

# Robot Route

Program it for one maze. Teach it for every maze. Find where each one breaks.

## OBJECTIVE

Act 1: write a program that walks the robot through a maze. Act 2: don't program it. Teach it, by showing it what to do in four training mazes. Then let it loose on three test mazes it has never seen. Score 2 for a program that works and 3 for every test maze your robot finishes by itself.

## QUICK START – READ THIS, START PLAYING

- 1 Every move is: face that way, then step one square. A = ahead, L = left, R = right, B = back. Hit a wall or the edge and the robot crashes.
- 2 Act 1: in pencil, write a program for Training maze 1 on your Program Strip. No touching the robot. Then run it. Reached the goal? +2. Now run the same program on Test maze 1.
- 3 Act 2: walk the robot by hand through Training mazes 1-4. Before every step, look at what's open next to the robot, find that row on your Habit Sheet, and tally the move you make.
- 4 Then test: on Test mazes 1-3 the robot moves alone, doing the move with the most tallies in each situation. Reach the goal within 30 steps? +3.

## ACT 1 – PROGRAM IT

- 1 Everyone writes a program for Training maze 1, one move per box, in pencil. Don't touch the robot while you write. The shortest one is 16 moves.
- 2 Run each program move by move. Hit a wall or the edge = crash, and the run is over.
- 3 Reached the goal? +2.
- 4 Now put the robot on Test maze 1 and run the same program. Watch what happens. A program only knows the maze it was written for.

## ACT 2 – TEACH IT

- 1 Walk the robot through Training mazes 1, 2, 3 and 4, one at a time. Take turns moving it. Choose any route you like.
- 2 Before every step: look left, ahead and right of the robot. Find the matching row on your Habit Sheet, then tally the move you're about to make.
- 3 A situation not on the sheet? Then the robot has nothing to go on there. Don't tally it.
- 4 Tip: pick one habit and show it every time. A robot shown three different things in the same situation learns nothing useful.

## TEST IT

- 1 Put the robot on Test maze 1. Nobody steers now. Each step, find the situation's row and make the move with the most tallies.
- 2 No row for it, no tallies in it, or a tie: the robot freezes. That run is over.
- 3 Goal reached within 30 steps? +3. Still wandering at step 30? It's going in circles. Stop.
- 4 Run Test mazes 2 and 3 the same way. Most points wins. Ties share the win.

## WHAT THE ROBOT TEACHES

- 1 Program: exact steps for one problem. Perfect there, useless anywhere else.
- 2 Learning: a rule picked up from examples. It works on mazes it never saw. That's the whole reason to learn instead of program.
- 3 Only what it has seen: Test maze 2 has a crossroads. No training maze does, so there's no row for it, and a habit-taught robot freezes. Real AI gets stuck the same way on situations missing from its training data.
- 4 Edge cases: a habit that works almost everywhere can still fail badly. On Test maze 3 the keep-the-wall-on-your-right habit goes round in circles with the goal two squares away.
- 5 The robot can't see the goal. Neither can a learned rule. It only knows what its sensors tell it.