Obstacle Avoidance

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Approximate Time Needed	15 - 30 min
Grades	6 - 8
Mat Required	Any
Standards	Click Here

Overview

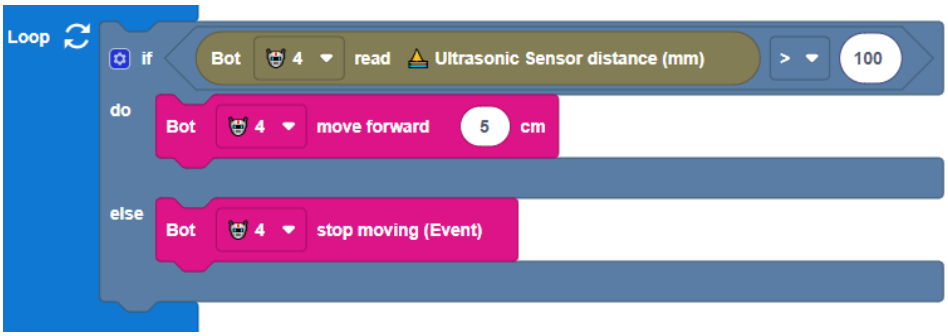
When we make our robots move autonomously, we need to make sure they don't smash into anything! Imagine if our robots crashed and caused damages to themselves and the surroundings! Let's code some obstacle avoidance.

Obstacle Avoidance

Avoiding an obstacle is fairly easy, and just requires a basic if/else statement. The problem is simple, if the distance of the ultrasonic is greater than 100 (no object within 10cm), then move forward. Otherwise, stop the robot.

To code this, we will need to grab the if statement code block from the ***Logic*** tab. Grab the = code block as well and put it into the if statement condition section. Then we need to grab the ultrasonic distance code block from ***Sensors > On-board*** and put it into the first input, and a number from the ***Math*** tab in the second input, with value 100. Remember to change the sign of the comparison code block, from = to >. This should mean that *if* the ultrasonic distance is less (>) than 100, do...

In the if statement, we will put our move forward code block (we will move it forward by 5cm). Tap the cog in the if statement, and add an else. Now put the stop moving code block in the else section. The moving code blocks are under ***Motion > Basic***.



Great work! This should now work, avoiding any object you place in the robots way! Tap run and make sure this works, if it doesn't revisit the steps above. If you are having trouble look at the image below.

Self-Assessment (Recap Questions)

1. What did I not complete?
(Reflect on any unfinished parts of the mission.)

2. What did I learn?
(Describe coding skills, historical facts, or problem-solving strategies.)

3. What was easy?
(Identify aspects of the lesson that were straightforward.)

4. What was hard?
(Explain challenges faced during coding or historical analysis.)

5. Did I enjoy this lesson? Why or why not?
(Personal reflection on engagement and interest.)

Rubric for Obstacle Avoidance Lesson Plan

Criteria	4pts - Excellent	3pts - Proficient	2pts - Developing	1pt - Needs Improvement
Understanding of Obstacle Avoidance Concept	Clearly explains how the ultrasonic sensor and if/else logic work together to avoid obstacles.	Understands the basic concept but may struggle to explain details.	Partial understanding; needs guidance to explain.	Little to no understanding of the concept.
Correct Implementation of Code	Code is fully functional with proper if/else logic, correct sensor usage, and smooth movement.	Code works but may have minor errors (e.g., incorrect comparison operator).	Code has significant errors but shows some understanding.	Code does not function as intended.
Troubleshooting & Debugging	Independently identifies and fixes errors in the code.	Needs minimal assistance to correct mistakes.	Requires significant help to debug.	Unable to troubleshoot without instructor support.
Self-Assessment & Reflection	Thoughtful and detailed responses to all recap questions.	Answers all questions but with limited depth.	Provides brief or incomplete reflections.	Little to no reflection provided.
Engagement & Participation	Actively engaged, asks questions, and helps peers.	Completes tasks but may not seek additional challenges.	Minimal engagement; requires prompting.	Disengaged or off-task.

Scoring Guide:

- **16-20 pts:** Mastery – Student demonstrates full understanding and application of the lesson.
- **11-15 pts:** Proficient – Student completes the task with minor errors or gaps.
- **6-10 pts:** Developing – Student struggles but shows some comprehension.
- **1-5 pts:** Needs Improvement – Student requires significant support to complete the task.