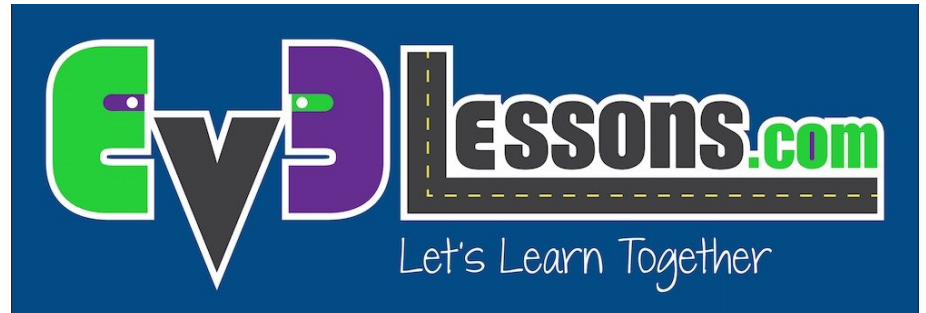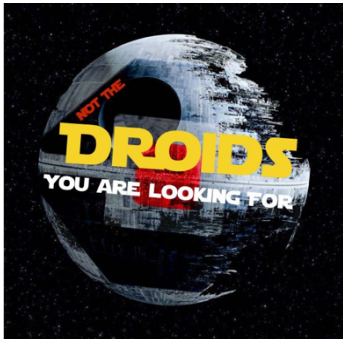# Bonus
# EV3 Programming Lessons



# PixyCam for MINDSTORMS Introduction

By Droids Robotics

# What is a PixyCam?

- Vision system

- Learns to detect objects that you teach it

- Outputs what it detects 50 times per second

- Connects directly to MINDSTORMS brick

# Getting Started

■ Make sure you have updated your MINDSTORMS software and hardware

■ The minimum requirements are:

– *Software: 1.1.1*

– *Firmware: 1.07H*

# Step 1: Install Software Blocks

■ Install all the Pixy EV3 blocks in the Mindstorms EV3 Software

■ This will allow you to use the camera in wait blocks, switches, loops, and more

■ **Instructions:**

– *Download the latest "LEGO blocks and examples" files from http://cmucam.org/projects/cmucam5/wiki/Latest_release*

– *Unzip the zipped file*

– *Open the LEGO MINSTORMS EV3 Software*

– *Open a new Project*

– *Select Tools → Block Import*

– *Select the PixyCam blocks you downloaded and unzipped earlier*

– *You will be asked to restart the EV3 Software after you import the blocks.*
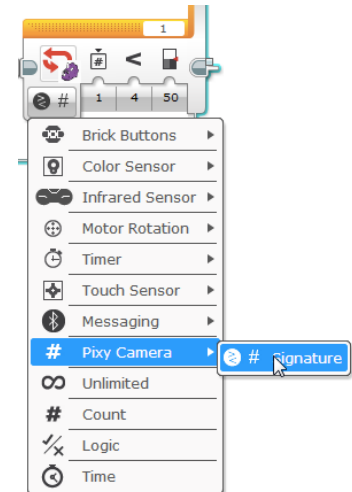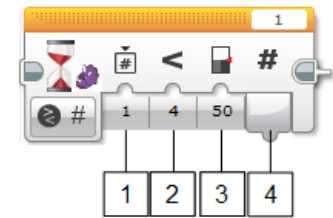
# Step 2: Install PixyMon

- This is software that lets you monitor the PixyCam. It is useful for the Step 3.

- Mac: http://cmucam.org/projects/cmucam5/wiki/Install_PixyMon_on_Mac


- Windows http://cmucam.org/projects/cmucam5/wiki/Install_PixyMon_on_Windows_Vista_7_8

# Step 3: Training the PixyCam with PixyMon

■ Tips:

– *Objects that are brightly colored work well. The camera uses color to detect the objects*

– *Train the PixyCam on a plain background. Hardwood floors and carpet causes trouble.*

A. Plug in the USB cable between the PixyCam and your computer and run PixyMon

B. Hold the object you want to teach in front of PixyCam lense and select Action → Set Signature 1 from the pulldown menu

C. Using the mouse, click and drag to select the region you want PixyCam to use to learn the object (make a box around the object)

D. Use the Configure screen to change the name (using Signature Labels) and use the Signature Tuning sliders until the object is well lit and completely highlighted (and nothing else is)
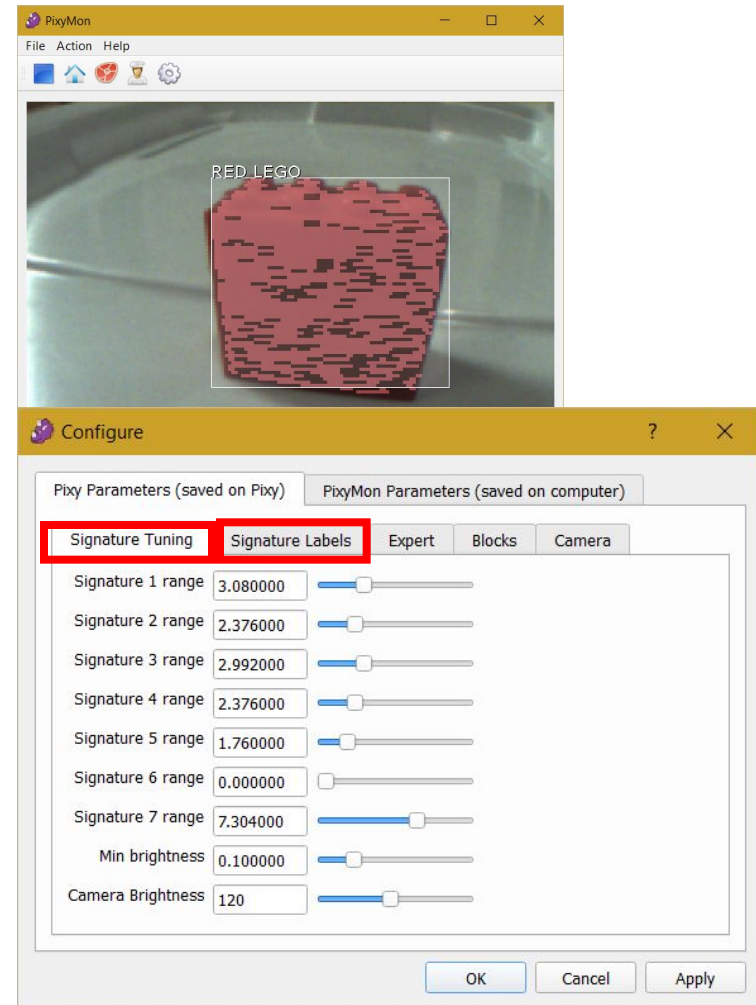
# Challenge

- Use PixyMon to recognize 4 different LEGO colors using LEGO bricks (Red, Green, Blue, Yellow).

- Tune the signatures and rename them the correct color

- You will be using these Signatures in the next lesson
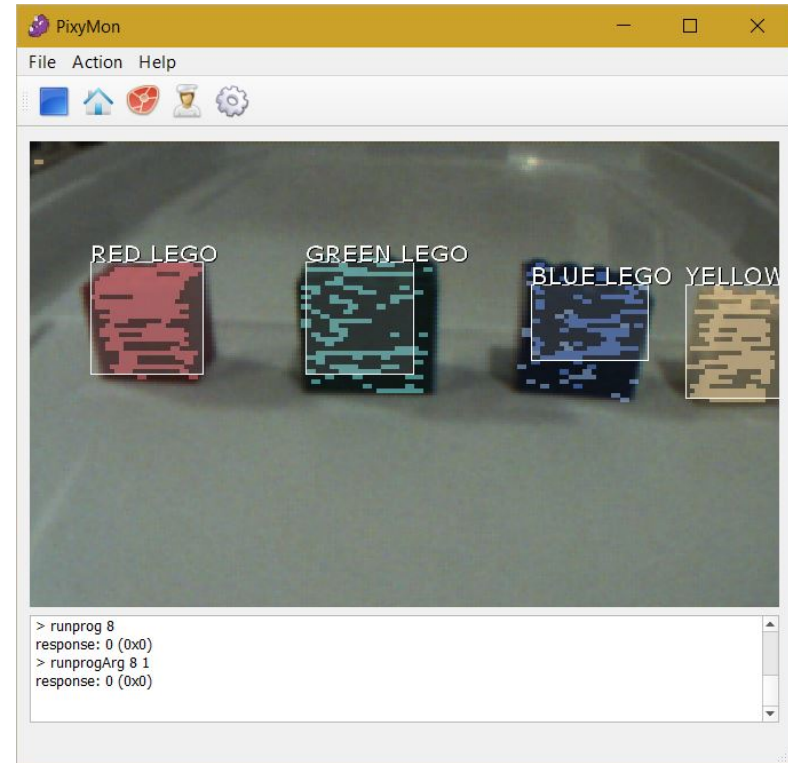
# Step 4: Mounting the PixyCam

- Add a LEGO beam to the PixyCam so that you can mount it on to your EV3 robot.

- Instructions are here: http://cmucam.org/projects/cmucam5/wiki/Mounting_Pixy_with_LEGO

- It should look like the image on the right in the end
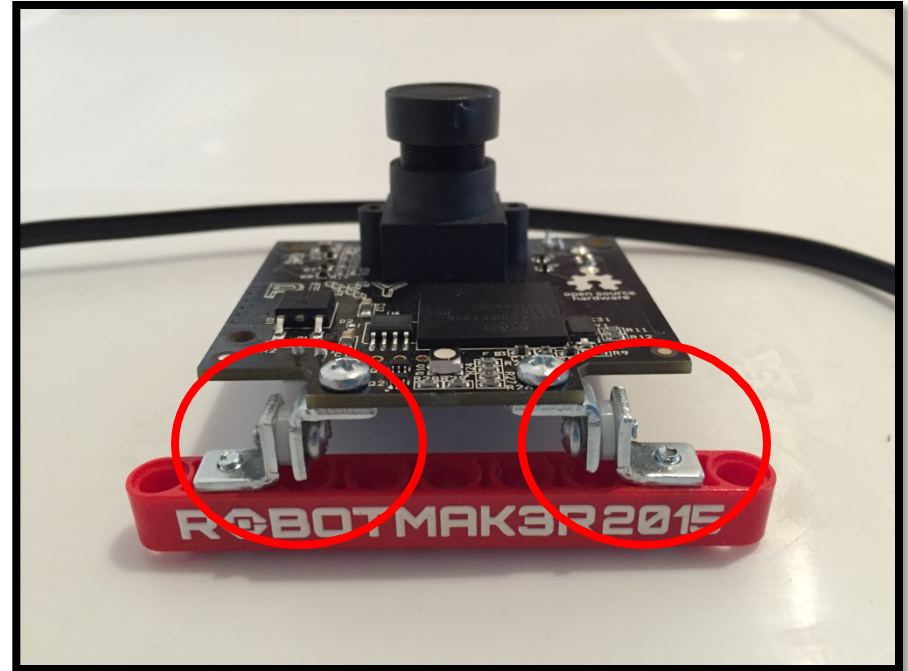
# Step 5: Ready to Program

■ Connect your PixyCam to the EV3 brick using the cable provided
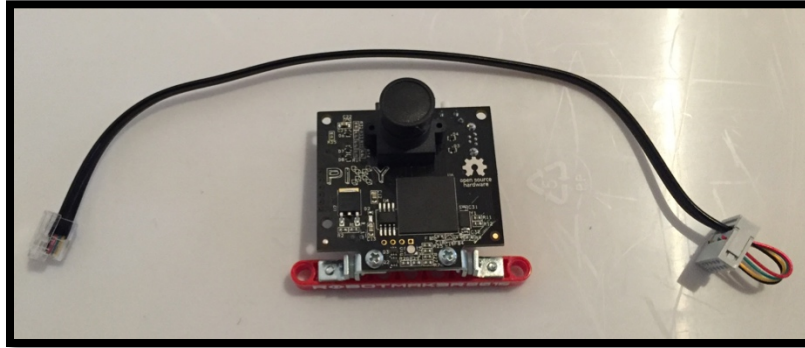


■ Turn on the EV3 and connect it to your computer

■ Move on to the next lesson.

# 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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