATIONAL EDUCATION

The General Directorate of Technical and Vocational Education

14. INTERNATIONAL MEB ROBOT CONTEST

LINE FOLLOWER BASIC CATEGORY

RULES

2020 - ŞANLIURFA

RULES

Objective

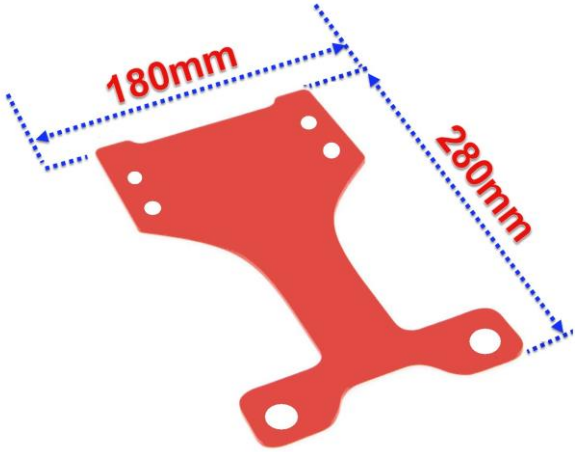
Line follower robots are designed to able to follow white line on black ground or vice versa autonomously. They are commonly used for carry the goods from one place to another in industry It is just enough to draw only lines on ground of plant to do this. The most important points for line follower robots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

- At elimination race, aim is to finish the course in best time and with minimum penalty points

Robot dimensions

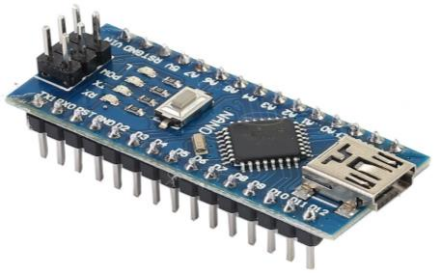
Robot has max.280mm lenght and 180mm width.



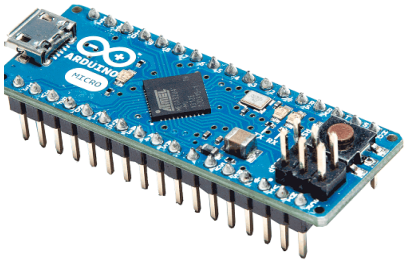
Equipments

Microcontroller: Arduino Nano, UNO or Micro.
Sensor array board with max. 5 sensors
Arduino Motor Shield - L293D or L298 DC Motor driver module
DC motor : 6-12V 250rpm plastic L type DC drive gear Motor
Wheels : max diameter 65mm and width 30mm
Battery box and ball caster can be used.

Pictures



Arduino Nano

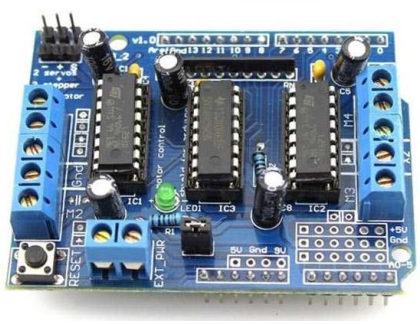


Arduino Micro

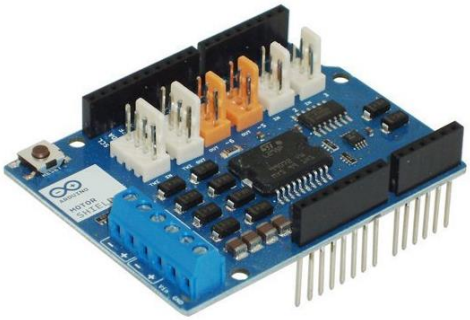
Arduino UNO

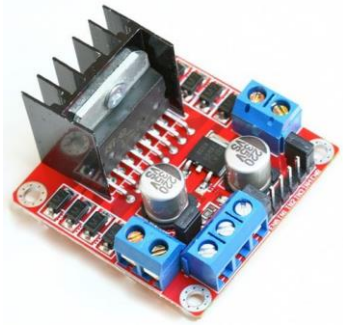
L type DC Motor

Robot wheels



Arduino Motor Shield - L293D





L298 DC Motor driver module

TRACK

Informations

- Lines are indicated by white color with black ground.
- 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.
- Lines are made by using white opaque foil with 20±2 mm width
- Roads consist of white lines on black ground.
- There are 11 turns which are 90^0 turns.
- There are 2 curves which have 240mm radius
- There is one curve which has 250mm radius
- There is a bridge which has 10^0 slope and 1000mm lenght.
- Start/finish line is placed 400mm far from starting place.
- Time sensors are used 10mm above at out of track and located bothe edges of start/finish line.

Qualification Races

- Each robot will run one by one. The order of competitors is determined by computer.
- Robots complete one lap on the track.
- Race will be held against the time. Lap time will be recorded by choronometer.
- 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.
- 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)
- Robots need to move stated direction of motion.

- When the robot loses the line and not find the track again, it will be put back manualy on just right place where robot out of. Time doesn't stop in this case. This right may be given only by judges and 10sec time penalty is also given in this case.
- Robot which is out of track 5 times will be disqualified.
- If robot cannot climp up the bridge, it is placed right on the bridge then robot gets 50sec.penalty.
- If robot drops from the bridge while climbing up, In this case, robot is placed on the bridge then robot takes 40sec.penalty.
- If robot drops from the bridge while going down, In this case, robot is placed on track after the bridge then robot takes 30sec.penalty.
- When robot passes through start/finish line after one lap, chronometer is stopped.
- Race is over for robot.
- Ranking list is composed of according to robot times
- Total time is calculated by substracting penalty times from chronometer time.

Other Rules

- Any time for break or maintenance will not given.
- 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.
- Robots can use an energy source such as battery or battery pack. Flammable or liquid type energy sources are forbitted.
- 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.
- If QR code is dismounted,changed or damaged , robot will be disqualified.
- If robot doesn't matched with its photo, it will be disqualified.
- 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.
- QR code must be sticked on robot body but not on detachable parts. Otherwise robot will be disqualified.

Evaluation

Robots will be listed according to scores. If scores are equal, robot which has less penalties has priority. If it is still equal, robot which passed bridge succesfully has priority. If there is still equality, then lighter robot has priority.

Dimensions of runways can be slightly different than images because of production process.

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

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