

LEGO Mindstorms Event Rules

Object

A small autonomous LEGO only robot ant must follow a “pheromone trail” to get to the goal destination. Points are awarded for successfully reaching the goal, but there are additional points for speed, for each piece of the trail followed, and other criteria.

Robot Specifications

Robots can only be built from official LEGO pieces. There is one exception to this rule; robots can use zip ties for extra support and stability. The robot should fit into a 12” (30 cm) cube to ensure that it will fit on the course.

Robots must be autonomous. Robots can use either the RCX LEGO Mindstorms brick or the NXT LEGO Mindstorms brick.

The robot must comply with the “General Rules for All Robots”.

Background

Ants are versatile creatures; many species of ants are able to change “roles” as required by their colony. One such role in the ant world is foraging, where an ant will go out and search for food to bring back to the nest.



Ref 1: http://en.wikipedia.org/wiki/File:Meat_eater_ant_feeding_on_honey02.jpg

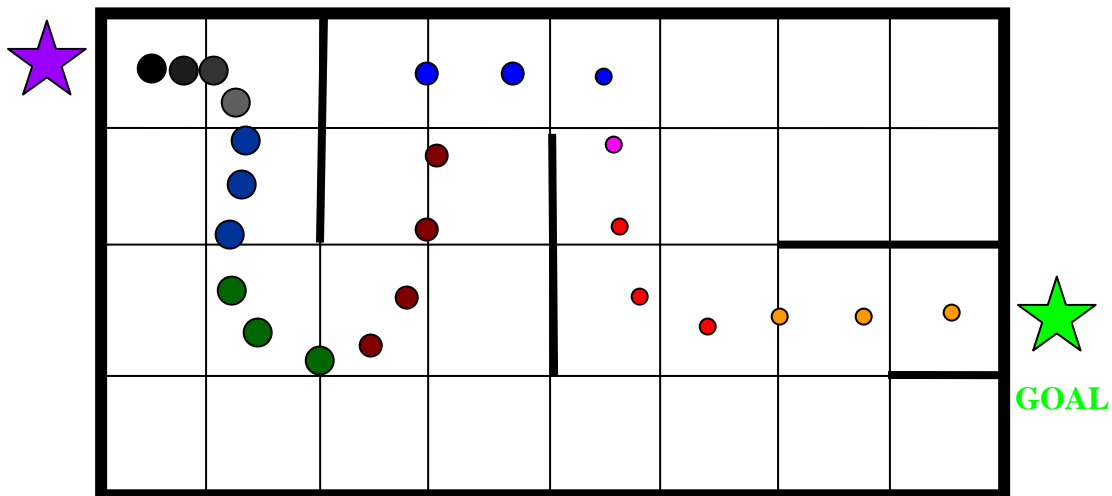
When the ant finds food, it transports the food back to the nest, dropping pheromones along the way. When another forager ant “sees” these pheromones, they can follow them to the food! Pheromones evaporate over time, so the stronger the pheromones, the more likely that there is food at the end of the trail.

Contest

The robot ant should follow the “pheromone trail” to find the goal as quickly as possible. Errant robots may be picked up and replaced on the course **just before** the robot left the trail. There is a penalty for each replacement.

The course will be in the form of an open-top maze on a 4' x 8' (122 cm x 244 cm) surface. The sides of the course are closed. The actual course won't be available until the day of the competition, but a sample course might look like the following picture. This picture is not to scale, actual dot sizes will be provided closer to the date of the competition:

START



Each “pheromone” is represented by a dark-colored filled circle on a light-colored background. Robots **must** make an audible sound when it finds a dot for that dot to be counted, and each individual dot may only be counted once. Dots will be variable in size and the distance between each dot will vary. Points are allocated for each pheromone dot found and followed by the robot, as well as bonus points for uninterrupted or quick completion of the course. The robot will be allowed a maximum of 3 minutes to complete the course.

Scoring

Points will be awarded according to the following table:

Points Awarded	Description	Example
10 points per pheromone followed.	10 points is awarded per pheromone followed on the trail.	If a robot finds 37 pheromones on the trail: 370 points.
50 bonus points for reaching the goal.	Bonus awarded for reaching the goal, regardless of route.	If a robot reaches the goal without following the pheromone trail: 50 points.
-50 points per violation.	Picking up the robot and replacing on the trail (just before the point where robot left the line).	The operator decides to pick up their robot after it has lost the trail, and place it back onto the trail (just before the point where it left the line): -50 points.
100 points bonus for uninterrupted completion.	Bonus awarded for successful uninterrupted completion of the entire course.	If a robot completes the course without being touched by the operator: 100 points. If a robot completes the course, but is picked up and repositioned by the operator once during that stage: 0 points.
5000 points divided by the time to complete the course in seconds.	Points for faster robots. The timer runs even when a robot leaves the line and is replaced.	If a robot completes the course in 25 seconds: 200 points.