

# BEGINNER EV3 PROGRAMMING LESSON



Using Sensor Data and Port View



By: Droids Robotics

# LESSON OBJECTIVES

1. **Learn how to retrieve and use data from your sensors**
2. **Learn how to use Port View on the EV3 Brick**
3. **Learn some examples of when and where Port View would be useful**
4. **Try to solve some common problems using Port View**

# WHY DO YOU NEED SENSOR DATA?

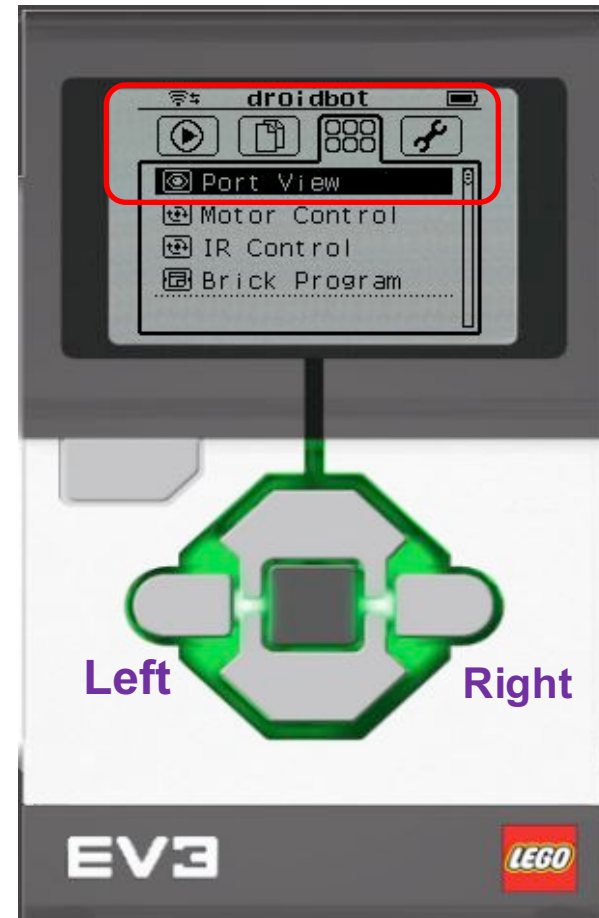
**Sensor data can be....**

- Used to help program more easily (no more guess and check!!)
- Used to help program more accurately
- Used to debug code as well as build issues

**PORT VIEW is an easy way to access SENSOR DATA!**

# HOW DO YOU GET TO PORT VIEW?

- **Step 1:**
  - Click the Left or Right buttons on the brick until you get to the third tab on the screen (icon with six small circles).
  - The first choice in this tab is Port View. (Click the middle button on the brick to select Port View)
- **Step 2:**
  - Use the Left and Right Buttons to pick the port and sensor/motor you want



All images of the EV3 Brick in this lesson were obtained using screenshots of Cogmation's Virtual Robotics Toolkit

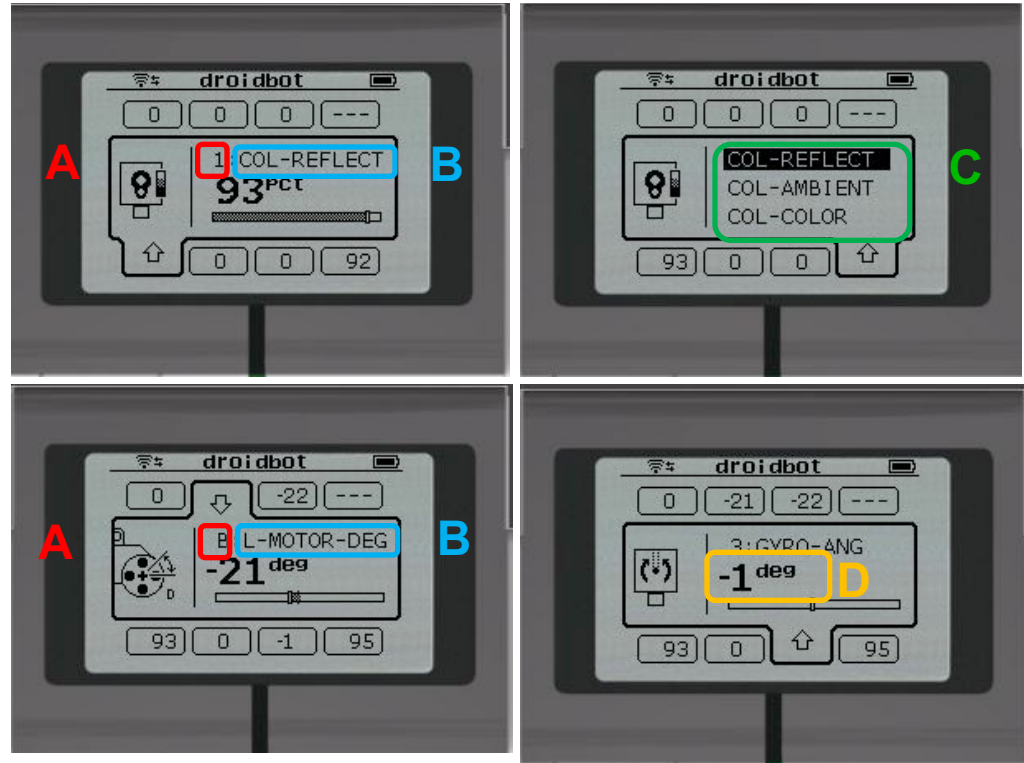
# WHAT YOU SEE IN PORT VIEW

**A. PORT Number**

**B. SENSOR/MOTOR & MODE**

**C. If you select a particular sensor (middle button on brick), you can change the MODE**

**D. VALUE . You might want to start at “0” (e.g. If trying to measure degrees for a turn). To reset the value, exit Port View and return to back to this screen.**



All images of the EV3 Brick in this lesson were obtained using screenshots of Cogmation's Virtual Robotics Toolkit

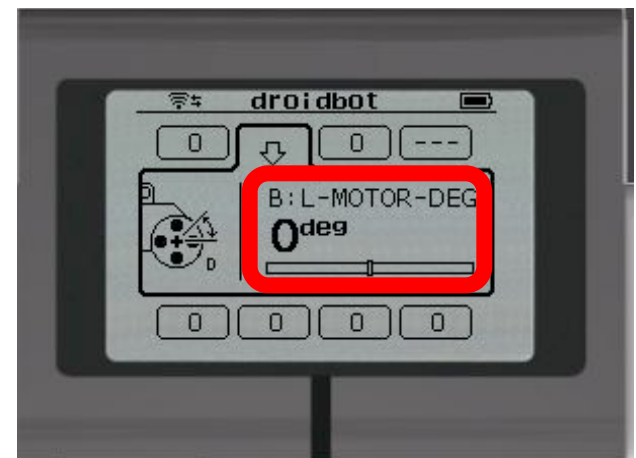
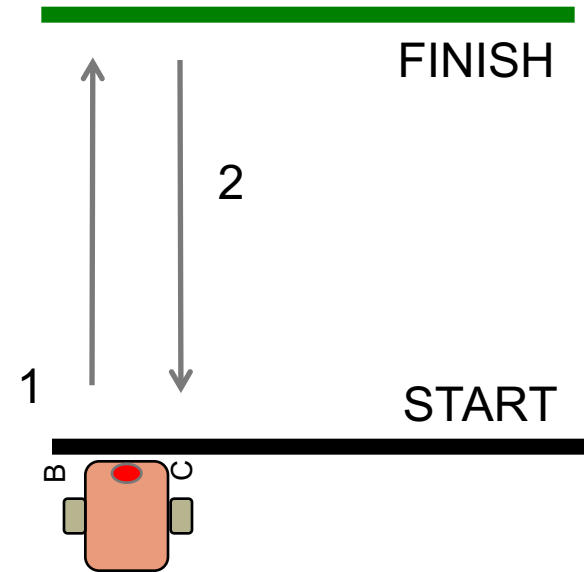
# MOVE STRAIGHT CHALLENGE

**CHALLENGE:** Move your robot forward from the start line to the finish line (1) and back to the start (2).

In the Moving Straight Lesson, you had to use a lot of guess and check to stop exactly on the second line.

Now try Port View:

- Go to one of the rotation sensors (Motor B or C for our robot on the right)
- Make sure it is on degrees as the mode and that it starts at 0 degrees.
- Move your robot with your hand from the start line to the end line. Make sure that your wheel turns smoothly and doesn't slip as the robot moves.
- Read how many degrees your robot moved
- Use this number in the Move Steering Block to move the correct distance.



# **PORT VIEW IS POWERFUL**

**As you go through the rest of the lessons on EV3Lessons.com, you will use Port View often**

**As you complete each challenge, think about how Port View might help you.**

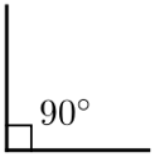
**The next page has many several examples to think about.**

# OTHER PROBLEMS YOU CAN SOLVE WITH PORT VIEW



## Challenge 1: Program Easier/More Accurately

I want to go from a starting point up to a LEGO model. I keep having to guess and check. How can I figure out how far away the LEGO model is?



## Challenge 2: Program Easier/More Accurately

I want my robot to turn 90 degrees. But 90 degrees in the real world is not 90 degrees in the steering block. So, how much does my robot have to turn to make a 90 degree turn?



## Challenge 3: Debug Code

The robot does not follow the green line like I programmed it to do. Why not? What color does the robot think that green line is? Try placing the robot on different objects or parts of mat/picture – what colors or reflected light values does the sensor read



## Challenge 4: Check Builds

I built my robot with the touch sensor a little bit inside the robot. I am not sure that the touch sensor is getting pressed enough. How can I make sure the sensor is getting pressed?



## Challenge 5: Test Sensors

I told my robot to stop when the Ultrasonic sensor is 20cm away. But it seems to stop earlier. Is the sensor working correctly? How can I see what the ultrasonic sensor sees?



# CREDITS

- This tutorial was created by Sanjay Seshan and Arvind Seshan from Droids Robotics.
- More lessons are available at [www.ev3lessons.com](http://www.ev3lessons.com)
- Author's Email: [team@droidsrobotics.org](mailto:team@droidsrobotics.org)



This work is licensed under a [Creative Commons Attribution-NonCommercial-ShareAlike 4.0 International License](https://creativecommons.org/licenses/by-nc-sa/4.0/).