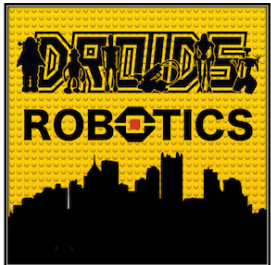


# INTERMEDIATE PROGRAMMING LESSON



## CALIBRATING COLOR SENSORS

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By Droids Robotics

# Lesson Objectives

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- 1) Learn why you need to calibrate your color sensors
- 2) Learn what calibration is
- 3) Learn how to calibrate your color sensors

# Why Calibrate?

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When you use your EV3 Color Sensor in Light Sensor Mode (e.g., reflected light mode), you should calibrate it

Calibration means “teaching” the sensor what is “Black” and what is “White”

- This makes White read as 100 and Black read as 0

Run your Calibrate Program whenever light or table conditions change

If you are in First Lego League, it is probably a good idea to run it before you start a table run where you use your EV3 Sensors in Light Mode

If you have 2 Color Sensors, the same calibration will apply to BOTH sensors. You don't have to make a different calibration program for each color sensor. Make it using 1 sensor on one of the ports and the values will apply to both.

- If you have sensors that are very different from each other, you will need to write your own custom calibration.

# Steps/Pseudocode for Calibration

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Challenge: Write a program that will calibrate your EV3 Color Sensors for black and white.

Pseudocode:

Reset the existing calibration values

Display that the user should place the robot on “black” and press ok

Read the Color Sensor Block in Light mode and save it to the Color Sensor Block in Calibrate mode.

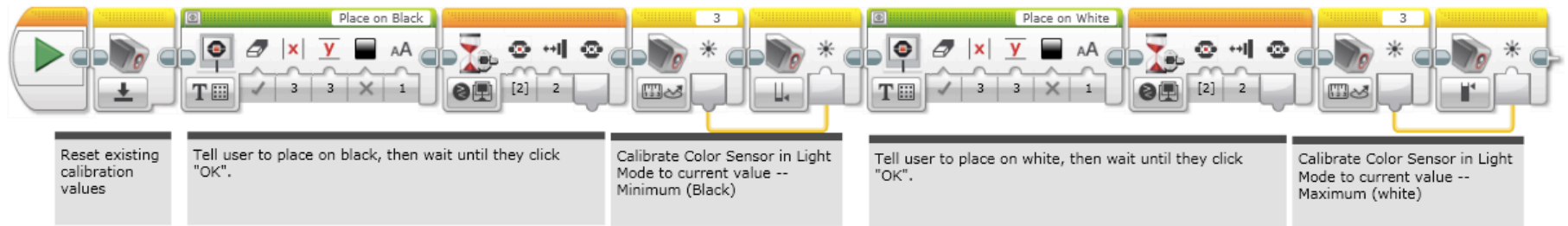
Repeat above steps for calibrating “white”.

# Calibrate Program Solution

The goal of this program is to teach the robot what black and white values should read. At the end of this program, the color sensor (in light mode) should read around 100 on white and 0 on black.

Note 1: This program is set to use sensor 3.

Note 2: If you use two color sensors the calibration values for one sensor will be used for the other also.



- When you run the above Calibrate Program, you will be asked to place the robot on a BLACK section of the mat and then hit center EV3 button.
- Then you will be asked to place the robot on WHITE and hit center EV3 button.

# Discussion Guide

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1. When do you need to calibrate your color sensor?
  - When it is used in reflected light mode
2. If I have two color sensors, do I need to calibrate each one?
  - The calibration applies to both (or all) the color sensors you have connected to your brick
3. What are you doing when you calibrate?
  - You are teaching the sensors what “black” and “white” mean
4. Should you calibrate for other colors (e.g. green) if you want to follow a green line?
  - No, you always calibrate for black and white.

# Credits

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This tutorial was created by Sanjay Seshan and Arvind Seshan from Droids Robotics.

Author's Email: [team@droidsrobotics.org](mailto:team@droidsrobotics.org)

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