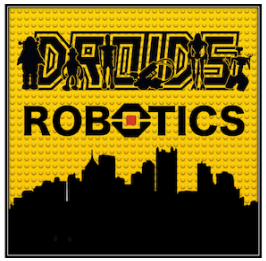
ADVANCED EV3 PROGRAMMING LESSON

Data Logging (Part 2)



By Droids Robotics

Lesson Objectives

- Learn what data logging is
- Learn the different ways of doing data logging on the EV3
- Learn how to use the Data Logging Block
- Prerequisites: Must own Edu version of EV3 Software

What is Data Logging?

- The EV3 software provides a simple way to continuously record sensor readings to a file and to plot the values later. This is called *Data Logging.*
- Why use Data Logging:
  - Great for science experiments. In Part 1, we will show how you can record values like temperature for a science project.
  - Great for understanding robot programming blocks. In Part 2, we will show how to use data logging to measure the difference between turns.
  - Great for understanding sensor behavior. In Part 3, we will show how to use data logging to understand the details of sensors such as the gyro sensor.

How do you Data Log on an EV3?

There are 4 ways to data log using the EV3 MINDSTORMS:

Lesson 1: Temperature Sensor Experiment

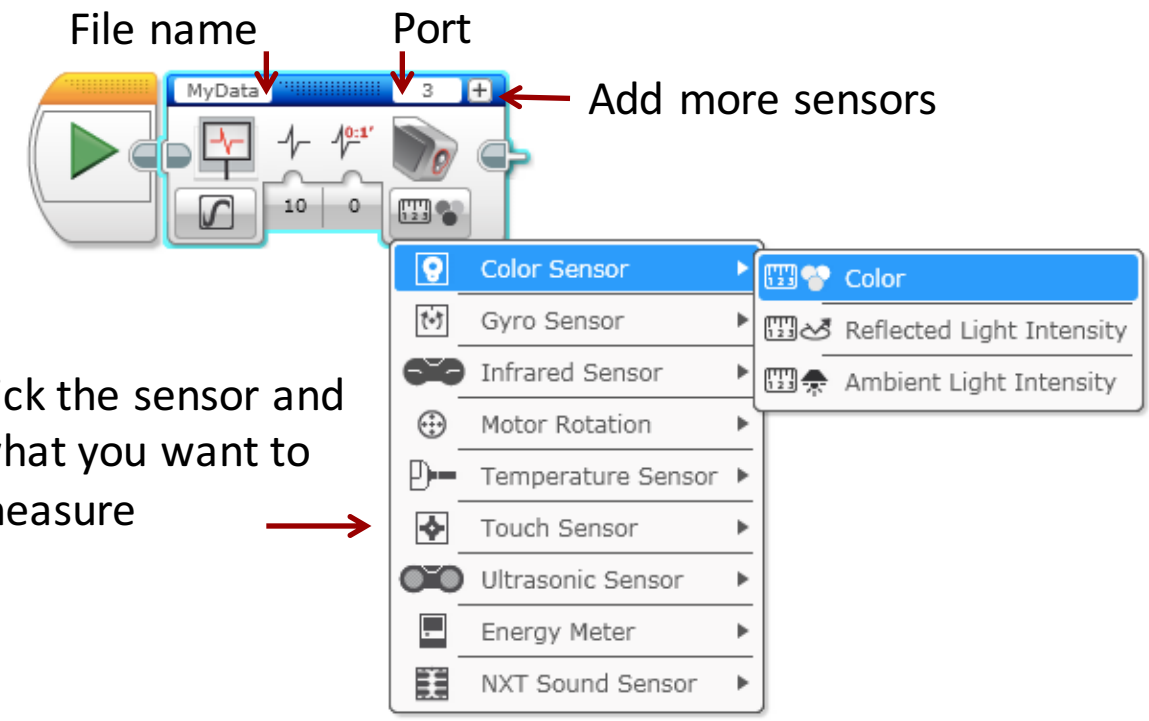
1. Live Data Logging: Real time data collected directly in the EV3 software
2. Remote Data Logging: Use the the brick to collect data, and transfer the data to the computer for analysis
3. Brick Data Logging: Run the experiment directly from the brick

Lesson 2: Differences Between Turns

4. Autonomous. Collect data with the Data Logging block. The data is stored on the brick.

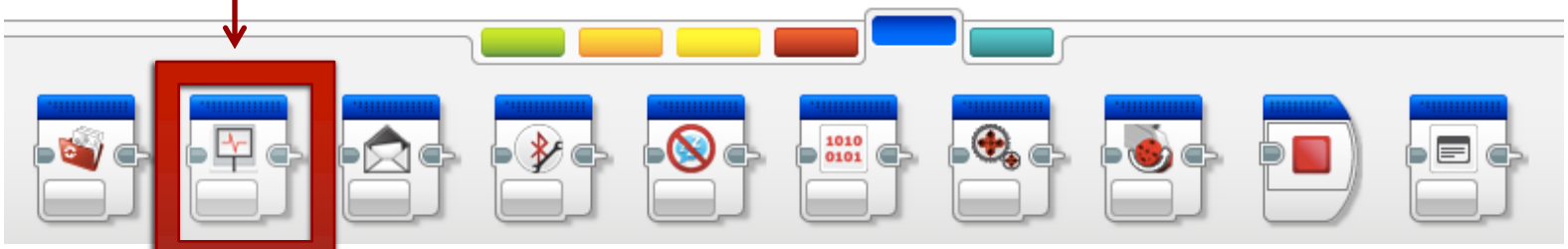
Autonomous Data Logging

Autonomous Data Logging requires the Data Logging Block



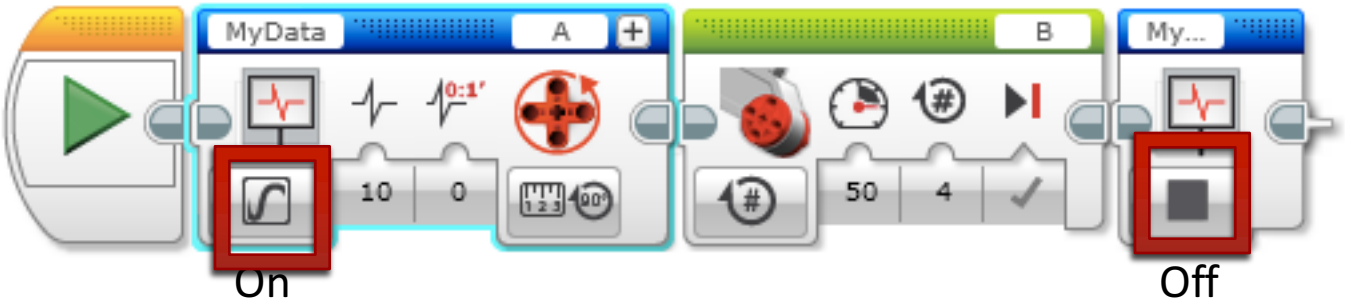
Pick the sensor and what you want to measure

Data Logging block is in the blue tab



How do you use the Data Logging Block?

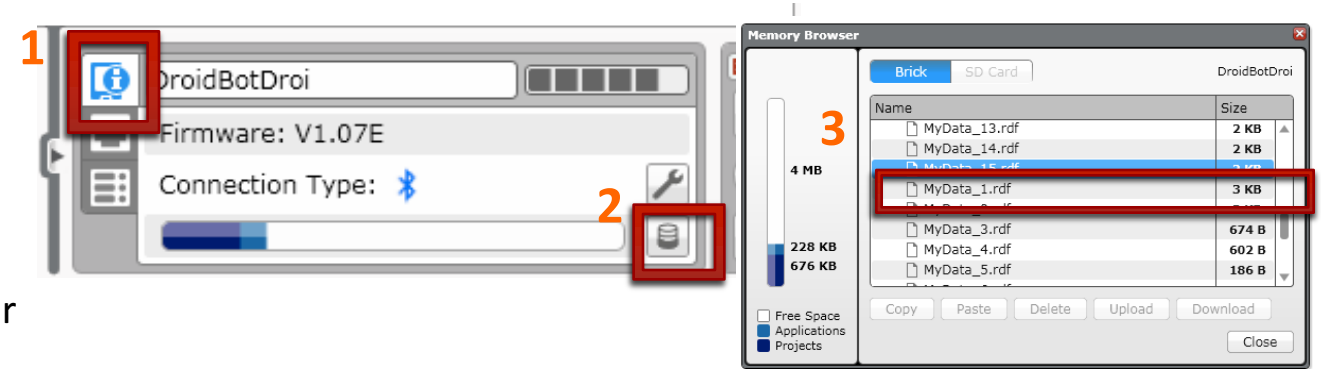
- To use this block, simply drag a Data Logging Block in front of the code you want to log and turn it “on”. To stop logging, add another Data Logging Block set to “off”.
- Pick all the other parameters – the ports, the sensors you want to log, what you want to record (rotations/degrees, etc.)
- Download and run program



How to View your Data

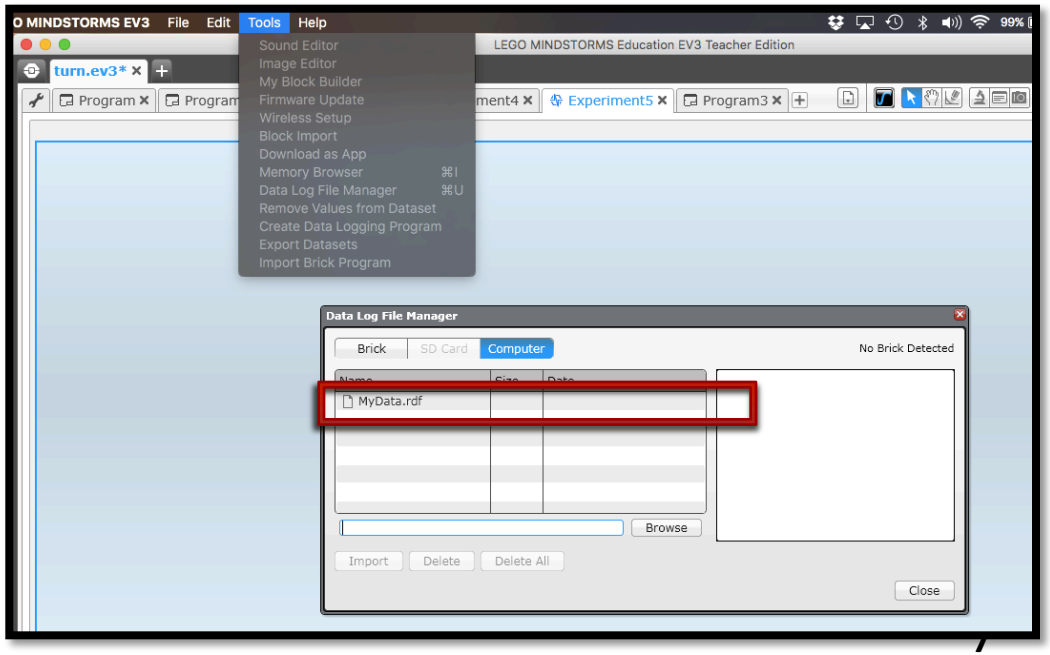
If you want to get the file from your brick to the computer:

1) Click on the Brick Information Icon
2) Press the Open Browser Memory Icon.
3) Find the correct .rdf file.



If you want to view the data file from either the brick or the computer:

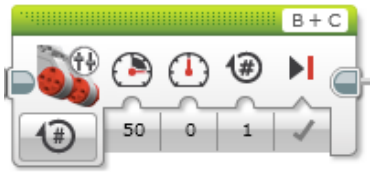
Tools → Datalog File Manager → Select BRICK or COMPUTER and pick the correct file



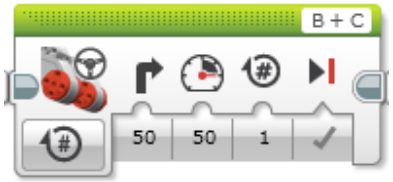
Challenge 1: Comparing Turns

- Make four different programs that do a pivot turn and compare the data from the rotation sensor

Method 1: Uses Move Tank Block with one motor set to 0 and the other set to 50



Method 2: Uses Move Steering Block with steering set to 50.



Method 3: Uses Motor Blocks but stops Motor C

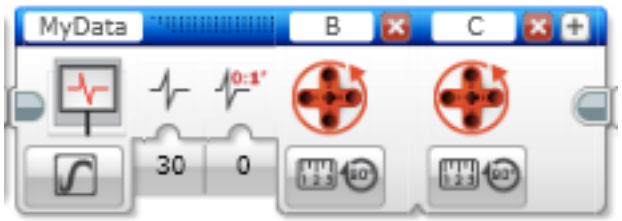
Motor C will not move. It is set to off.

Method 4: Uses one Motor Block to turn, and ignores Motor C's actions.

Motor C may move a bit because it is dragged along. Motor C's mode was not specified

Steps to Remember

STEP 1: In the Data Logging My Block, select the sensor you are reading, the ports they are in.



STEP 2: Select the duration and rate

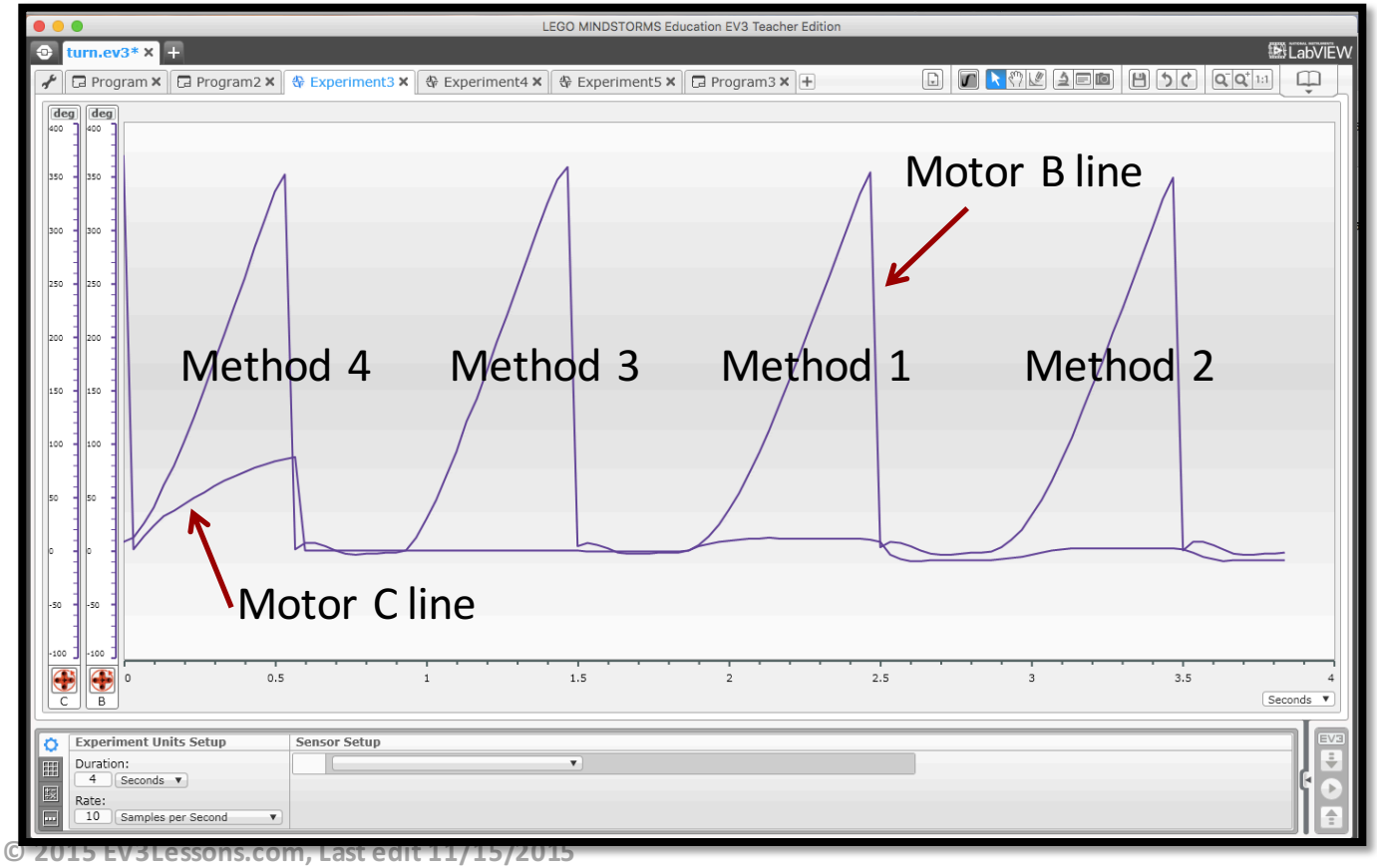
STEP 3: Remember to stop data logging at the end of your code

STEP 4: Remember to change the name of the file each time otherwise they will all be called MyData.

STEP 5: Import your data file and compare the graphs. Which type of pivot turn is the most reliable?

Challenge 1 Solution

Below, we ran all 4 together, but you will find it easier to run each method separately (because you can avoid adding motor resets)



In Method 4, Motor C is dragged along.

Methods 1 and 2 are very similar.

Method 3 appears to be the most reliable. You may not notice much difference in real life, but the data log shows us the true reading.

Credits

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