

Smart Line Following

Time required: 60 minutes

Please read all the directions carefully before beginning the assignment.

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

Understanding

Demonstrate understanding of:

line follower,

This sketch is based on the mBlock version. This version uses if, else if and nested if statements.

Tutorial Assignment

1. Start the Arduino IDE. Save the sketch as **SmartLineFollowing**.
2. Copy the file **Movement.h** into the sketch folder.
3. Complete and test the program as shown with the requirements listed.

```
1 /**
2   @file    SmartLineFollowing.ino
3   @author  William A Loring
4   @version V1.0.0
5   @date    Revised: 10/06/17 Created: 12/10/2016
6   @Description: Smart line following
7   Turn left or right to follow the line.
8   If the line is lost when turning, keep turning in the same direction
9 */
10 #include <MeMCore.h>
11 #include "Movement.h"
12 // Setup mBot hardware
13 MeIR ir;          // Setup IR Remote object
14 MeBuzzer buzzer;  // Setup Buzzer object
15 MeLineFollower lineFinder(PORT_2); // Setup LineFollower object
16 MeRGBLed led(0, 30); // Setup led object
17 bool turningLeft = true; // Store the state of turning left or not
18 int sensorState; // Store line follower sensor reading
19
20 void setup() {
21   led.setpin(13); // Set the pin for the led
22   ir.begin(); // Begin listening for the ir remote
23 }
24
25 void loop() {
26   if (ir.keyPressed(IR_BUTTON_UP)) {
27     followLine();
28   }
29 }
```

```

31 //-----
32 // followLine function
33 void followLine() {
34     while (true) {
35         // Read line follower sensors
36         sensorState = lineFinder.readSensors();
37
38         // Both on line, go straight ahead
39         if (sensorState == S1_IN_S2_IN) {
40             forward();
41             led.setColorAt(1, 0, 0, 0); //Set LED1 (LeftSide)
42             led.setColorAt(0, 0, 0, 0); //Set LED0 (RightSide)
43             led.show();
44
45             // Right off line, turn left
46         } else if (sensorState == S1_IN_S2_OUT) {
47             left();
48             led.setColorAt(1, 0, 60, 0); //Set LED1 (LeftSide)
49             led.setColorAt(0, 0, 0, 0); //Set LED0 (RightSide)
50             led.show();
51             turningLeft = true; // Track that the robot is turning left
52
53             // Left off line, turn right
54         } else if (sensorState == S1_OUT_S2_IN) {
55             right();
56             led.setColorAt(1, 0, 0, 0); //Set LED1 (LeftSide)
57             led.setColorAt(0, 0, 60, 0); //Set LED0 (RightSide)
58             led.show();
59             turningLeft = false; // Track that the robot is turning right
60
61             // Both off line, keep turning in the same direction
62         } else if (sensorState == S1_OUT_S2_OUT) {
63
64             // A nested if statement
65             // Keep turning left if already turning left
66             if (turningLeft == true) {
67                 left();
68                 led.setColorAt(1, 60, 0, 0); //Set LED1 (LeftSide)
69                 led.setColorAt(0, 0, 0, 0); //Set LED0 (RightSide)
70                 led.show();

```

```
71
72     // Keep turning right if already turning right
73 } else {
74     right();
75     led.setColorAt(1, 0, 0, 0); //Set LED1 (LeftSide)
76     led.setColorAt(0, 60, 0, 0); //Set LED0 (RightSide)
77     led.show();
78 }
79 }
80 }
81 }
```

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.