ADVANCED EV3 PROGRAMMING LESSON

Line Following with Two Color Sensors and Proportional Control

By Droids Robotics
Code Contributed by FLL 1920

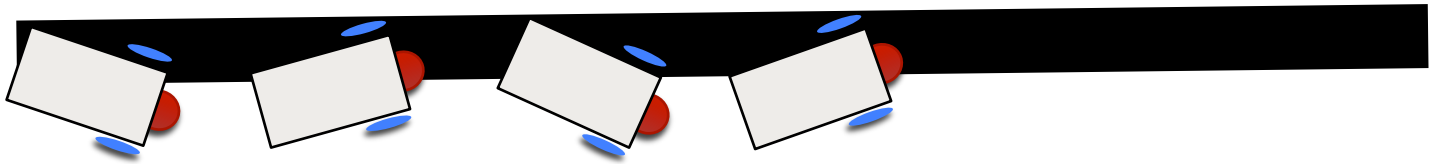
Objectives

- Learn how to write a line follower that uses two color sensors
- Learn how to write a two color line follower that uses proportional control

- Pre-requisites: Basic Line Following, Switches, Loops, Proportional Control

A Basic One Sensor Line Follower

- Robot sees white, turn left
- Robot sees black, turn right

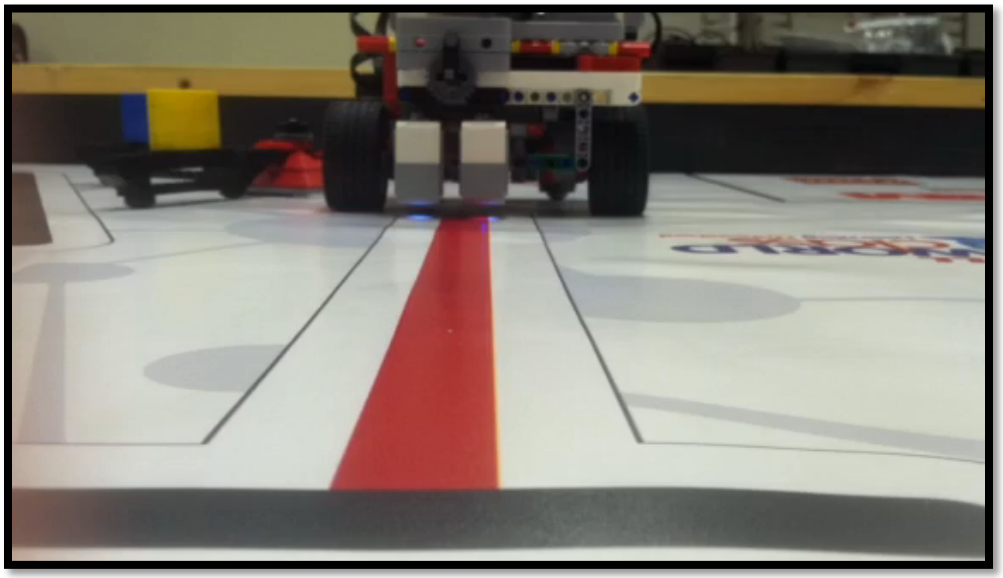


What is a Two Color Line Follower?

The goal is to use two light sensors next to each other to follow a line

The light sensors need to be placed approximately the line's width apart

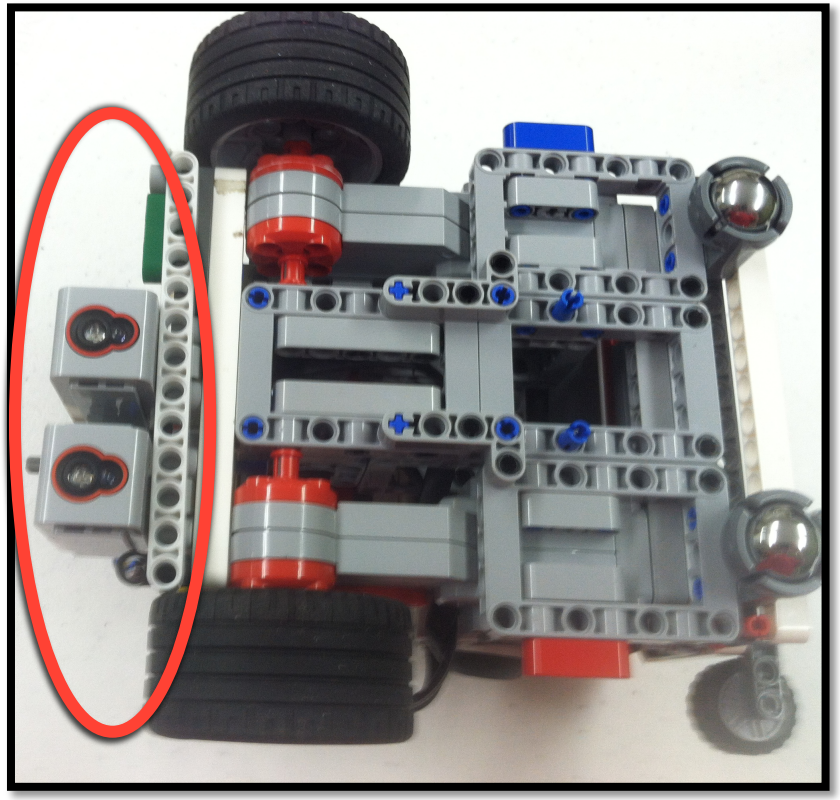
When following the line they should both sensors should be reading the edge of the line



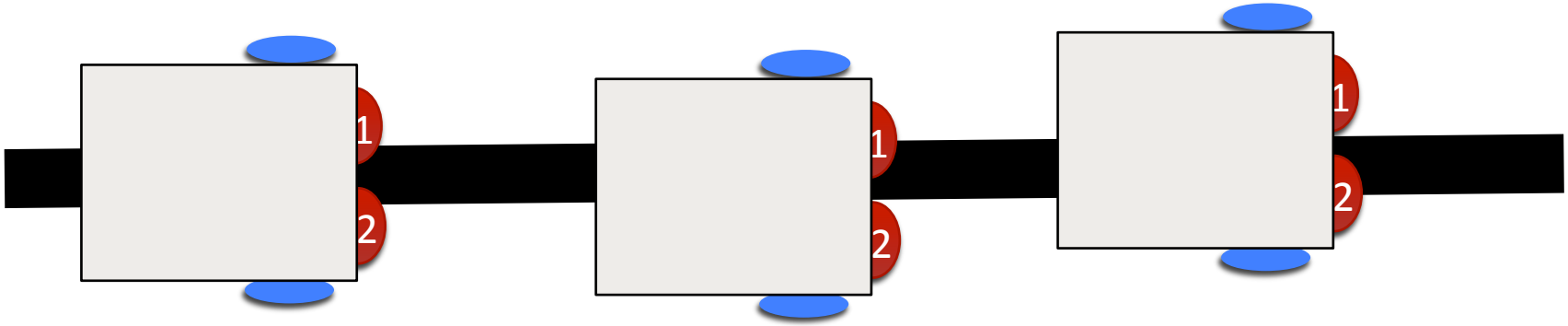
Watch video to see line straddling in action

Tips for success

- Placement of the two color sensors are very important
- In the picture on the right, we have a beam placed so you can see how far apart to place your sensors.



Two Color Sensor Line Follower



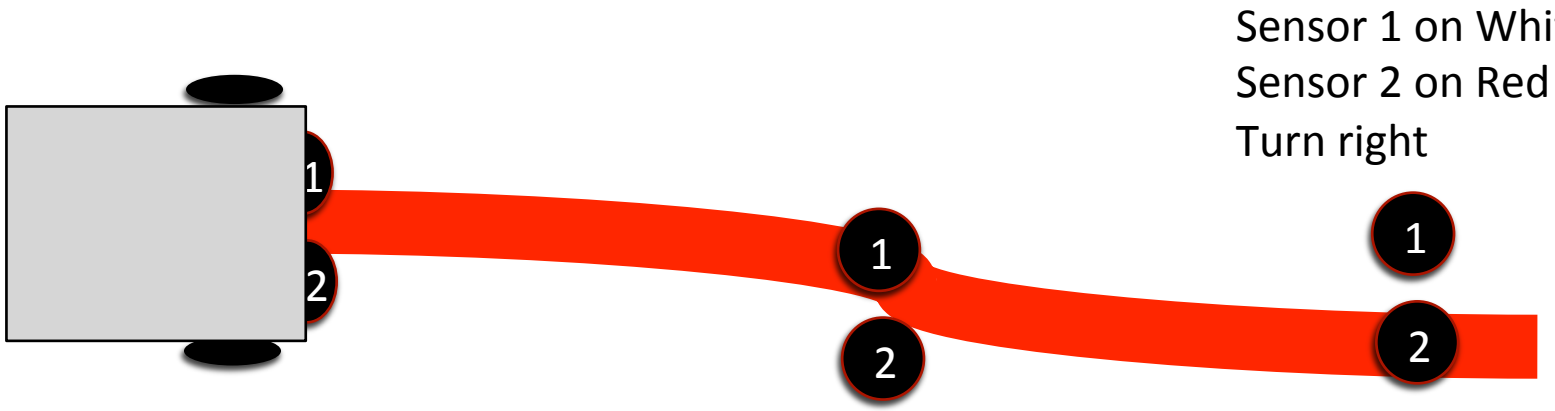
Sensor 1 on White
Sensor 2 on White
Go forward

Sensor 1 on Black
Sensor 2 on White
Turn left

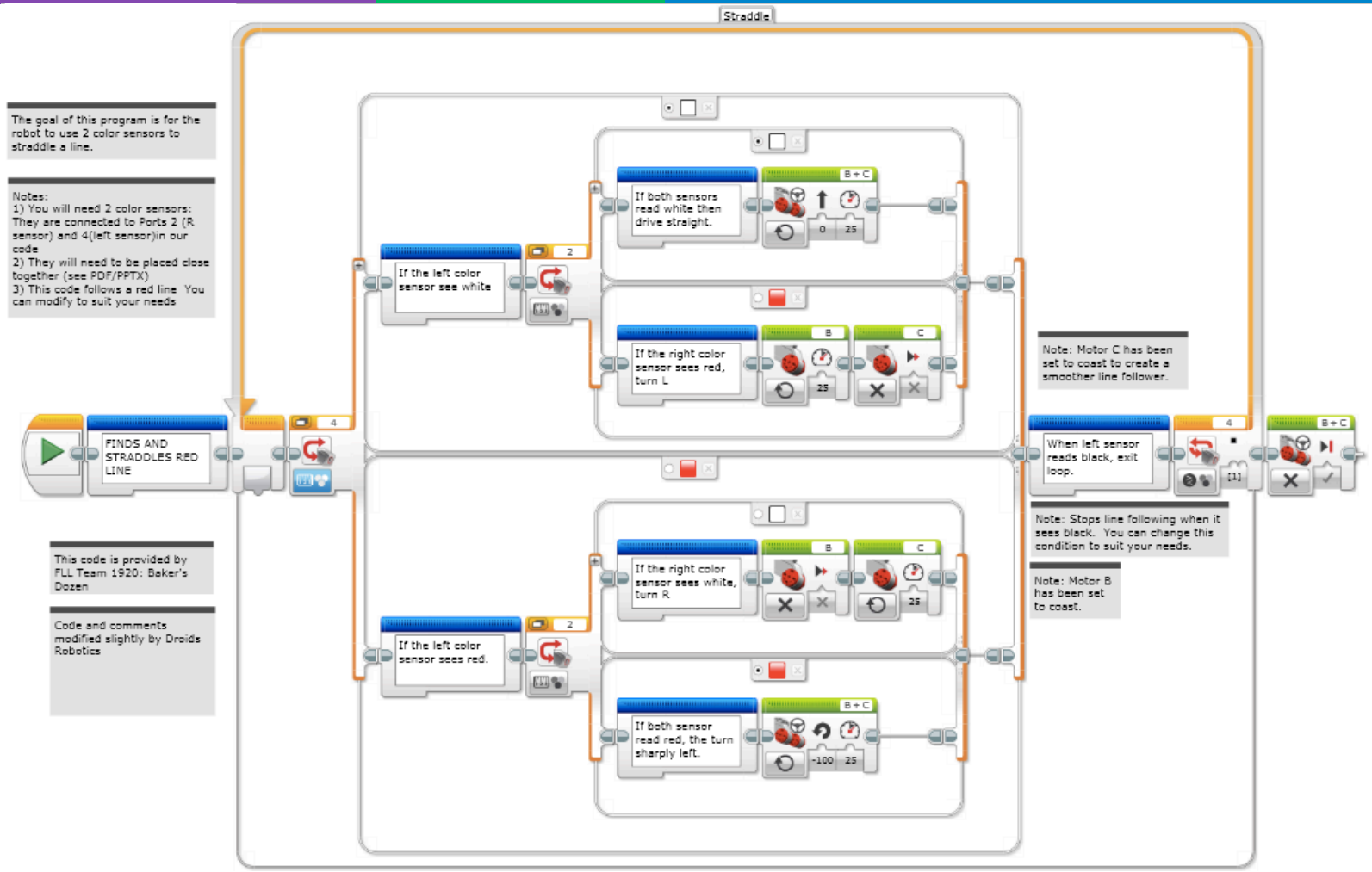
Sensor 1 on White
Sensor 2 on Black
Turn right

Challenge 1

- Use the ideas from Slide 4 and write a line follower that straddles a red line – uses 2 color sensors to line follow a red line?

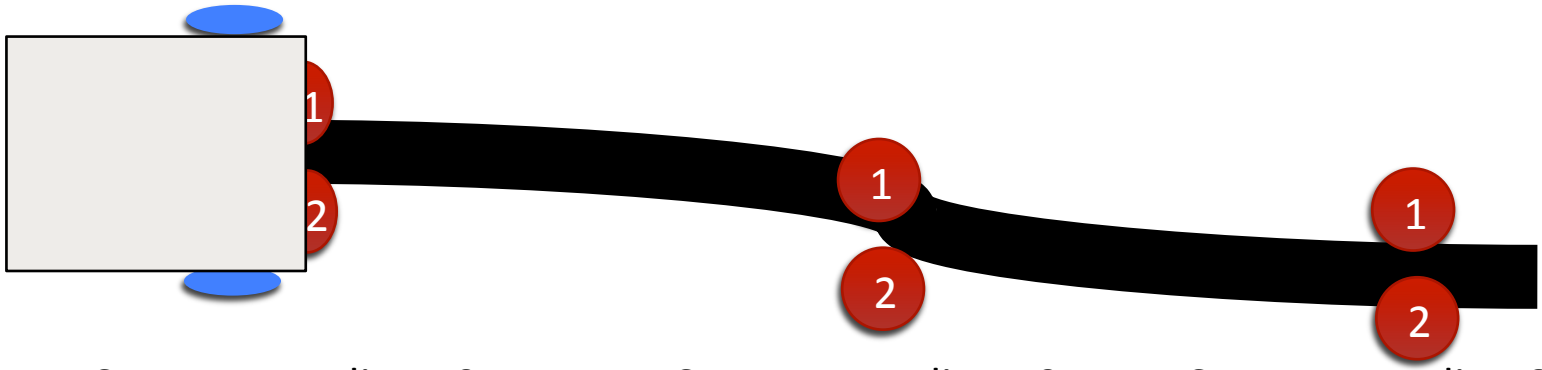


Challenge 1 Solution



How do you add proportional control?

- What is the target → both sensors should read the same value
- What is the error → the difference between the sensors
- What is the correction → turn more sharply if the difference is large

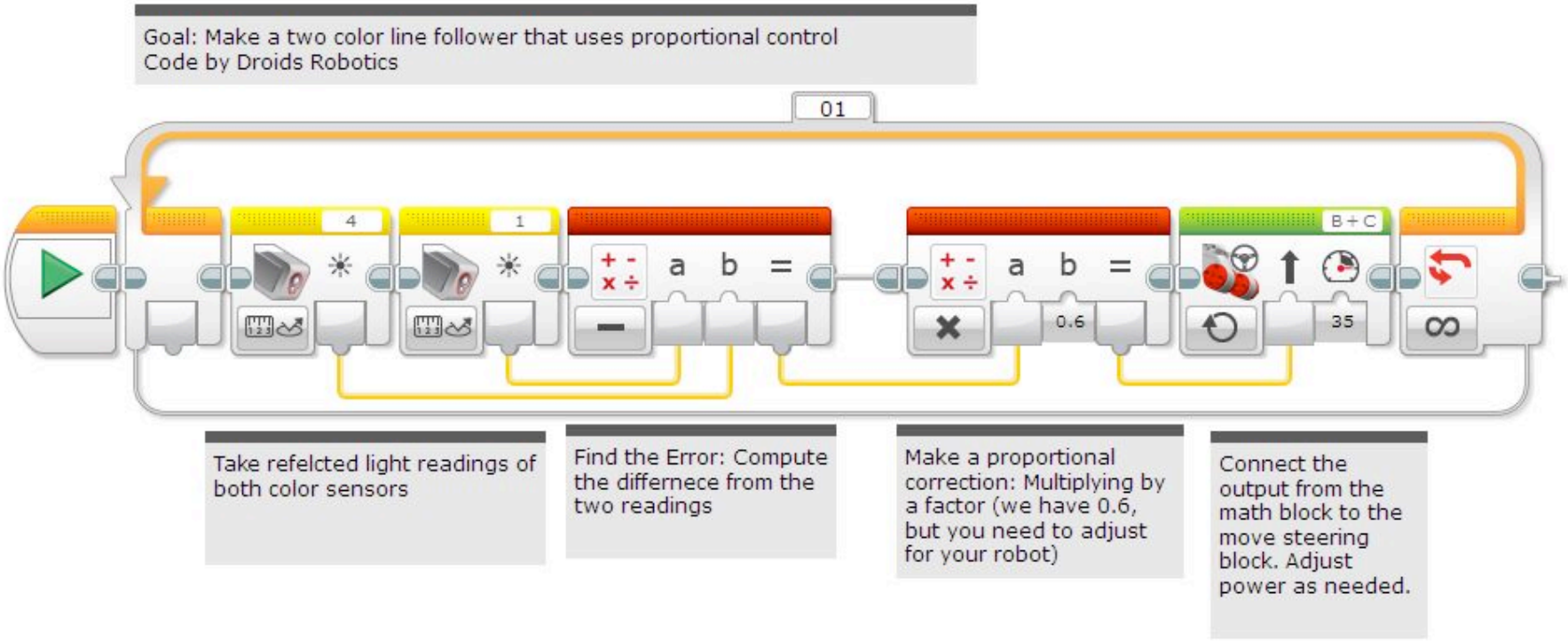


Sensor 1 reading 50
Sensor 2 reading 50
Go forward

Sensor 1 reading 10
Sensor 2 reading 100
Turn Left sharply

Sensor 1 reading 60
Sensor 2 reading 40
Turn right slightly

Challenge 2 Solution



Watch this code in action on YouTube

- EV3Lessons.com YouTube Channel

- https://youtu.be/qHwho1k1GZ4

Credits

- This lesson was written by Sanjay and Arvind Seshan from Droids Robotics
- FLL Team 1920, Baker's Dozen contributed code, video and photos for making the basic two color line follower (line straddle)
- More lessons are available at www.ev3lessons.com