



RobotChallenge – Line Follower

Revised on September 15, 2025

Introduction: The robot has 3 attempts on a closed track. The shortest time achieved will be used as the result for ranking. The Line Follower competition is divided into Lego Line Follower, Line Follower, and Line Follower Enhanced. Each event consists of the following 3 categories.

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1. Lego Line Follower

Group

- A. Junior
- B. Senior
- C. Adult

1.1. Robot Requirements

1.1.1. Size and Weight Restrictions

- A. The maximum robot size is 30cm x 30cm, and it must fit smoothly into the standard inspection container.
- B. The maximum robot weight is 3KG.
- C. The robot must pass inspection before the competition. If the size or weight exceeds the limits, a maximum of 5 minutes is allowed for structural modifications. If it still fails inspection after this time, the competition qualification will be revoked. The referee will time this period with a stopwatch.

1.1.2. Robot Equipment Requirements

- A. The robot must be constructed from original LEGO parts. The version is not restricted.
- B. Modifications to data cables are not restricted.
- C. Only rubber bands used to bundle the robot's data cables may be third-party components. Rubber bands cannot be used for any other function.
- D. LEGO controllers are allowed to be powered by standard AA alkaline batteries or original batteries. However, modifying the power supply structure is not allowed, and the use of special batteries such as 14500 lithium batteries is prohibited.
- E. The referee has the sole authority to decide whether all components used are permitted in the competition.

1.2. Competition Rules

1.2.1. Competition Method

- A. The competition consists of 3 rounds. The next round begins after all teams have completed the current round.
- B. The competition uses electronic timing. Timing starts when the robot crosses the starting line. Timing stops when the robot completes one full lap of the line following task and crosses the starting position again, marking the end of the run.
- C. The shortest time achieved in the 3 rounds will be used as the ranking result.

1.2.2. Time Limit

Each team has a maximum of 3 minutes to complete the line following run. Teams that do not complete the run within the time limit will be recorded with a time of 03:00:01.



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1.2.3. Autonomous Control

Once the robot crosses the start line, it must operate fully autonomously. Otherwise, it will be disqualified. The robot must start in front of the starting line to avoid triggering the timer prematurely.

1.2.4. Competition Field Line Standards

- A. The line follower field mat size is 2.8m wide by 4.5m long.
- B. The field surface is white. The track is a black line with a width of 15mm.
- C. The track has a start area, and the track ends with a finish area. The start area and finish area are the same overlapping zone.
- D. Track line characteristics:
 - a. There are no intersections (i.e., no crossing lines).
 - b. Zigzags and sharp turns may exist, but the distance between the center points of adjacent parallel line segments (line spacing) shall be no less than 15cm.
 - c. The distance from the line to the nearest field edge shall be no less than 15cm, measured from the center of the line.
 - d. The minimum arc radius is 7.5cm.
 - e. Angles greater than or equal to 90 degrees may exist.

1.2.5. Field Border

If the robot leaves the field, its result will be voided and recorded as 03:00:01. The robot is considered to have left the field if any of its wheels, legs, or its path completely leaves the surface of the field (the field refers to the competition mat).

1.2.6. Off-Line

- A. If the robot's entire vertical projection leaves the black track line and it does not proceed along the track, it is considered off-line, resulting in no valid result.
- B. If the robot spins in place or reverses direction, it is considered off-line, resulting in no valid result.
- C. If the robot touches the field timing equipment, it is considered off-line, resulting in no valid result.
- D. The referee has the sole and final authority to decide on off-line violations.

1.3. Valid Result

A result is valid only if the robot completes the entire course without going off-line (the robot's entire projection never leaves the black track line), and the full electronic time is recorded.



2. Line Follower

Group

- A. Junior
- B. Senior
- C. Adult

2.1. Robot Requirements

2.1.1. Size and Weight Restrictions

- A. The maximum robot size is 30cm x 30cm, and it must fit smoothly into the standard inspection container.
- B. The maximum robot weight is 3KG.
- C. The robot must pass inspection before the competition. If the size or weight exceeds the limits, a maximum of 5 minutes is allowed for structural modifications. If it still fails inspection after this time, the competition qualification will be revoked. The referee will time this period with a stopwatch.

2.1.2. Robot Equipment Requirements

There are no restrictions on any robot equipment.

2.2. Competition Rules

2.2.1. Competition Method

- A. The competition consists of 3 rounds. The next round begins after all teams have completed the current round.
- B. The competition uses electronic timing. Timing starts when the robot crosses the starting line. Timing stops when the robot completes one full lap of the line following task and crosses the starting position again, marking the end of the run.
- C. The shortest time achieved in the 3 rounds will be used as the ranking result.

2.2.2. Time Limit

Each team has a maximum of 3 minutes to complete the line following run. Teams that do not complete the run within the time limit will be recorded with a time of 03:00:01.

2.2.3. Autonomous Control

Once the robot crosses the start line, it must operate fully autonomously. Otherwise, it will be disqualified.

2.2.4. Competition Field Line Standards

- A. The line follower field mat size is 2.8m wide by 4.5m long.
- B. The field surface is white. The track is a black line with a width of 15mm.
- C. The track has a start area, and the track ends with a finish area. The start area and finish area are the same overlapping zone.
- D. Track line characteristics:
 - a. There are no intersections (i.e., no crossing lines).
 - b. Zigzags and sharp turns may exist, but the distance between the center points of



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adjacent parallel line segments (line spacing) shall be no less than 15cm.

- c. The distance from the line to the nearest field edge shall be no less than 15cm, measured from the center of the line.
- d. The minimum arc radius is 7.5cm.
- e. Angles greater than or equal to 90 degrees may exist.

2.2.5. Field Border

If the robot leaves the field, its result will be recorded as 03:00:01. The robot is considered to have left the field if any of its wheels, legs, or its path completely leaves the surface of the field (the field refers to the competition mat).

2.2.6. Off-Line

- A. If the robot's entire vertical projection leaves the black track line and it does not proceed along the track, it is considered off-line, resulting in no valid result.
- B. If the robot spins in place or reverses direction, it is considered off-line, resulting in no valid result.
- C. If the robot touches the field timing equipment, it is considered off-line, resulting in no valid result.
- D. The referee has the sole and final authority to decide on off-line violations.

2.3. Valid Result

A result is valid only if the robot completes the entire course without going off-line (the robot's entire projection never leaves the black track line), and the full electronic time is recorded.



3. Line Follower Enhanced

Group

- A. Senior
- B. Adult

3.1. Robot Requirements

3.1.1. Size and Weight Restrictions

- A. The maximum robot size is 30cm x 30cm, and it must fit smoothly into the standard inspection container.
- B. The maximum robot weight is 3KG.
- C. The robot must pass inspection before the competition. If the size or weight exceeds the limits, a maximum of 5 minutes is allowed for structural modifications. If it still fails inspection after this time, the competition qualification will be revoked. The referee will time this period with a stopwatch.

3.1.2. Robot Equipment Requirements

There are no restrictions on any robot equipment.

3.2. Competition Rules

3.2.1. Competition Method

- A. The competition consists of 3 rounds. The next round begins after all teams have completed the current round.
- B. The competition uses electronic timing. Timing starts when the robot crosses the starting line. Timing stops when the robot completes one full lap of the line following task and crosses the starting position again, marking the end of the run.
- C. The shortest time achieved in the 3 rounds will be used as the ranking result.

3.2.2. Time Limit

Each team has a maximum of 3 minutes to complete the line following run. Teams that do not complete the run within the time limit will be recorded with a time of 03:00:01.

3.2.3. Autonomous Control

Once the robot crosses the start line, it must operate fully autonomously. Otherwise, it will be disqualified.

3.2.4. Competition Field Line Standards

- A. The line follower field mat size is 2.8m wide by 4.5m long.
- B. The field surface is white. The track is a black line with a width of 15mm.
- C. The track has a start area, and the track ends with a finish area. The start area and finish area are the same overlapping zone.
- D. Track line characteristics:
 - a. There are no intersections (i.e., no crossing lines).
 - b. Zigzags and sharp turns may exist, but the distance between the center points of



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adjacent parallel line segments (line spacing) shall be no less than 15cm.

- c. The distance from the line to the nearest field edge shall be no less than 15cm, measured from the center of the line.
- d. The minimum arc radius is 7.5cm.
- e. Angles greater than or equal to 90 degrees may exist.

3.2.5. Field Border

If the robot leaves the field, its result will be recorded as 03:00:01. The robot is considered to have left the field if any of its wheels, legs, or its path completely leaves the surface of the field (the field refers to the competition mat).

3.2.6. Off-Line

- A. If the robot's entire vertical projection leaves the black track line and it does not proceed along the track, it is considered off-line, resulting in no valid result.
- B. If the robot spins in place or reverses direction, it is considered off-line, resulting in no valid result.
- C. If the robot touches the field timing equipment, it is considered off-line, resulting in no valid result.
- D. The referee has the sole and final authority to decide on off-line violations.
- E. In Line Follower Enhanced, the robot must navigate past obstacles. Going off-line during the obstacle navigation is allowed. However, once past the obstacle, if the robot does not return to follow the black track line according to the intended path, it is considered off-line.

3.3. Valid Result

A result is valid only if the robot completes the entire course without going off-line (considering rule 3.2.6.E), and the full electronic time is recorded.

3.4. Line Follower Enhanced Props Description

3.4.1. Line Gap

There will be a 10cm gap in the line at a certain point. The gap will not be on a curve. The continuation of the line will be a straight extension.

3.4.2. Obstacle

- A. Approximately 25cm long x 12cm wide x 6.5 cm high.
- B. The robot must detour around this brick and immediately return to the line following track to complete the course.

3.4.3. Seesaw

- A. A seesaw (as shown in Figure 1) will be placed at a certain point on the black line following track.
- B. The length of the seesaw is at least 50cm.
- C. The highest point of the seesaw's axle is less than 12cm above the ground.



- D. The black line continues on the seesaw.

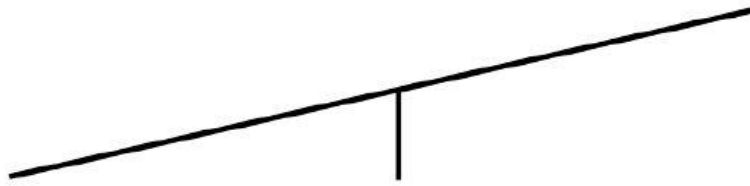


Figure 1: Seesaw

4. Raising an Objection

- A. There shall be no objection to the referee's decisions.
- B. If there is any misunderstanding regarding the application of the competition rules, the team captain may raise an objection with the referee.

5. Rule Flexibility

If the concepts and foundations of these rules are adhered to, they should be flexible enough to accommodate changes in the number of participants and the content of the competition.

6. Liability

- A. Participating teams are always responsible for the safety of their robot and for any accidents caused by their team members or robot.
- B. The RobotChallenge organizing committee and its personnel cannot be held liable for any accidents caused by participating teams or their equipment.