

INTERMEDIATE PROGRAMMING LESSON



TURNING MY BLOCK

By Sanjay and Arvind Seshan



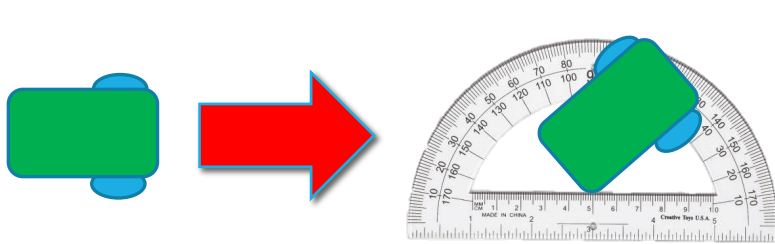
EV3 CLASSROOM LESSON
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Lesson Objectives

1. Create a useful My Block
2. Learn to make a My Block that will take inputs based on measurements with a protractor
3. Make a Turning My Block

Prerequisites: Turning, My Blocks with Inputs and Outputs, Data Wires, Math Blocks, Port View

Rotation vs. Protractor Degrees



45 degree turn by the robot in the real world can be measured with a protractor.

We call this protractor degrees.



You can use the EV3 to measure how much your wheel turns. **We call this rotation degrees.**

- Just like Move_CM, you can also create a My Block for turns. In Move Centimeters, we had to figure out how much the robot wheels rotate for one CM.
- To make a Turn Degrees My Block, you have to figure out how much your rotation sensor on the motor turns for one degree on a protractor.

Turn Degrees in 3 Easy Steps

STEP 1: How many rotation degrees does the robot turn for every 1 protractor degree?

STEP 2: Create a Turn_Degrees My Block with 2 inputs (Degrees and % Speed)

STEP 3: Define the Turn_Degrees My Block

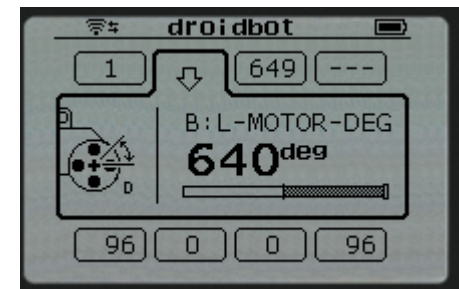
Step 1: Measuring Rotation Sensor

Calculate how many motor degrees are in 1 protractor degree

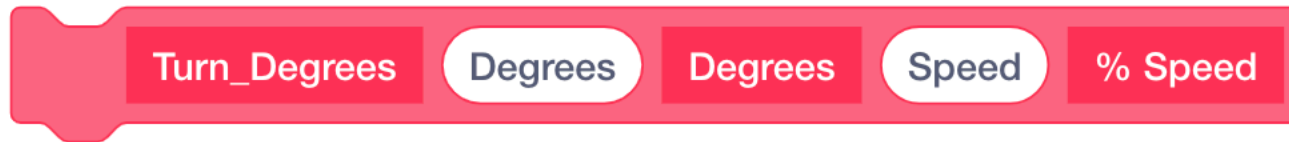
- Go to Port View and pick the rotation sensor on your motor
- Hold one wheel in place and only turn the other wheel (Pivot Turn). Turn the robot any number of degrees you choose. Make sure the wheels don't slip when you do this.
- Look at the Motor Degree value and divide by the number of protractor degrees you turned.
- This is the number of rotation degrees in 1 protractor degree.

An example using Droid Bot

- Robot was turned 90 protractor degrees
- Using Port View, the motor moved 330 degrees
- $330 \text{ motor degrees} / 90 \text{ protractor degrees} = 3.7$



Step 2: Create Turn_Degrees My Block



Add an input
number or text



Add an input
boolean

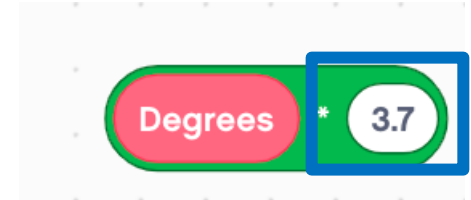


Add a label

Step 3: Define the My Block

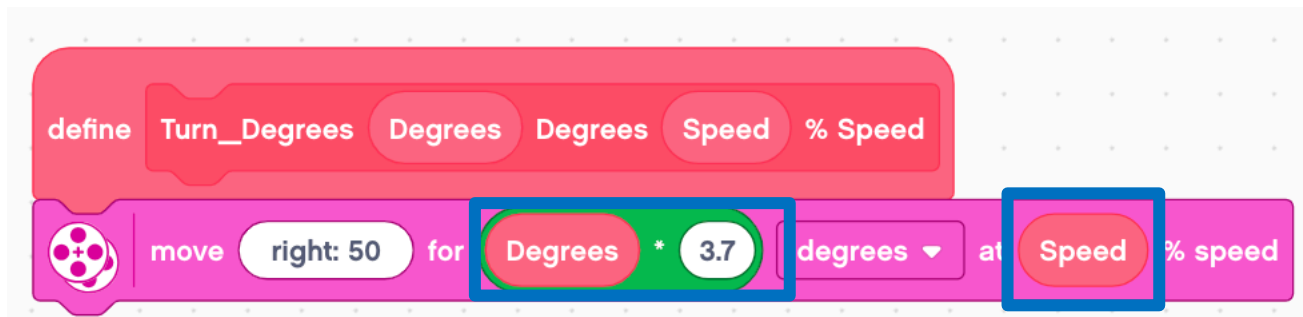
Use a Multiplication Math Block to Calculate the number of degrees the robot will turn in 1 protractor degree

- Drag the Degrees input into the first parameter of the math block
- In the second parameter of the math block, enter the number of degrees your robot turns for every protractor degree. (For Droidbot, this is 3.7)



Add a Moving Block under the define block

Place the Math Block in the distance parameter and the Speed input in the % Speed Parameter



Step 4: Use the My Block

Now, when you drag the block into your programming canvas, you just need to enter the number of protractor degrees you want the robot to move and the speed it should move at.

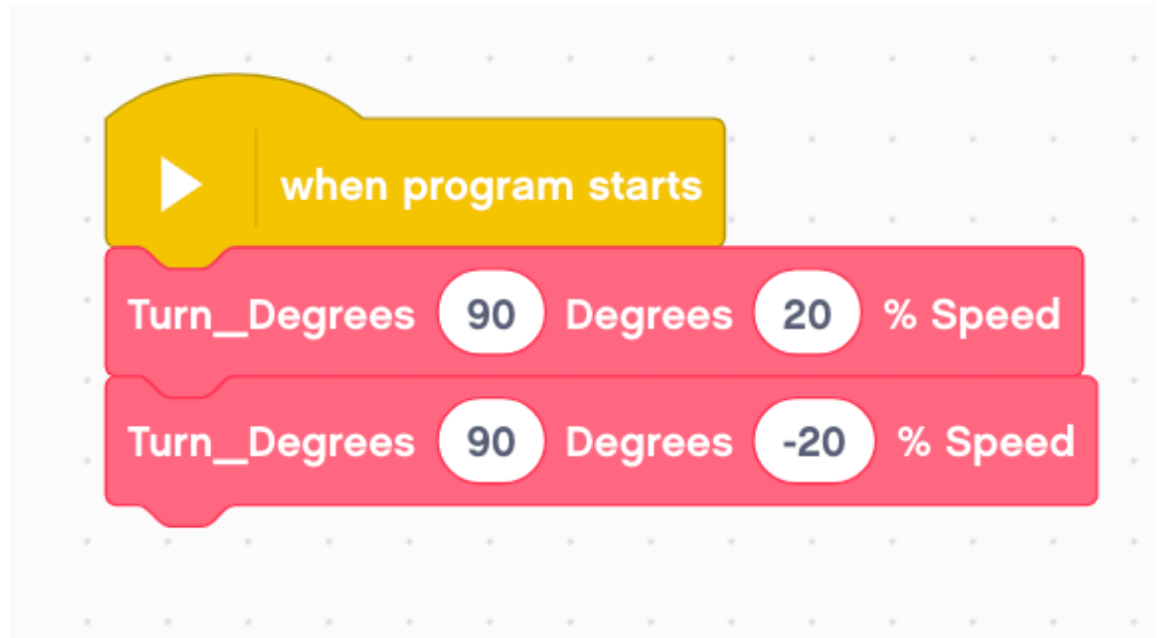
In the example below, the robot will turn 90 degrees at 20% speed



Reusable Turn_Degrees Block

The new Turn_Degrees My Block can be used multiple times.

In this example, it is used to turn 90 degrees right and left by changing the % Speed Input.



Discussion

Why is a Turn_Degree My Block useful?

- You can measure turns using a protractor and input this number into your turn block

Will changing the inputs in one copy of Turn_Degrees impact another copy of it?

- No. That is exactly why a My Block is useful. You can use the same block multiple times, each time using a different number for power and degrees (or any other parameter you set up).

Can you alter a My Block after it is made?

- Right click on the My Block and click edit

Credits

This tutorial was created by Sanjay Seshan and Arvind Seshan

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