

# INTERMEDIATE PROGRAMMING LESSON



Simple Line Follower

By: Droids Robotics  
[www.ev3lessons.com](http://www.ev3lessons.com)

# LINE FOLLOWER

- The following slides are animated
- It explains how a robot line follower works.

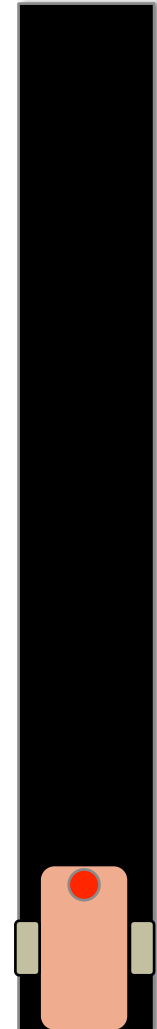
# FOLLOW THE MIDDLE?

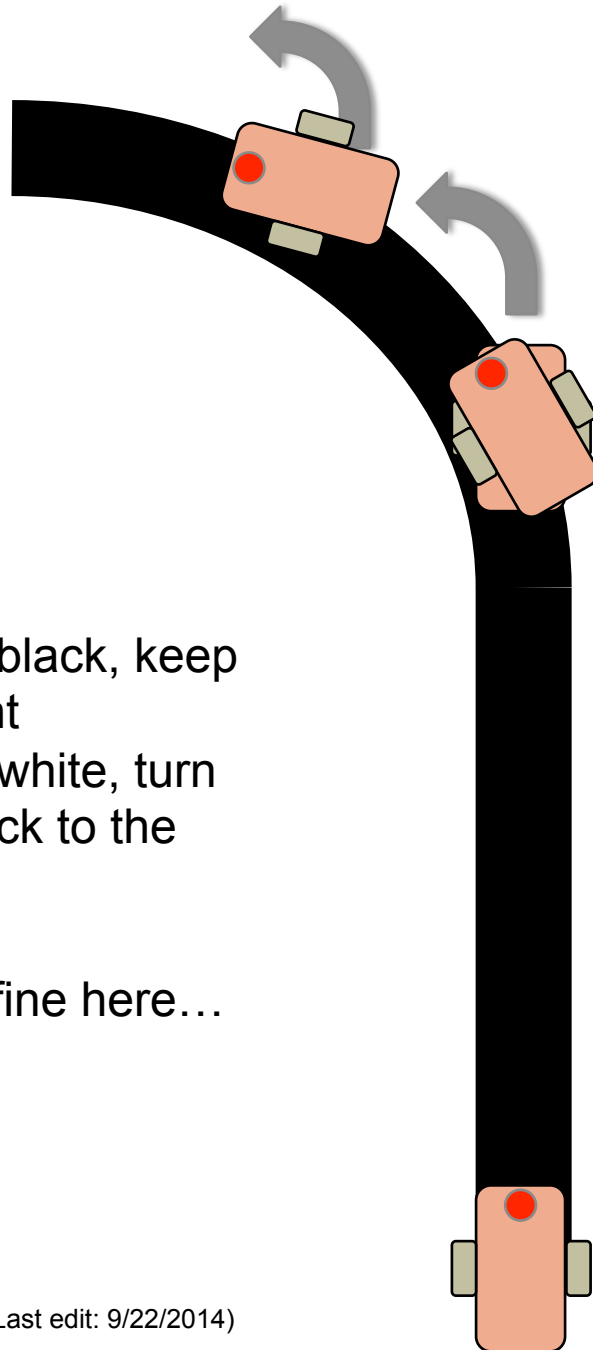
Humans want to follow the line in the middle.

Let's have the robot do the same thing using the **Color Sensor**

What type of questions can we ask using this sensor

- Are you on line or not?





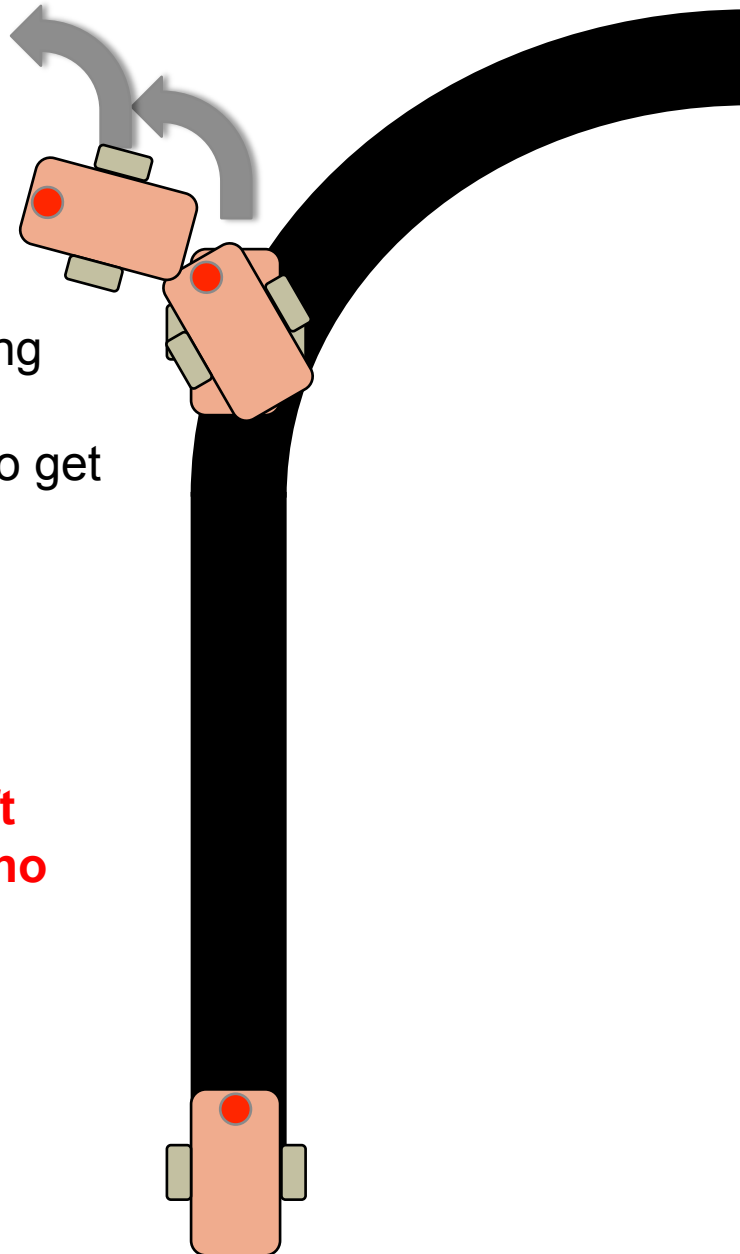
1. If we are on black, keep going straight
2. If we are on white, turn left to get back to the line

Seems to work fine here...

1. If we are on black, keep going straight
2. If we are on white, turn left to get back to the line

**OH NO... my robot is running away....**

**When the robot leaves the left side of the line, the program no longer works!**



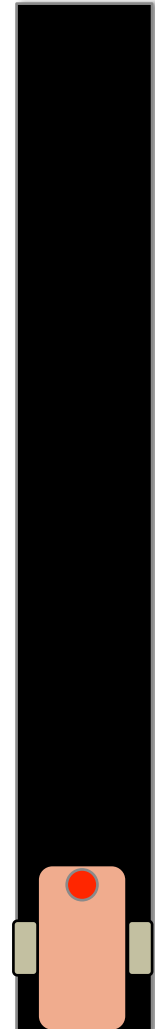
# LINE FOLLOWING: ROBOT STYLE

## Why could the Human follow the middle?:

- They can **see ahead**.
- They can **see the whole line and its surroundings**
- They **see both sides** and which side they left

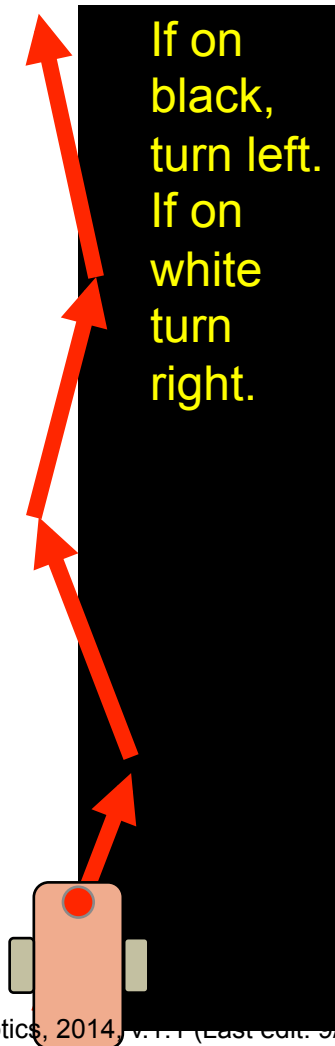
## Why can't the Robot do the same thing?:

- **Can't tell right or left side** of the line
- **How do we make sure the robot always veers off on the SAME SIDE of the line?**
  - Instead of the middle, could the robot follow the "edge"?
- So now the robot will fall off only the same side.
- We will now show you how this works!

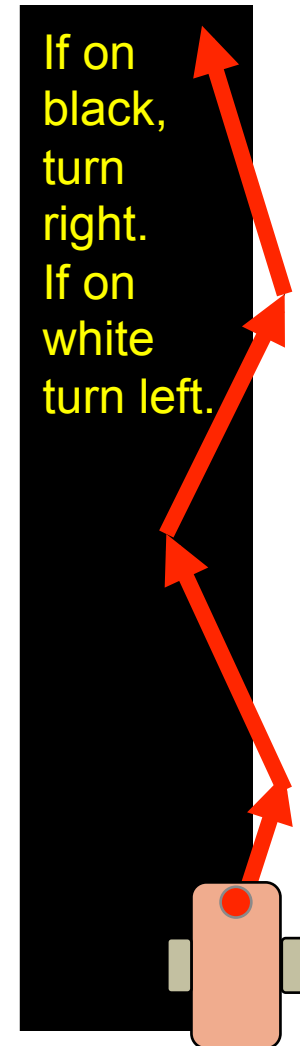


# ROBOT LINE FOLLOWING HAPPENS ON THE EDGES

Left side line following



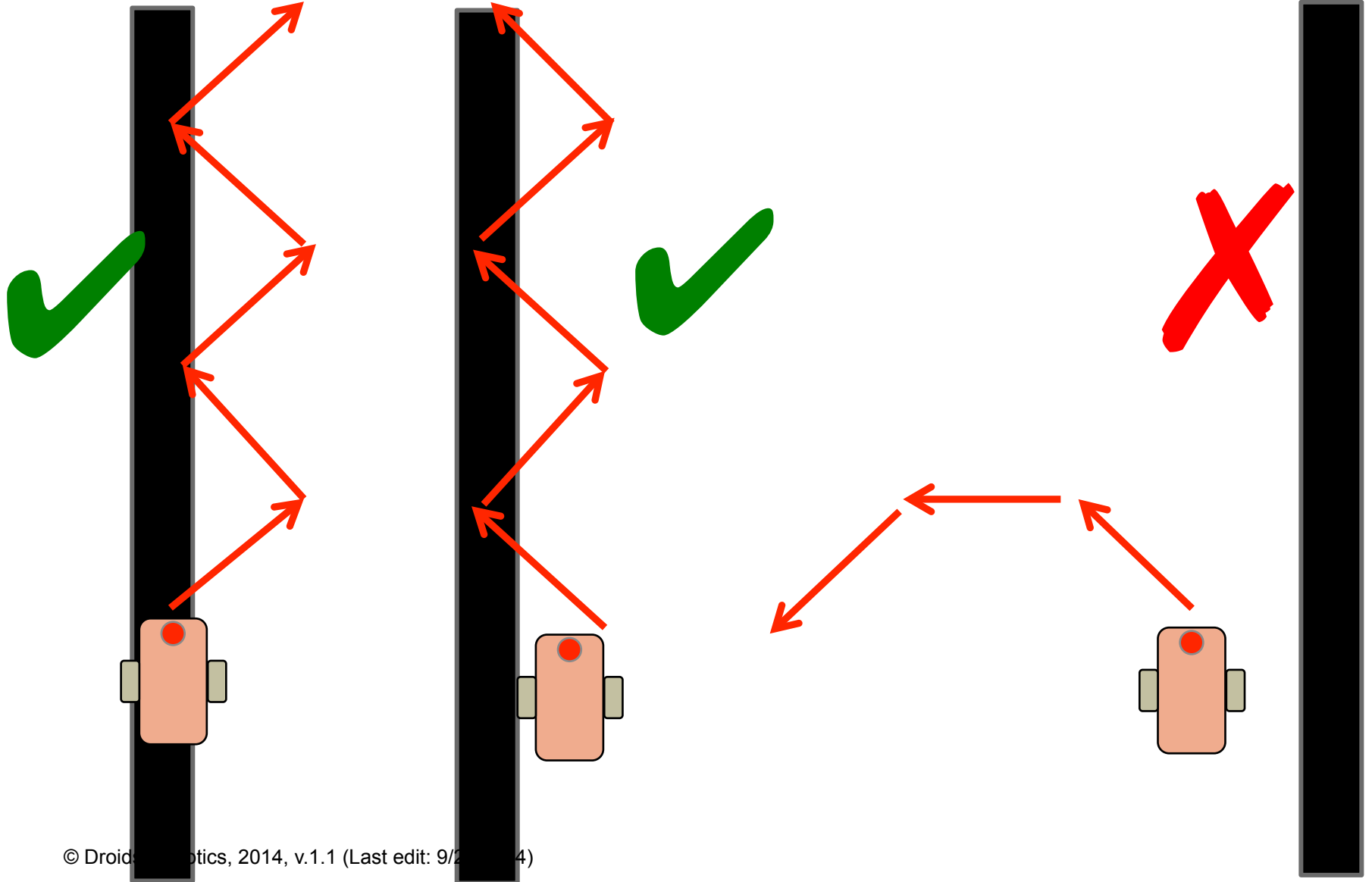
Right side line following



The robot has to choose which way to turn when the color sensor sees a different color.

The answer depends on what side of the line you are following!

# STARTING THE ROBOT ON THE CORRECT SIDE





# LINE FOLLOWER CHALLENGE

**Step 1:** Write a program that follows the RIGHT edge of a line.

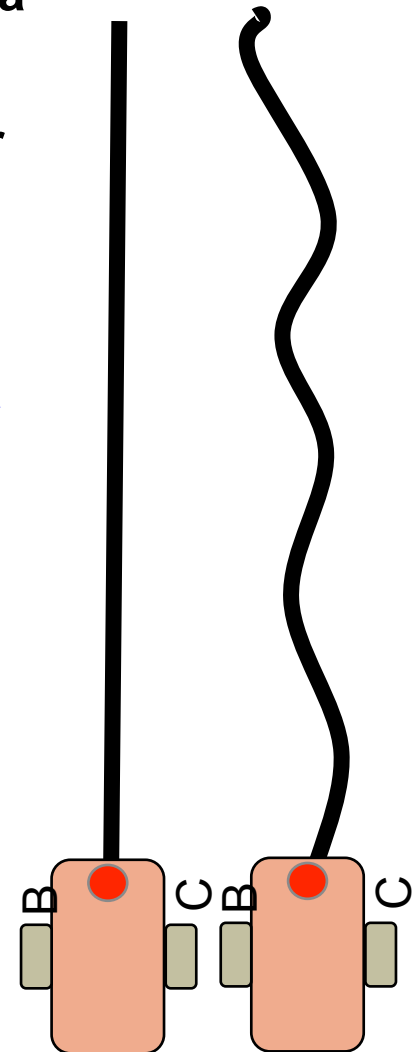
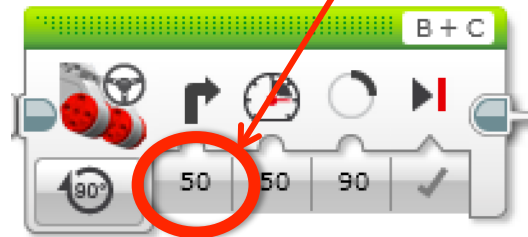
Hints: If your sensor sees black, turn left. If your sensor sees white, turn right. Use loops and switches!

**Step 2:** Try it out on different lines.

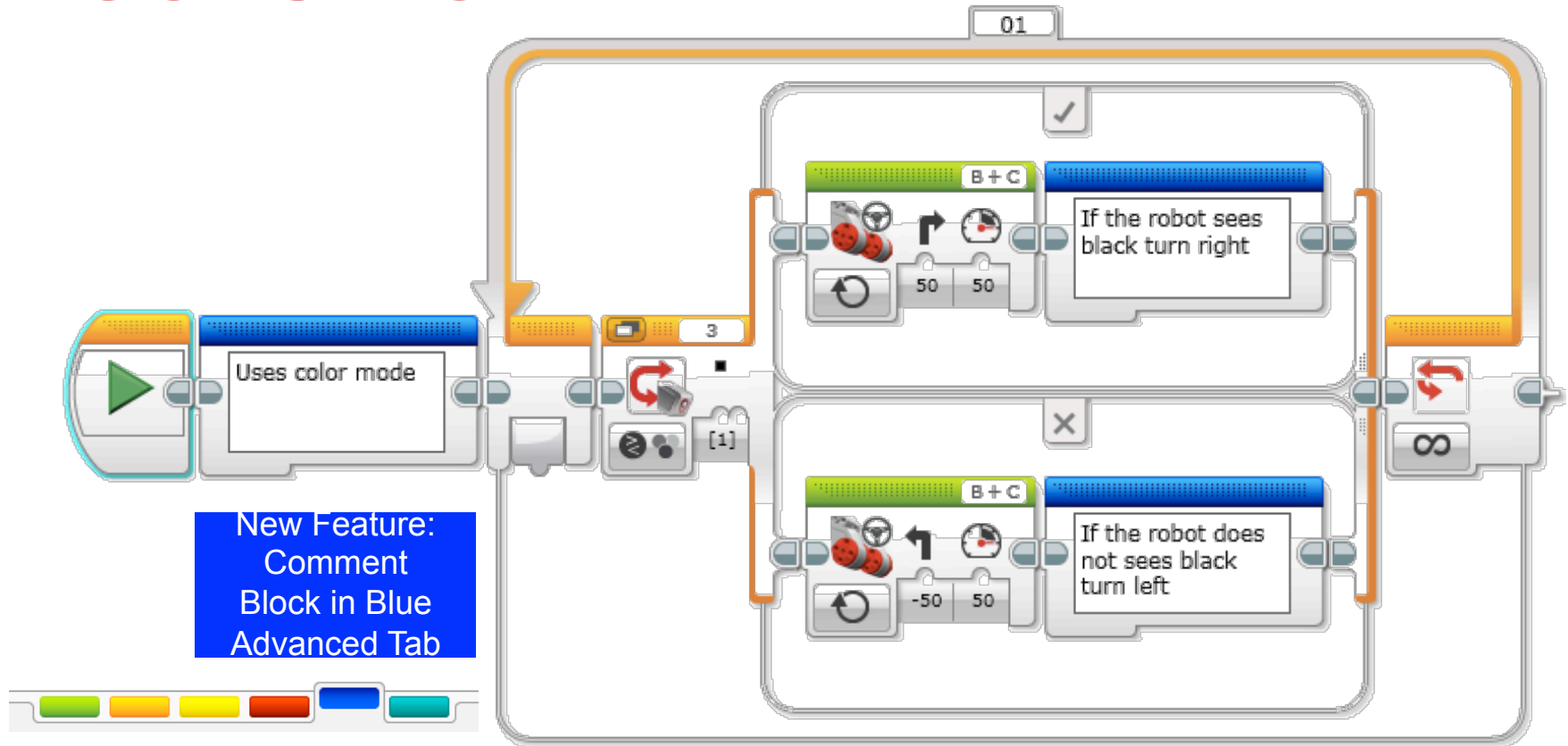
**Did your line follower work the same on straight and curved lines?**

**Step 3:** If not, instead of turn Steering = 50, try smaller values.

Is it better on the curved lines now?

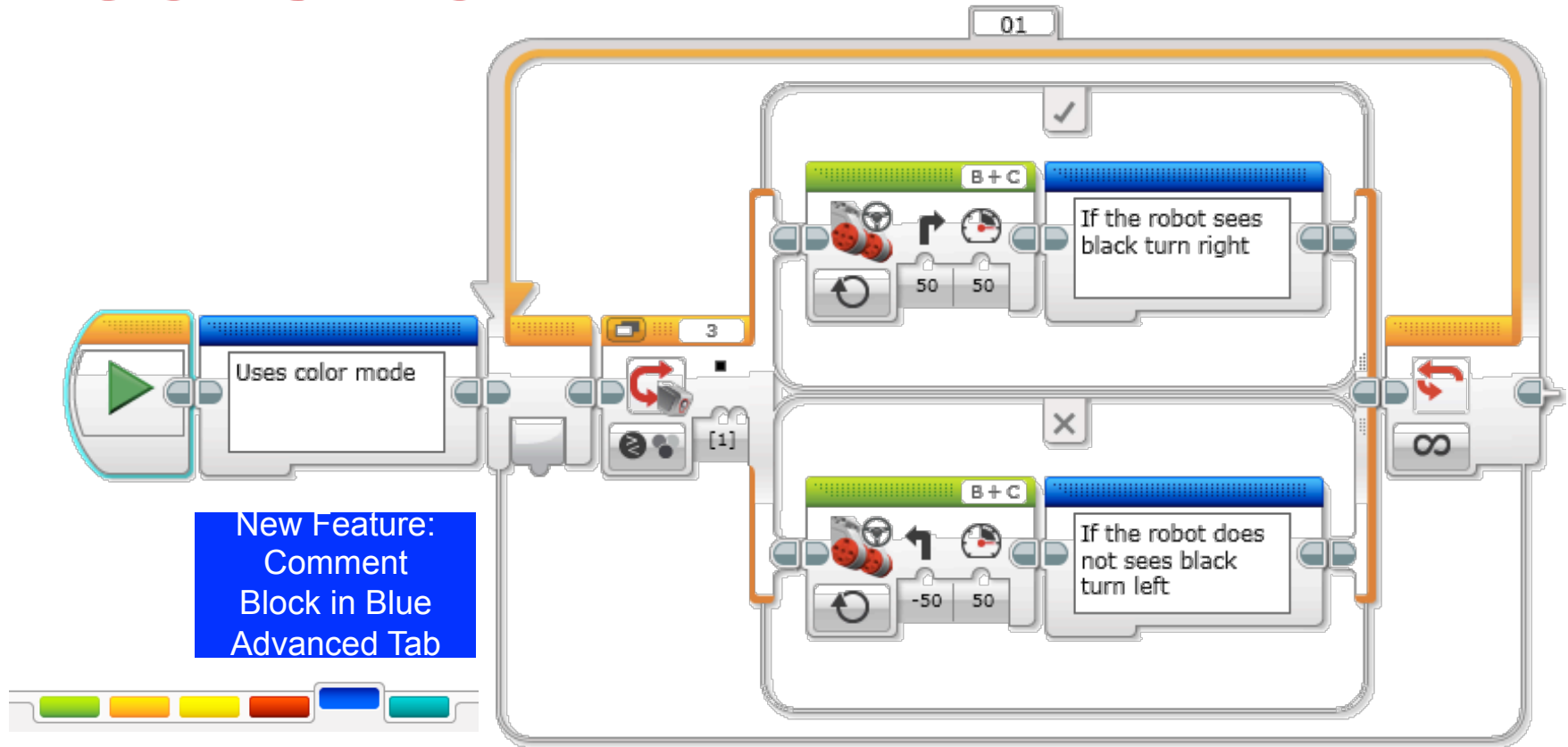


# LINE FOLLOWING CHALLENGE SOLUTION



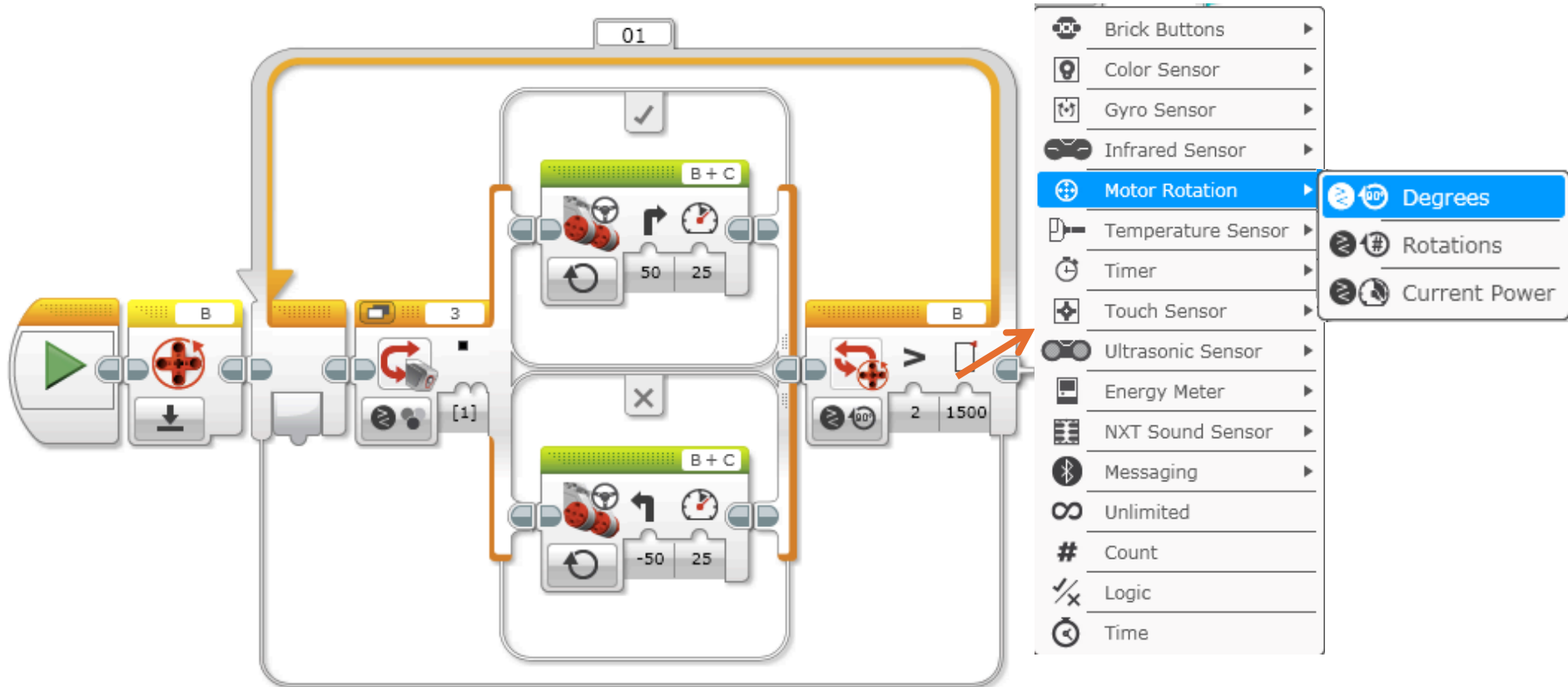
Does this program follow the Right or Left side of a line?

# LINE FOLLOWING CHALLENGE SOLUTION

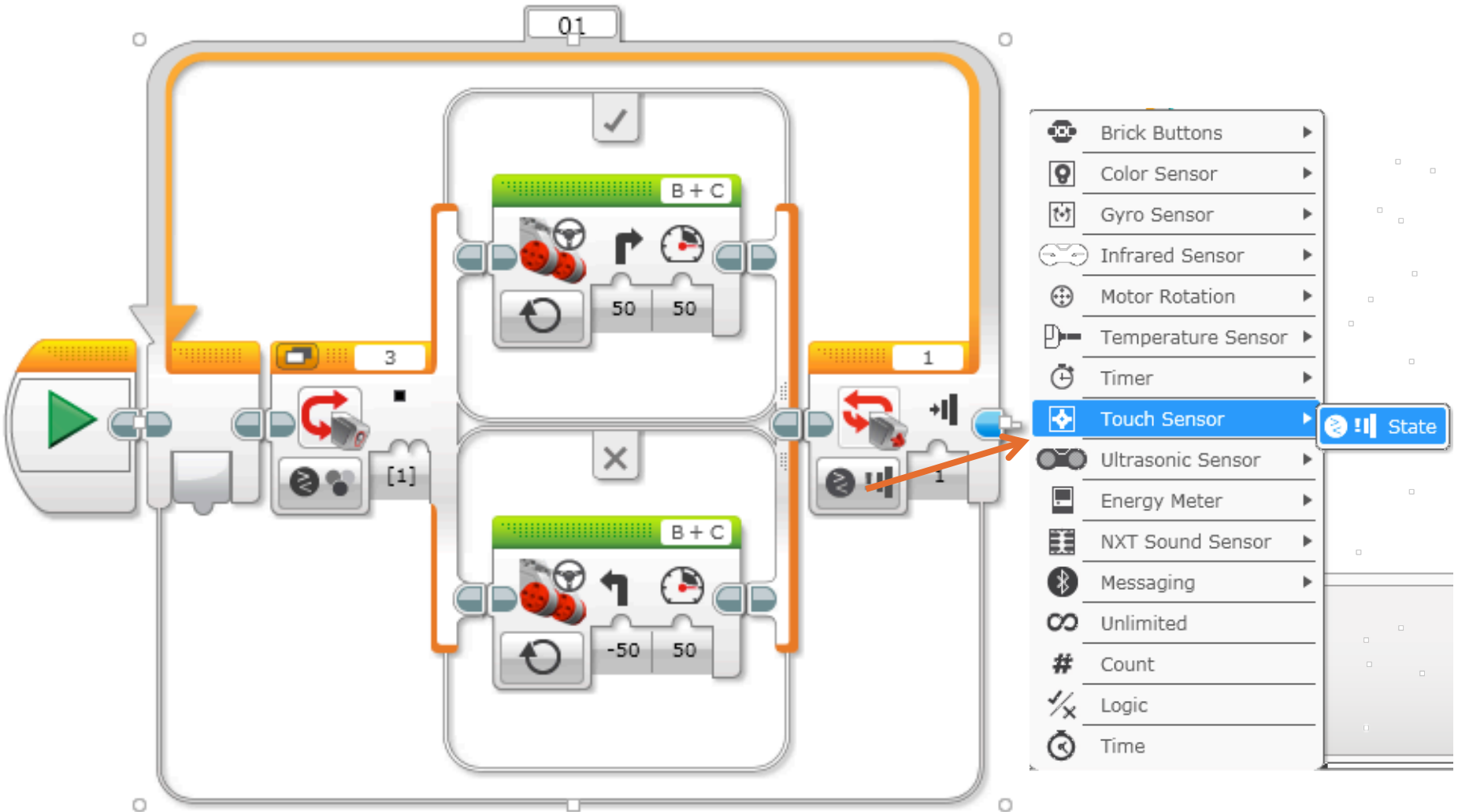


How do we make this stop?

# LINE FOLLOWING FOR A SENSOR OR DISTANCE



# LINE FOLLOWING FOR A SENSOR OR DISTANCE



# CREDITS

- **This tutorial was created by Sanjay Seshan and Arvind Seshan from FLL Team Not the Droids You Are Looking For (Droids Robotics)**
- **We have additional material for more advanced lessons available on request.**
- **Useful tools for FLL teams and robot programmers are available at [www.ev3lessons.com](http://www.ev3lessons.com)**
- **The material is made available to you free of charge. However, we would greatly appreciate a letter indicating that you are using the materials and what you think of them.**
- **Feedback and suggestions are encouraged.**
- **Email: [team@droidsrobotics.org](mailto:team@droidsrobotics.org)**

