Line Follow - SPRINT

Official handbook 2026

RoboRAVE Greece

Our slogan is : "Today's Play, Tomorrow's Pay."

1. General information

1.1 What is the Line Follow – Sprint challenge.

The Line Follow - SPRINT is an exciting robotics competition that requires precision, creativity and speed. Competitors are asked to design, build and program an autonomous robot capable of navigating a predetermined path following a black line. The main goal is to get the robot to the end of the path quickly, while delivering ping pong balls to an elevated tower. The difficulty increases through the categories as the tracks include more intersections, broken lines and unexpected obstacles!

The competition helps participants develop problem-solving skills and improve their accuracy and creativity in robot programming.

Line contest Follow - SPRINT, robots must demonstrate agility and precision, comparable to that of an experienced athlete. Any deviation from the line or contact with obstacles can result in time penalties. The added difficulty of following a line and creating a delivery mechanism presents challenges for both manufacturers and programmers. This competition covers all age groups, offering an inclusive and rewarding experience.

1.2 Who can compete on a team?

The Line Follow – SPRINT has the following age categories:

1) Ages 11-14 (Middle School) - Born 2012 - 2015

2) Ages 15 -18 (High School) – Born 2008 - 2011

Teams must consist of 2 to 4 members. Teams with more than 4 members will not be allowed to participate in the competition unless they register additional teams to comply with the regulations.

In the event that a category has fewer than 5 entries, the organizer has the right to combine age categories.

1.3 The specifications of the robot.

Robots must meet all of the following criteria to be eligible for the competition:
1. **Construction Cost:**
The total cost of the robot should not exceed 1,500 euros.
2. **Materials and Platform:**
Robots can be built from any platform or material.
3. **Autonomy:**
The robot must be fully autonomous and not use remote control capabilities.

o Devices such as remote controls or connection cables are not allowed to control the robot.

o Programs can be run from an external device (e.g. laptop) only when the robot is

in the base (Home), and the device must not operate when the robot is out of the base.

4. **Line Sequence Algorithm:**

The robot must be able to execute a line sequence algorithm in its program.

o The algorithm must be applicable to more than one variation of the track.

5. **Sensors and Motors:**

The use of multiple sensors, motors and processing units in the robot is allowed.

6. **Dimensions:**

The robot's volume must not exceed **65,030 cm³**.

Robots participate in the competition already assembled and programmed, and competitors have the right to make changes during the testing period.

2. The race track

2.1 What are the track specifications?

Line slopes Follow – SPRINT have the following characteristics:

- **Track Dimensions:**

The track has overall dimensions of 240 cm long and 120 cm wide.

- **Construction Material:**

Official tracks are made of PVC vinyl tarpaulin.

- **Line Thickness:**

The thickness of the sequence and intersection lines is 2 cm .

- **Starting Point (Home) Line):**

All tracks start from the Start Line (Home Line), which forms a "T" intersection with the route. Home is defined as any point behind the Start Line.

- **Tower :**

A cardboard tower measuring 35 cm long, 10 cm wide and 20 cm high is placed **exactly** 1 cm behind a corresponding "T" intersection at the opposite end of the track.
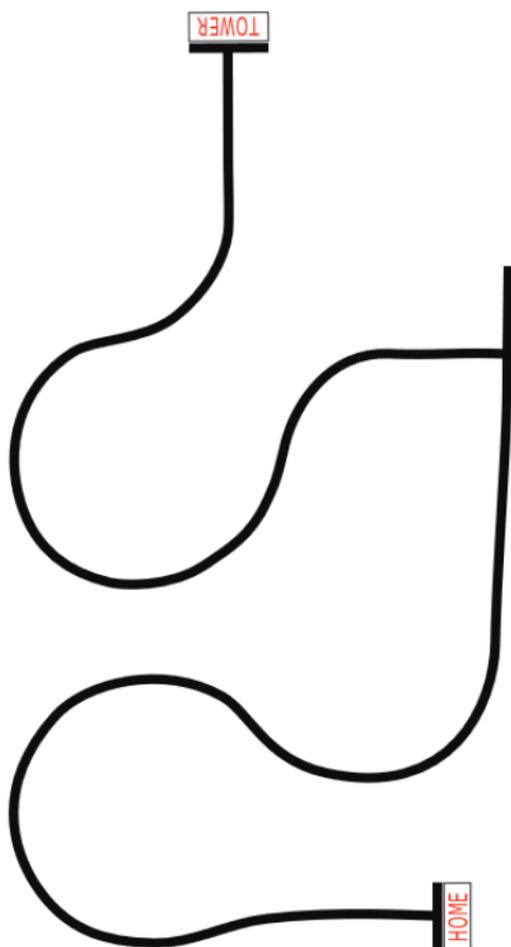
- **Tower Opening:**

The tower has an opening measuring 10 cm x 10 cm , on the top and front, so that ping-pong balls can be placed inside.

- **Tower Stability:**

The towers are secured in place with four pieces of Velcro , one at each corner, directly onto the track.

Line track Follow SPRINT

2.2 What are the obstacles on the track?

On Line Follow – SPRINT, robots are required to overcome various types of obstacles depending on their category. These include:

1. **Intersections:**

The route intersects perpendicularly with another line, forming a "T" intersection. In one direction, the line ends after a few centimeters, while in the other it continues towards the tower.

The number of obstacles varies by category, with the number and difficulty increasing in the higher categories.

2.3   What can the robot help with for line sequencing?

The path line is black and designed to be used by sensors and cameras to navigate the robot towards the tower.

1. **Straight Section before the Tower:**

Before the Tower line, there will be a straight section 20 cm long without obstacles.

2. **Distance from the Edge of the Track:**

The course line will be at least 10 cm away from the edge of the track or from advertising surfaces.

3. **Radius of Curvature:**

The radius of a curve is limited to a minimum length of 15 cm, to ensure robot navigation.

3. Competition procedure

3.1 How do the teams compete?

Teams have 60 minutes of practice time at the start of the match.

Home Run (1st Ball):

1. Robots start from the Home Line having only one ping-pong ball and can start as soon as the timer gives the signal .

2. The robot must be entirely (all its vertical projections) behind the vertical line of Home Run .

Image: Robot launch. The robot is completely behind the start. Not only does it not touch any part of the vertical intersection, but all of its vertical projections are behind the vertical intersection of the start (Home Run).
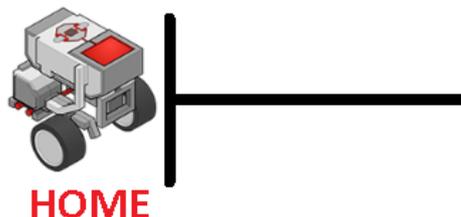
3. The robot will earn points as it follows the path to the tower, successfully delivers the ping-pong ball to the tower, and autonomously returns to base.

4. If the robot fails, it can try again. However, the timer will continue to count until the race is complete.

Bonus Ball Run

1. After the robot completes a successful Home Run , can attempt as many Bonus Ball attempts allow a time limit of 3 minutes, loaded with balls in each attempt, delivering as many as possible to the tower. The maximum that can be deposited depends on the age category of the team. The attempt stops when the 3 minute time limit is over or the robot deposits all balls.

2. The number of balls the robot can deposit in the Bonus Ball Run is:

-Middle School : 130 balls

-High School:230 balls

3. Every time the robot returns to Home Run, the robot must stop on its own and entirely (all its vertical projections) in front of the vertical intersection of Home Run . The robot operator then has the right to lift it with his hands to place it in a starting position

behind the vertical Home, load the ball, and start the program for the next attempt. Time continues to run.

Image: Return of the robot. The robot is completely in front of the start. Not only does it not touch any part of the vertical intersection, but all of its vertical projections are in front of the vertical intersection of the start (Home Run).

HOME
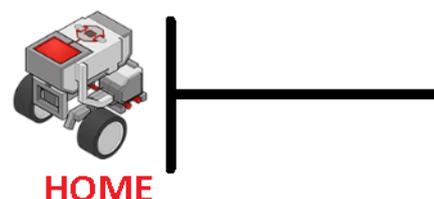
3.2 What are the rules of the competition?

The following rules are applied during official matches by the referee:

1.   **Compliance with the Rules:**
The referee ensures that the team and robot comply with the rules of the sections.

   o   If the referee considers that any of the participation criteria are not met, the Head Referee will be notified to make further decisions.

   o   A team or robot that does not meet the criteria is usually not allowed to participate and must make changes according to the decision of the Head Referee.

2.   **Match Duration:**
The match lasts up to 3 minutes, timed by the referee. This is the only time during which the robot can earn points. The match is held on a pre-defined field that complies with the rules of section 2, and the layout of the track is revealed on the day of the competition.

3.   **Robot Positioning:**
The robot must be located entirely (all its vertical projections) behind the vertical line of Home Run at the beginning of the race or at any new attempt.

4.   **Successful Ball Delivery:**
A ball is considered to be successfully delivered when it leaves the robot and enters the tower through the top opening. Balls that bounce off the tower do not count.

5.   **Return Robot to Base (Home):**
There are cases where the robot must be returned to base and the attempt restarted, but with the clock still running:

o If a competitor touches the robot or the tower. The referees may decide to restart the match if the interference on the field has a significant impact on the robot's performance.

o With the referee's permission, competitors may return the robot to the base for any reason.

o If the robot loses contact with the line and does not move in the correct direction for more than 3 seconds.

6.   **Interaction with the Robot:**
Only competitors are allowed to handle and interact with the robot during the competition.

Remember:

"Players play, coaches guide, parents encourage."

4. The scoring of the event

Challenge	Maximum points per mission	
	MS	HS
4.1.1 Successful start (robot leaves Home)	10	5
4.1.2 Obstacle avoidance	5 (x1)	5(x2)
4.1.3 Arrival at the tower	10	10
4.1.4 Ball delivery	10	10
4.1.5 Avoiding obstacles to return	5 (x1)	5(x2)
4.1.6 Return to Home	10	5
4.2.1 Bonus balls	1 for each ball	1 for each ball
Maximum points (without bonus balls)	180	280

4.1 How is grading done?

What Points Are Earned on the Home Route? Run ;

Points are awarded only for the first route (exit from Home , successful or unsuccessful delivery of the ball to the tower and return to Home) that the robot makes during a match:

1. **Exit from Base (10 points / 5 points):**

o   If the robot successfully moves away from the base (Home), it earns 10 points in the MS category and 5 points in the HS category.

o   The exit from the base is considered successful when the robot completely passes the Home line .

2. **Obstacles (5 points):**

o   For each obstacle that the robot successfully overcomes for the first time, it earns 5 points.

o   Completing an obstacle is considered successful when the robot passes it completely.

3. **Arrival at the Tower (10 points):**

o   If the robot reaches the tower, it earns 10 points.

o   The arrival is considered successful when the front of the robot is within 10 cm of the base of the tower.

4. **Ball Delivery (10 points):**

o   If the robot successfully delivers a ball to the tower, it earns 10 points.

5. **Obstacles to Return (5 points):**

o   For each obstacle that the robot successfully overcomes on its way back from the tower, it earns 5 points.

o   Completing an obstacle is considered successful when the robot passes it completely.

6.   **Return to Base (10 points / 5 points):**

o   If the robot successfully returns to base, it earns 10 points in the MS category and 5 points in the HS category.

o   The return is considered successful when the robot is completely in front of the start. Not only does it not touch any part of the vertical intersection, but all of its vertical projections are in front of the vertical intersection of the start (Home Run).

Points Earned on the Bonus Route Ball Run

Points for the Bonus route Ball can only be won if a Home run has been successfully completed Run (the robot has returned to the start regardless of whether it successfully delivered the 1st ^{ball}).

1.   **Bonus Balls :**
o   For each ball successfully delivered by the robot to the tower, 1 point is earned.

Bonus route Ball Run no other points are awarded (as are awarded on the Home route) Run)

5. Qualification and winner selection

5.1 How the Top Teams Are Selected:

The official competition finals are used to highlight the top teams in each category. The top teams compete live to determine the top team and the best robot. The teams that will participate in the finals are determined as follows:

1.   **Official Timed Races:**

o   Teams will participate in official timed matches on the day of the competition.

o   The number of matches is determined by the Referee at the beginning of the competition and is at least three.

▪   An official match is considered any match conducted under the supervision of a referee with a recorded score.

2.   **Best Route:**

o   Only the best route of the day for each team will be considered for the finals.

o   In the event of a tie, the time of completion of the best attempt is taken into account. The team with the shortest time prevails.

3.   **Qualification to the Final Stages:**

o   The 8 best performing teams in each category will qualify for the finals.

4.   **Merge Categories:**

o   If categories are merged due to a limited number of teams, each category will have to conduct its finals as if it had not been merged.

▪   Teams from different categories should not compete against each other in the finals.

▪   Depending on the size of the category, there may be an automatic win.

5.2 How the final matches are held:

The Line finals Follow – SPRINT are conducted according to the following rules:

1.   **Top Team Competition:**

o   The top teams in each division compete against each other in an additional series of matches.

o   Teams compete in pairs in knockout matches, simultaneously on parallel tracks.

o   The pairs are selected as follows:
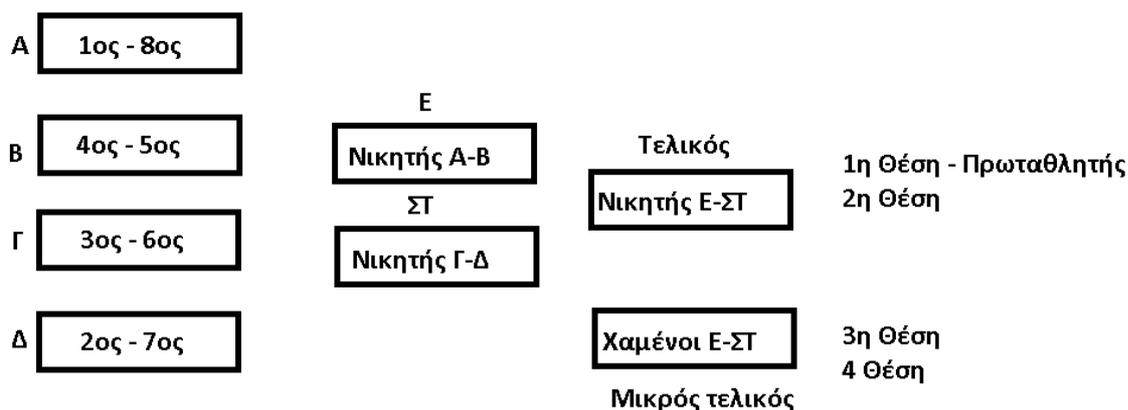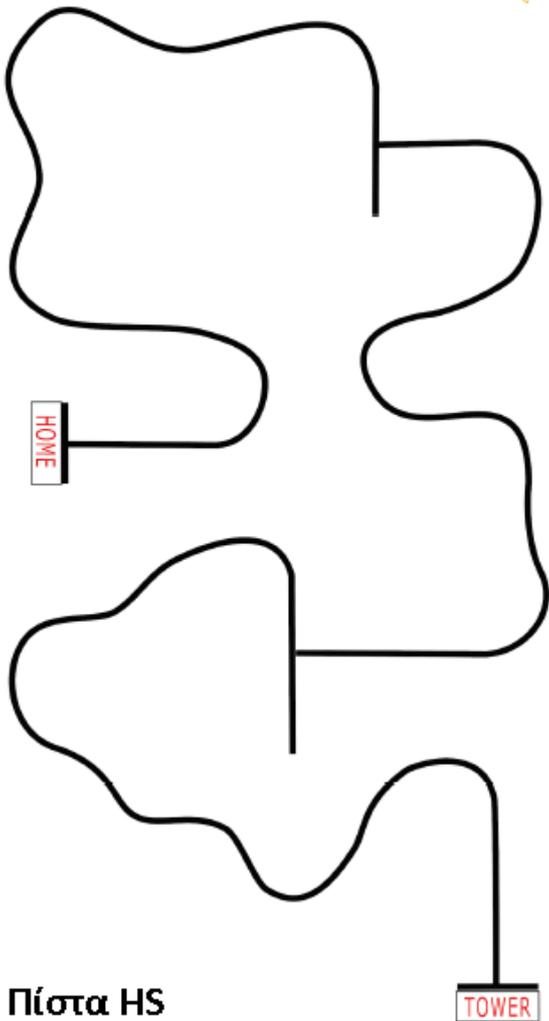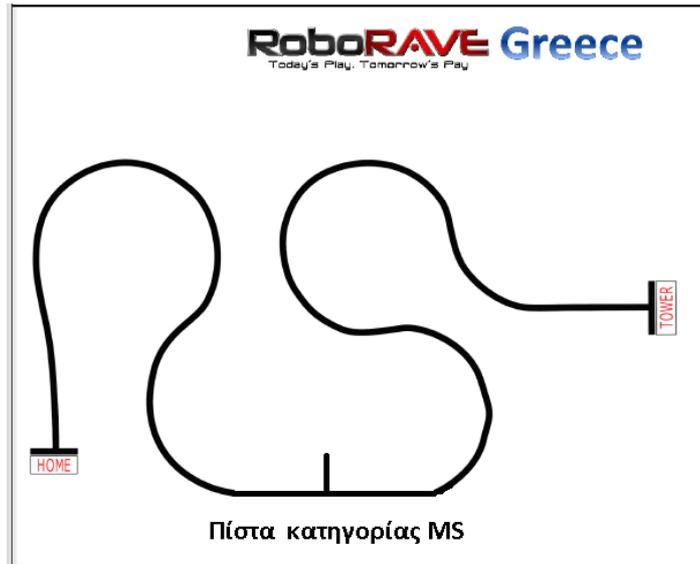

2.   **Ranking in the Final Phases:**

o   The ranking of the teams in the finals is determined solely by the time it takes to deposit the balls in the tower. The team that successfully delivers the balls the fastest wins. There is no other scoring.

3.   **Awards:**

o   All three top places receive awards in recognition of their achievements.

6. Appendix

Examples of tracks from past competitions (all tracks have the same dimensions):

Πίστα κατηγορίας MS

Πίστα HS

Πίστα UP