Default Program 2: Smart Obstacle Avoidance - Arduino

Time required: 120 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:

ultrasonic sensor

Add Smart Obstacle Avoidance to the mBot default program in Arduino.

Assignment

1. Start the Arduino IDE. Open **DefaultProgram1 a**nd save it as **DefaultProgram2**.
2. Add the appropriate code from the **SmartObstacleAvoidance** program to the default program. You should be able to copy and paste some of the code.
3. Add an if else statement to access the B button as shown.
4. Use the **ObstacleAvoidance()** function to catch the mode change.
5. Remove the **while (true)** loop from the ObstacleAvoidance() function.

NOTE: Remove the led code from the **ObstacleAvoidance** function. For some reason you can't change to another mode with led code in the mode change function.

6. Modify the **Movement.h** file if necessary.
7. Complete and test the program with the requirements listed.

Requirements

- Test the obstacle avoidance.
- Button A: Remote Control
- Button B: Smart Obstacle Avoidance

```
MeUltrasonicSensor ultrasonic(PORT_3);  // Setup the ultrasonic sensor object
int sensorState;  // Store ultrasonic sensor reading
int DetectL;      // LookLeft sensor reading
int DetectR;      // LookRight sensor reading
bool ObstacleDetected = false;  // Is there an obstacle ahead or not?

void setup() {
  ir.begin();     // Start listening to the remote
  led.setpin(13); // Set the Arduino pin for the led's
  Init();         // Play initialization sounds and show LED's
}

void loop() {
  SetMode();            // Check ir remote for mode setting
  RemoteControl();      // Check for modeFlag set to 0 for Remote control if Button A is pressed
  ObstacleAvoidance();  // Check for modeFlag set to 1 for Obstacle avoidance if Button B is pressed
}

//-------------------------------------------------------------------------------------------
// Determine the robot's mode of operation, A or modeFlag 0 - Remote Control is default
//-------------------------------------------------------------------------------------------
void SetMode() {
  // Determine which remote button was pressed
  if (ir.keyPressed(IR_BUTTON_A)) {
    delay(DEBOUNCE);
    modeFlag = 0;           // Set Mode A, Remote Control
    playNote(noteC4, HN);   // Play note to indicate mode change
  } else if (ir.keyPressed(IR_BUTTON_B)) {
    delay(DEBOUNCE);
    modeFlag = 1;           // Set Mode B, Obstacle Avoidance
    playNote(noteD4, HN);   // Play note to indicate mode change
  }
}

```

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.