

Simple Line Following (What's My Line?)

Time required: 60 minutes

Please read all the directions carefully before beginning the assignment.

- Comment your code as shown in the tutorials and other code examples.
- Follow all directions carefully and accurately.
- Think of the directions as minimum requirements.

Understanding

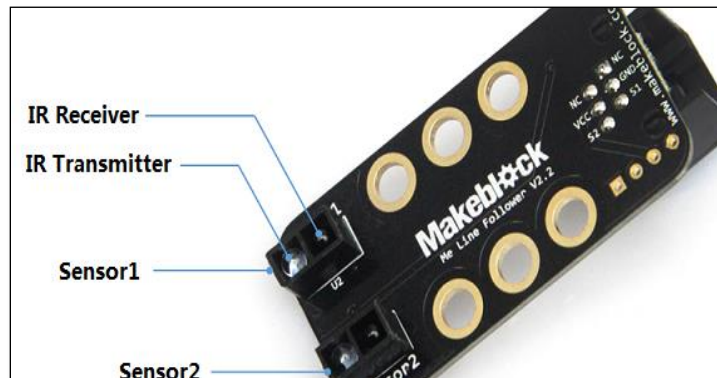
Demonstrate understanding of:

Line-follower sensor, if then else

Knowledge Points

Principles of the Line-follower Sensor

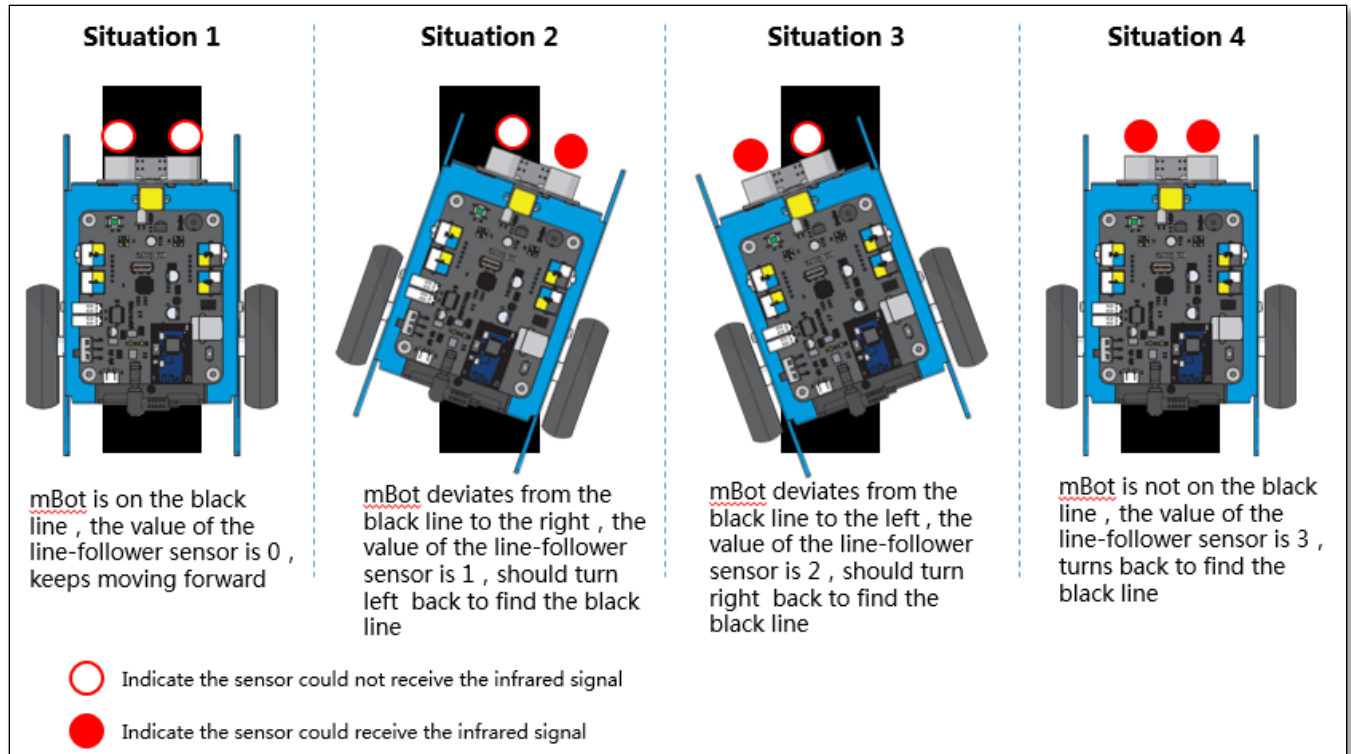
The line-follower sensor is below the robot (see the attached diagram), which consists of two sensors, Sensor 1 and 2, each consisting of an infrared emitter and an infrared receiver (see the attached diagram). As it is often used to keep the robot moving straight, it is called a line-follower sensor. Its detection range is 1 to 2 cm.



The infrared emitter continually emits infrared light during the mBot moving:

- If the infrared light is reflected (encountering white or other light color surfaces), the receiver receives the infrared signal and output the value 1 (now you can see the blue LED on the back of the line-follower sensor is lighted);
- If the infrared light is absorbed or cannot be reflected, the receiver will not receive the infrared signal but output the value 0.

The mBot line-follower sensors can detect a white line on a black surface, or a black line on a white surface.



- **Situation 1:** Line follower = 0. Both sensors detect a line indicated by both blue lights shutting off.
- **Situation 2:** Line follower = 1. The right sensor no longer detects a line indicated by the right blue light turning on. In order to get the mBot back on the line, therefore, we turn the mBot left until both sensors are activated and the mBot continues moving forward.
- **Situation 3:** Line follower = 2. The left sensor no longer detects a line indicated by the left blue light turning on. We turn the mBot right until both sensors are activated and the mBot continues moving forward again.
- **Situation 4:** Line follower = 3. Both sensors no longer detect a line. Run backward until the robot detects a line.

Sensor Position	Value
Both sensors over the line	0
Right sensor off line	1
Left sensor off line	2

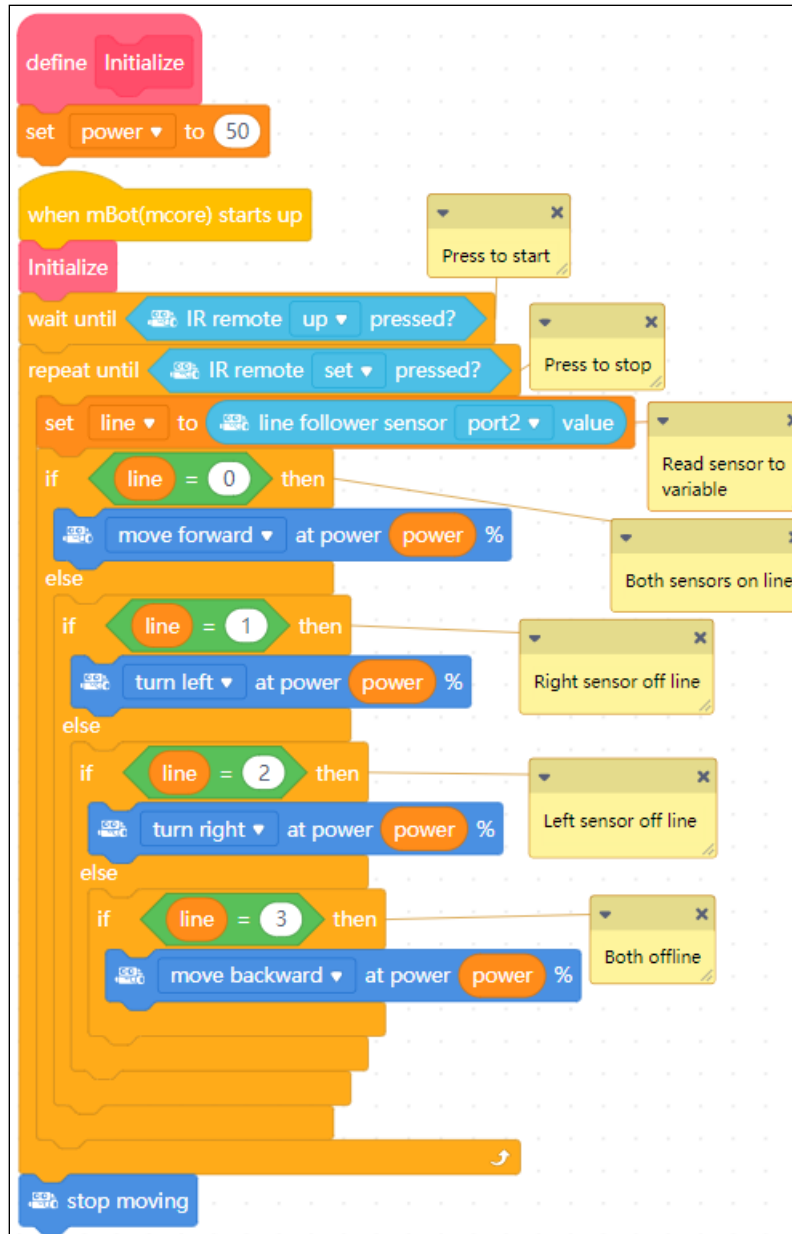
Both sensors off line	3
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Line Follower Track: A paper track came with the mBot in the box. A line follower track can also be made with foam board and black tape. Automotive cloth wiring harness, electrical tape, or duct tape works well.

Tutorial

Create the follow **Simple Line Following** program.

Test with the paper line following track that came with your mBot, or make your own.



Assignment

1. Add LED's to the program to indicate direction.

Assignment Submission

- **All students** → Attach finished programs to the assignment in Blackboard.
- **In class assignment submission** → Demonstrate in person.

- **Online submission** → A link to a YouTube video recording showing the assignment placed in the submission area in BlackBoard.