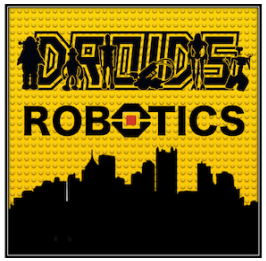
ADVANCED EV3 PROGRAMMING LESSON

PROPORTIONAL ULTRASONIC WALL FOLLOWER



By Droids Robotics

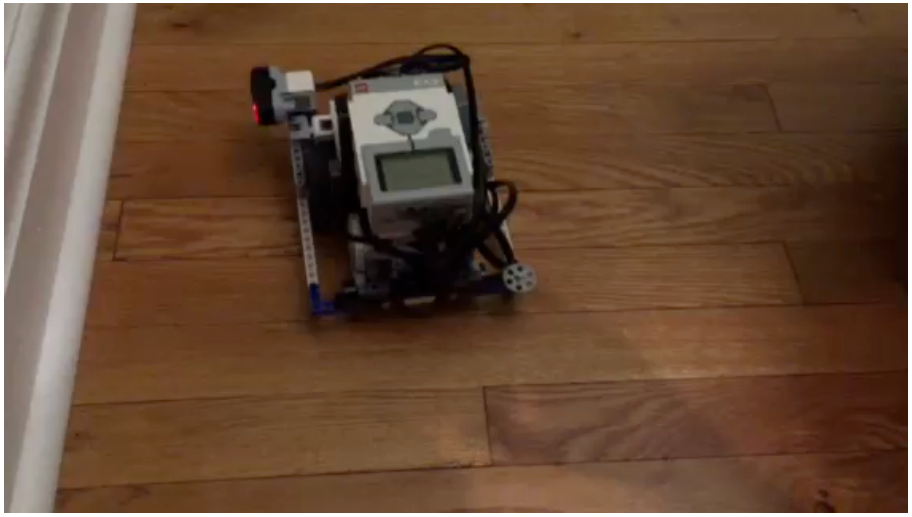
Objectives

- Learn how to use proportional control with the ultrasonic sensor to follow walls

- Prerequisites: Data Wires, Proportional Control, Loops, Math Blocks, Sensor Blocks

Challenge: Proportional Wall Follower

- **Challenge:** Write a wall follower program that uses the ultrasonic sensor and proportional control
- **STEP 1:** (Calculate the error) Subtract the target distance from the Ultrasonic value.
- **STEP 2:** (Apply the correction) Use the error from the previous step as the steering in a Move Steering block. You may need to multiply the error by a magic number to make your robot smoother
- **STEP 3:** Repeat the above steps in a loop

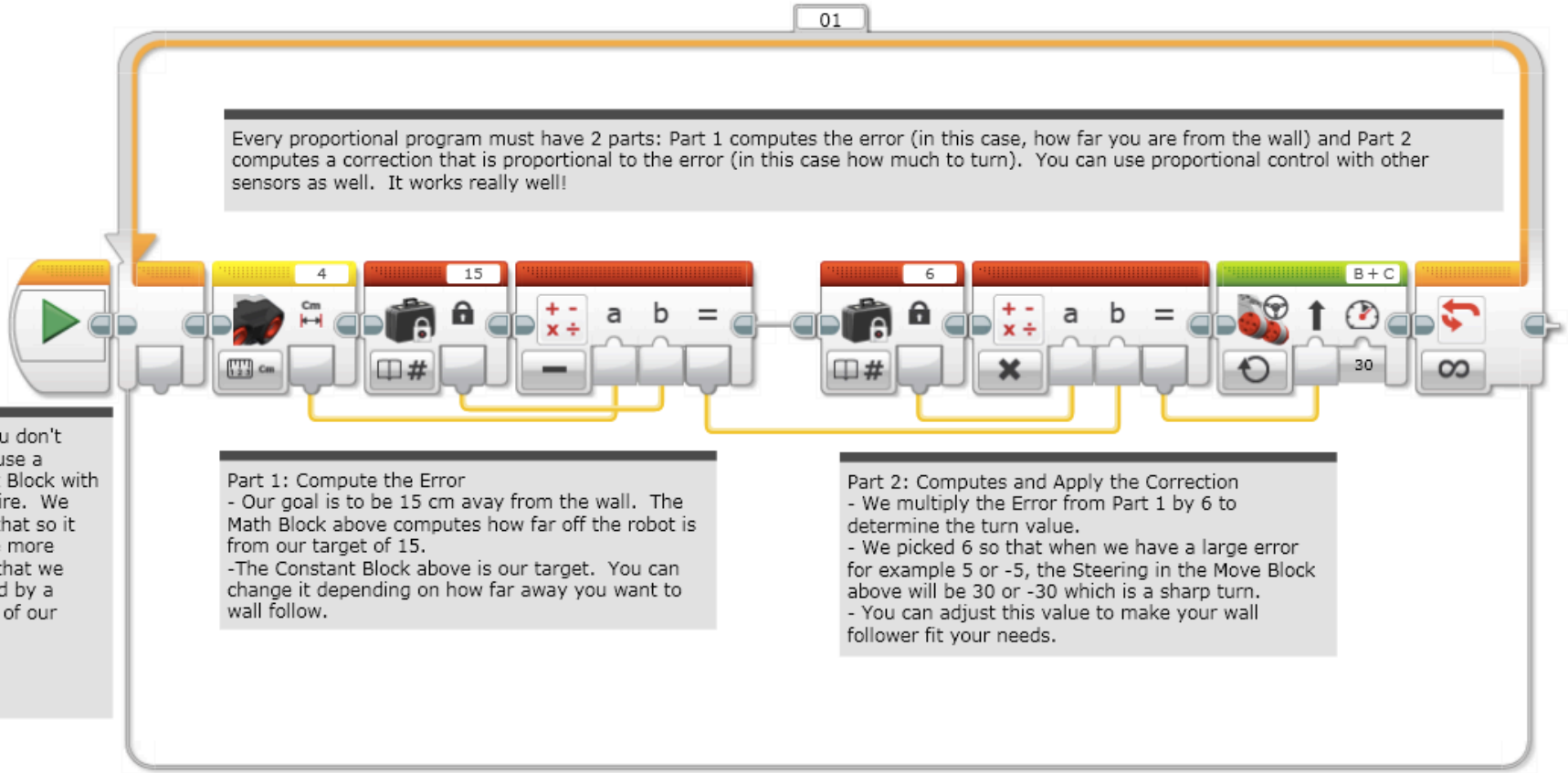


Play the video to see how the robot should move

Do you notice any differences from the wall followers in the Intermediate Ultrasonic Wall Follower Lesson?

Challenge Solution

We recommend that you use a proportional wall follower like this one. A proportional wall follower changes the angle of the turn based on how far away from the line the robot is.



Every proportional program must have 2 parts: Part 1 computes the error (in this case, how far you are from the wall) and Part 2 computes a correction that is proportional to the error (in this case how much to turn). You can use proportional control with other sensors as well. It works really well!

Note: You don't need to use a Constant Block with a data wire. We just did that so it would be more obvious that we multiplied by a constant of our choice.

Part 1: Compute the Error
- Our goal is to be 15 cm avay from the wall. The Math Block above computes how far off the robot is from our target of 15.
-The Constant Block above is our target. You can change it depending on how far away you want to wall follow.

Part 2: Computes and Apply the Correction
- We multiply the Error from Part 1 by 6 to determine the turn value.
- We picked 6 so that when we have a large error for example 5 or -5, the Steering in the Move Block above will be 30 or -30 which is a sharp turn.
- You can adjust this value to make your wall follower fit your needs.

Credits

- This tutorial was created by Sanjay Seshan and Arvind Seshan from Droids Robotics.
- More lessons are available at www.ev3lessons.com
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