Obstacle Avoidance with Warning and Random Turns (Look Out!) - Arduino

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:

ultrasonic sensor

While Loop

A while loop is like the mBlock **repeat until** block. This loop keeps going until a condition is met.

In this example, the condition is **true**, the loop repeats forever.

```
while (true) {
    // Your code here
}
```

In the example program below, the keep away part of the program will continue to repeat until the set button is pressed. The program exits the loop. The mBot stops moving.

In this example the value of the ultrasonic sensor indicates the distance between mBot and the object in front of it. Given the threshold of 15cm, mBot will keep moving forward until its distance from the object is less than 15cm; the mBot will stop immediately when its distance from the object is less than 15cm.

Requirements

- The robot randomly turns left or right to avoid an obstacle and gives a visual warning.
- Test obstacle avoidance with your foot.

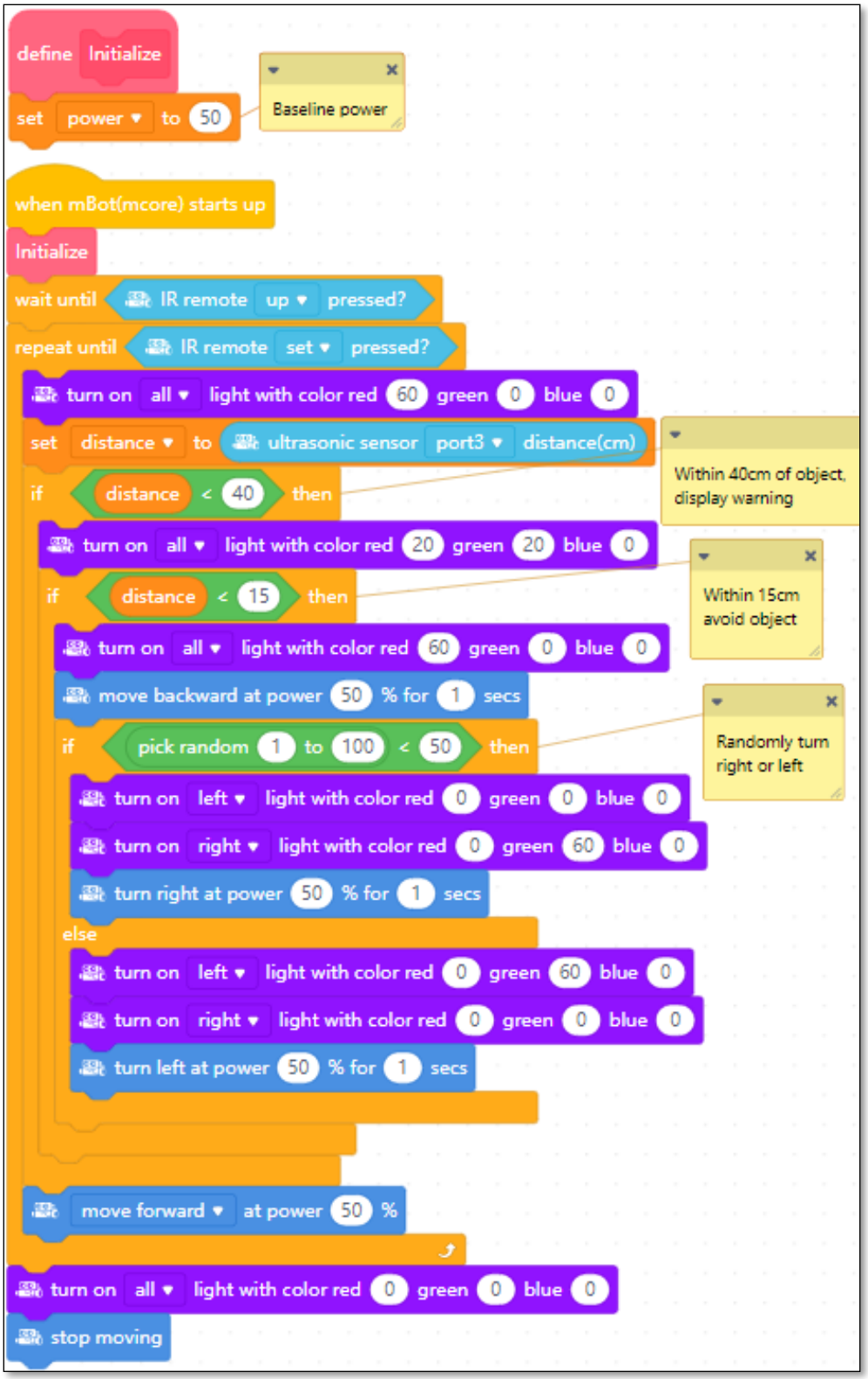
Assignment

1. Open Arduino **SimpleObstacleAvoidance**
2. Save the sketch as **ObstacleAvoidanceWithWarning**
3. The Arduino program **RandomLED's** will show how to do random numbers.

This pseudocode shows how to make a decision based on random numbers.

```
if(random(0, UPPER_RANDOM) < 50){
  turn right
}else{
  turn left
}
```

4. Complete and test the program with the requirements listed.
5. Use the following mBlock program as a starting point.



- Stop first, then play a sound when an object is detected.

- Experiment with the detection distance.

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.