

Rover Programming Simulator Tutorial

Step-by-step instructions and example programs for Levels 1-7

Getting Started

1. Choose a **Level**. You may jump to any level at any time.
2. Choose a command in the Program pane, enter its value, and click **Add**.
3. Use the up/down buttons to reorder commands, or X to delete one.
4. Use **Step** to test one command at a time. Use **Run** for the whole program.
5. Use **Stop** or **Reset Rover** when needed. **Clear Program** removes all commands.
6. The challenge is complete when the rover finishes completely inside the green target.

Important: Progress is not saved. Choosing a new level resets the rover and clears the program.

Commands

Drive Forward/Reverse use millimeters. **Turn Left/Right** use degrees. **Set Drive Speed** and **Set Turn Speed** use percentages. **Wait** pauses. **Repeat Previous Command** repeats the command directly above it.

Sensor levels add **Drive Until Bumper** and **Drive Until Distance**.

Level 1 - First Drive

Goal: Drive straight into the target.

#	Example program
1	Drive Forward 1200 mm

Experiment by changing the distance 100 mm and watching where the rover stops.

Level 2 - Make a Turn

Goal: Combine straight driving with a 90-degree turn.

#	Example program
1	Drive Forward 650 mm
2	Turn Right 90 degrees
3	Drive Forward 1200 mm

Use Step first. Turning changes direction without changing location.

Level 3 - Obstacle Course

Goal: Plan a route around multiple obstacles.

#	Example program
1	Drive Forward 300 mm
2	Turn Left 90 degrees
3	Drive Forward 840 mm
4	Turn Right 90 degrees
5	Drive Forward 1020 mm

Try to find a different successful route after the example works.

Level 4 - Meet the Bumper

Goal: Use the bumper switch to find the wall, then back away and park.

#	Example program
1	Drive Until Bumper
2	Drive Reverse 200 mm
3	Turn Right 90 degrees
4	Drive Forward 300 mm

The Bumper status changes from open to PRESSED when the rover touches the wall.

Level 5 - Bumper Navigation

Goal: Use a wall as a known reference point, then navigate around the barriers.

#	Example program
1	Drive Until Bumper
2	Drive Reverse 100 mm
3	Turn Left 90 degrees
4	Drive Forward 940 mm
5	Turn Right 90 degrees
6	Drive Forward 1150 mm
7	Turn Right 90 degrees
8	Drive Forward 150 mm

The bumper establishes a physical reference instead of relying only on a guessed travel distance.

Level 6 - Distance Stop

Goal: Approach the wall without touching it, then turn toward the target.

#	Example program
1	Drive Until Distance 200 mm
2	Turn Right 90 degrees
3	Drive Forward 300 mm

Watch the live Distance value fall. Adjust the final drive distance if needed to center the rover.

Level 7 - Sensor Challenge

Goal: Use distance readings to navigate the tighter course without a collision.

#	Example program
1	Drive Until Distance 150 mm
2	Turn Left 90 degrees
3	Drive Until Distance 150 mm
4	Continue with turns and sensor-controlled drives

This level is intended for experimentation. Use Step frequently; there can be more than one successful program.

Debugging Tips

- If the rover hits a wall, reset it and reduce the distance or use a sensor command.
- If it turns the wrong direction, switch Turn Left and Turn Right.
- If it stops beside the target, change only one distance at a time.
- Use Step to identify exactly which command causes the problem.
- Changing speed changes how fast the simulation runs, not the requested travel distance.