

Logic: Automatic Thresholds Challenge

Automatic Threshold Challenge

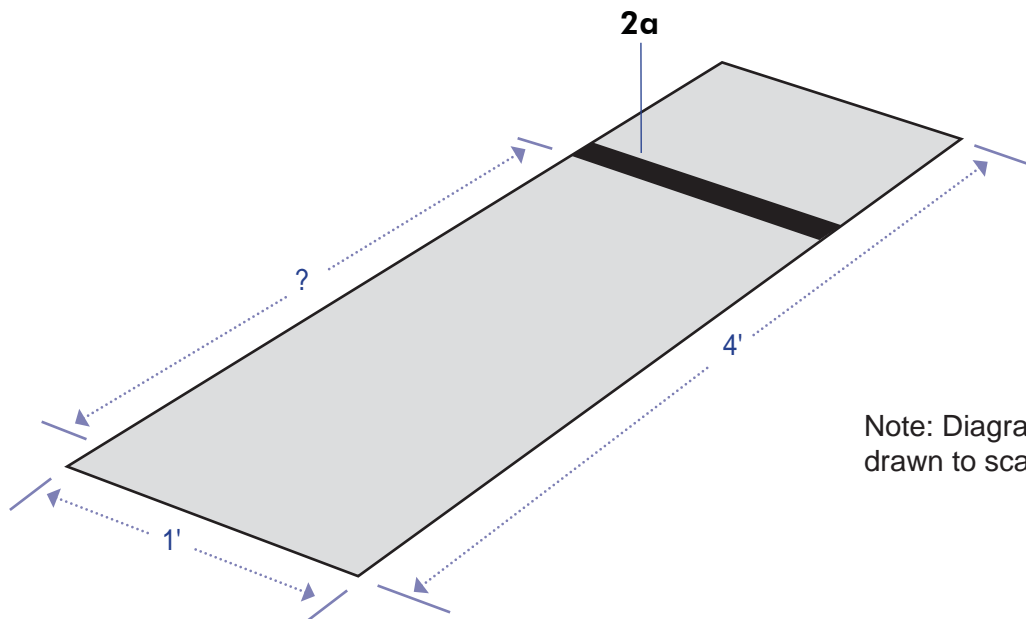
In this challenge, you will program the robot to record two Light Sensor values and calculate its own Light Sensor threshold. It will then use the calculated threshold to go Forward until Dark.

Materials

- 4' long light-colored smooth playing surface, at least 1' wide (hard floor, table, shelf, panel)
- Black removable tape to mark locations on playing surface

Playing Field Setup

1. Use part of a standard 4'x4' gameboard or floor space
2. Using the board diagram below:
 - a. **Goal Line:** Make a dark tape line for the robot to test its threshold
3. Complete the challenge as described in the Rules and Procedure section on the next page!



Note: Diagrams are not drawn to scale

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Rules and Procedure

The sequence below describes how a successful program will work. You must write your program so that it works in the same way.

1. Start with the robot in hand
2. Run the program on the robot:
 - a. **Record Dark value**
 - i. The robot prompts the operator to position the Light Sensor over a Dark area and press the NXT Enter button
 - ii. The operator places the robot's Light Sensor over the dark line and presses Enter
 - iii. The robot records the Light Sensor value for Dark
 - b. **Record Light value**
 - i. The robot prompts the operator to position the Light Sensor over a Light area and press the NXT Enter button
 - ii. The operator places the robot's Light Sensor over the light table surface and presses Enter
 - iii. The robot records the Light Sensor value for Light
 - c. **Calculate threshold**
 - i. Hint: The calculation for Light Sensor threshold is $(\text{Light} + \text{Dark}) / 2$
 - ii. The robot calculates the Light Sensor threshold and stores it for later use
 - d. **Run to line**
 - i. The robot prompts the operator to press the NXT Enter button one final time to make the robot run to the line
 - ii. The operator places the robot on the table facing the line and presses Enter
 - iii. The robot runs to the dark line and stops
3. Turn the room lights off and run the exact same program again
4. Beat the challenge by successfully calculating the threshold and moving to the dark line under both lighting conditions!

