

Activity 6 – Obstacle Avoidance

Overview

Learn how to program a robot to avoid an obstacle using input from the Ultrasonic Sensor.

Materials Needed

- Assembled robot
- Engineering logbooks
- “Obstacle Avoidance” student page
- Bins
- Cardboard boxes
- Painter’s tape

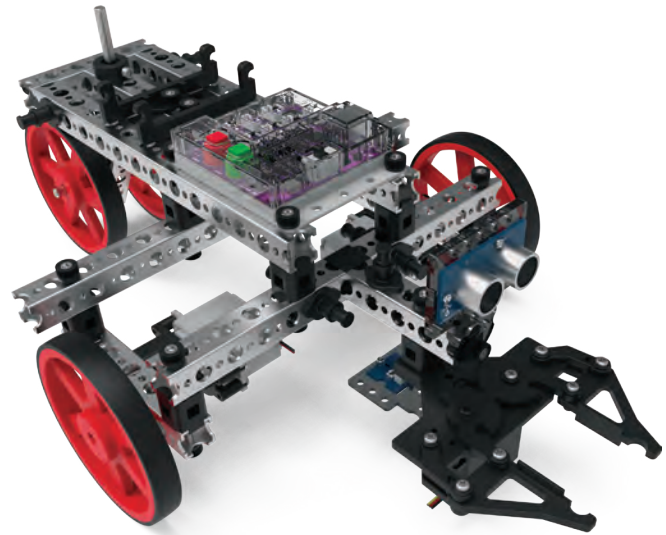
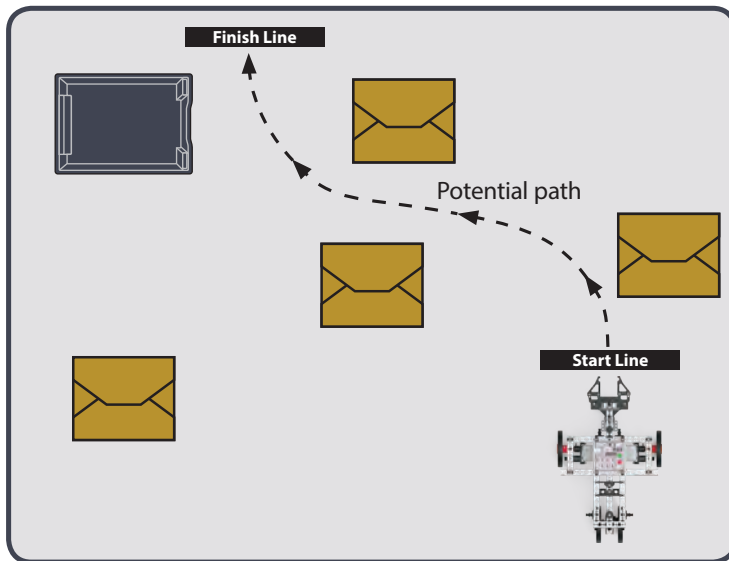
Vocabulary

- distance
- obstacle
- ultrasonic

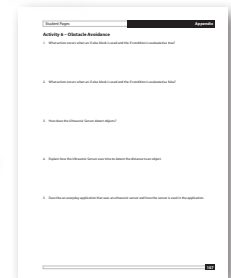
Procedure

Days 1-2

1. Get into your teams.
2. Review the activity vocabulary.
3. Locate your assembled robot with PULSE controller and sensors attached.
4. Look over the driving course your teacher has set up. The PRIME bins and cardboard boxes could be used as obstacles.



Bins




“Obstacle Avoidance” student page



Cardboard boxes



Tape

 **Tip:** This is a suggested course layout.

5. Open the *TETRIX Ardublockly* software.
 - You will program your robot to navigate through a series of obstacles using the Ultrasonic Sensor.

6. Create a program that executes these instructions:
 - Drive forward until an obstacle is detected.
 - Stop and reverse for a specified time.
 - Make a slight turn.
 - Drive forward until an obstacle is detected.
7. Here are some programming tips:
 - You will need the setup-loop block, pulse Begin block, pulse Invert Motor block, and pulse Set Motor Powers blocks.
 - You can use the if-do block with the Ultrasonic Sensor. If the sensor doesn't detect an object within 25 cm, it will drive forward. If it does detect an object, the robot will reverse and turn before driving forward again.
8. Connect the PULSE controller to your computer and load your program on the PULSE controller.
9. When you see a green LED, you can unplug the cable from the controller on the robot.
10. Test your program operation using an obstacle before testing on the course.
11. Revise your program as needed to successfully complete the activity.
12. Complete the "Obstacle Avoidance" student page.
13. You will use the same robot for the next activity. Store but do not disassemble the robot.



Tip: The Ultrasonic Sensor detects objects by using sound waves. The value it reads is the time required for the sound wave to travel from the sensor to the object and back.