

Robomowers

Statement

In this activity you must create a program for two robomowers so as to mow the lawn ruled into squares with trees in some of them and a swamp surrounding the lawn.

Both robots use the same program defined by the arrays of arrows to the right of the lawn. Each robot can be in one of three states. Its current state is shown by a little symbol: blue circle, red triangle, or green square.

Each robot has two eyes: one sees the square on the robot's left, the other one sees the square in front of the robot. An eye determines what is in the square it observes: is it mowed clean or not, or it contains a tree, or the swamp, or the other robot. Depending on what the robot's eyes see and on its state, it performs one of the three possible actions: turns left, makes a step forward, or turns right, and also changes its state or leaves it intact according to what the program says. For more details see Help (Control Instructions) below.

The task is to mow as large area as possible. Of two solutions with the same number of mowed squares, the shorter one (which uses fewer steps) is considered to be better.

Your best solutions are saved automatically. You can return to them, using the *Load* buttons.

Help (Control Instruction)

Both robots follow the same rules (programs) defined by filling up three arrays, each corresponding to one of their three possible states (one can view the states as the strategies of robot's behavior). In each array, rows correspond to the view on the left of a robot and columns correspond to the view in front. For each state, the action that the robot must perform next given the left-hand and front views is selected by consecutive clicking on the arrow in its current square. Likewise, its next state is selected by clicking on the icon at the top left corner of the square.

Robots' motion can be observed in three modes specified by the common playback buttons under the lawn: step-by-step (single arrows), animated, or smooth (the arrow in the middle), and instantaneous (double arrows, which run the entire process at once). When robots run into each other or hit the swamp, they break and stop moving.

Buttons with captions on the panel at right allow to load and save any intermediate solutions; the best solution is saved automatically.