

ECE 388: Electronics and System Engineering through Robotics Lab

Final project

Objective

Each team must construct and program a robot to follow a trail (meanwhile sweeping the dust out of the way), navigate itself to go through the maze, free the rover, and move three ice cores to the area on the northeast corner.

Field setup

Figure 1 shows the field setup. The whole field is divided into three areas: Area I, II and III. The Area I includes a black trail and dust (orange blocks). The Area II is a maze. Area III is Mission in Mars.

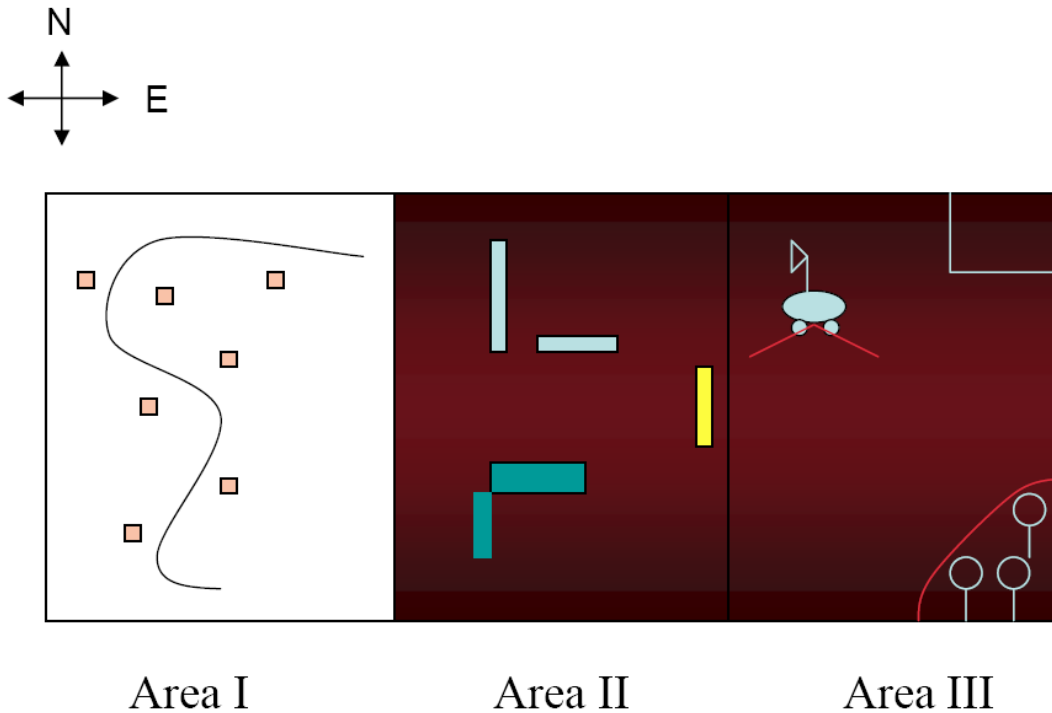


Figure 1: Field layout

Challenges and points

You robot must accomplish the challenges in 6 minutes to earn the points. If you robot is stuck in one of the areas, you could pick up your robot, download a new program, place your robot on the edge of the next area and continue. The time for downloading a new program will be deducted from the total 6 minutes. Every time you pick up your robot, there will be a 5 point deduction.

Area I

1. Your robot must be programmed to **sense** the presence of hazardous materials and **follow the trail** (30). Meanwhile the dust on the trail must be cleared so that the robot does not touch any (20, 10 if the dust is partially cleared).

Area II

2. Your robot must enter Area III by traveling through the maze in Area II without knocking over any obstacles in Area II (30, 15 if any obstacle is knocked over).

Area III (modified from 2003 FLL missions¹)

3. The Rover is stuck on a Sand Dune. The Rover must be freed so that it remains on its wheels but no longer touches the Sand Dune (15, 30 if the rover is moved back to Area I).

4. Three Ice Cores must be moved into the blocked area on the northeast corner. Moving fewer is worth partial points (10 for each ice core).

Extra points:

5. The robot move back to Area I from Area III by traveling through the maze in Area II (30, 15 if any obstacle is knocked over).

Skill test

The skill test is to build and program your robot to travel through the maze in Area II.