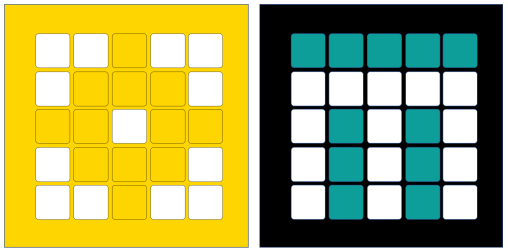
PRIME LESSONS

By the Makers of EV3Lessons



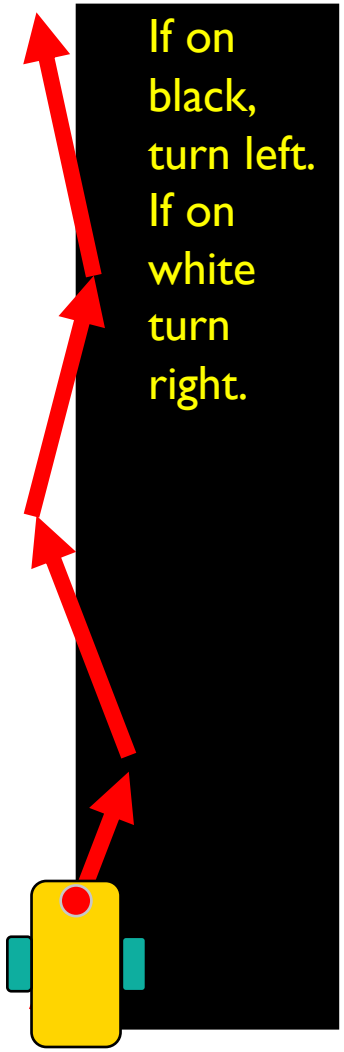
LINE FOLLOWER

BY ARVIND SESHAN

LESSON OBJECTIVES

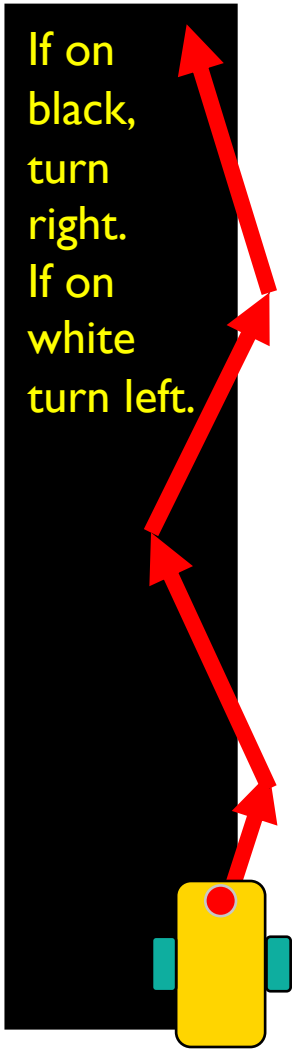
- Learn how to get a robot to follow a line using Color Mode or Reflected Light Mode on the SPIKE Prime Color Sensor
- Learn how to combine sensors, loops and if-else statements

ROBOTS FOLLOW THE EDGE OF THE LINE

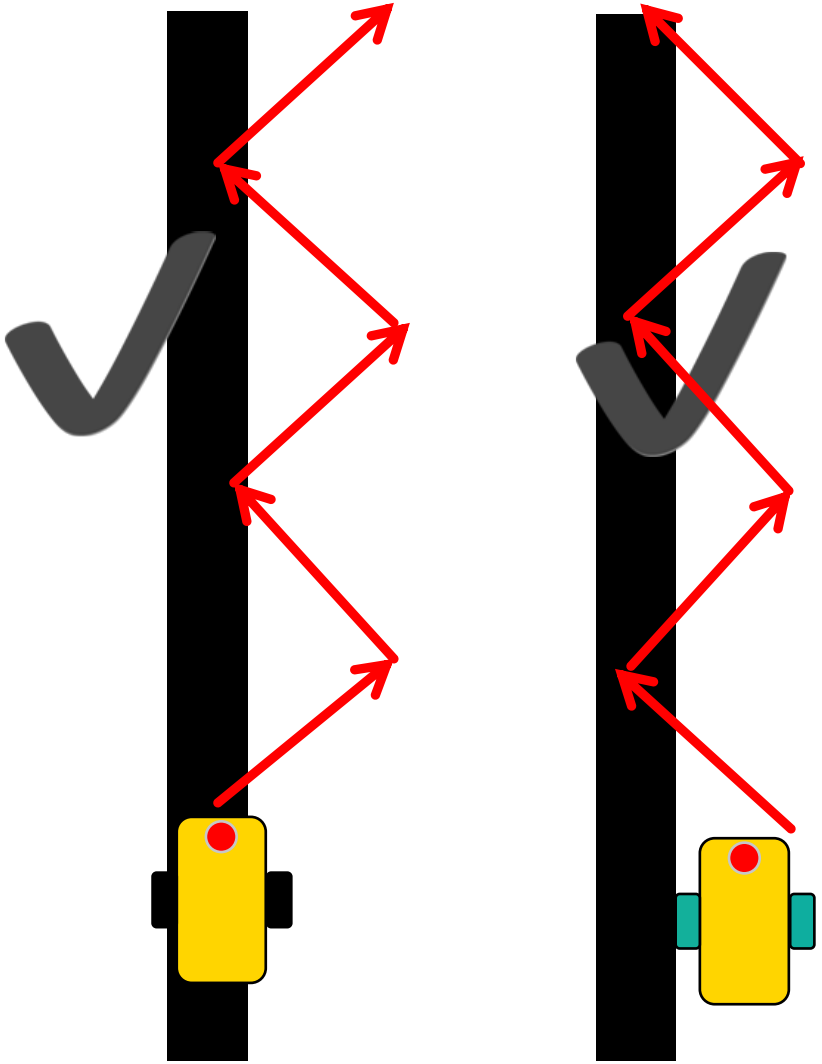


The robot has to choose which way to turn when the color sensor sees a different color.

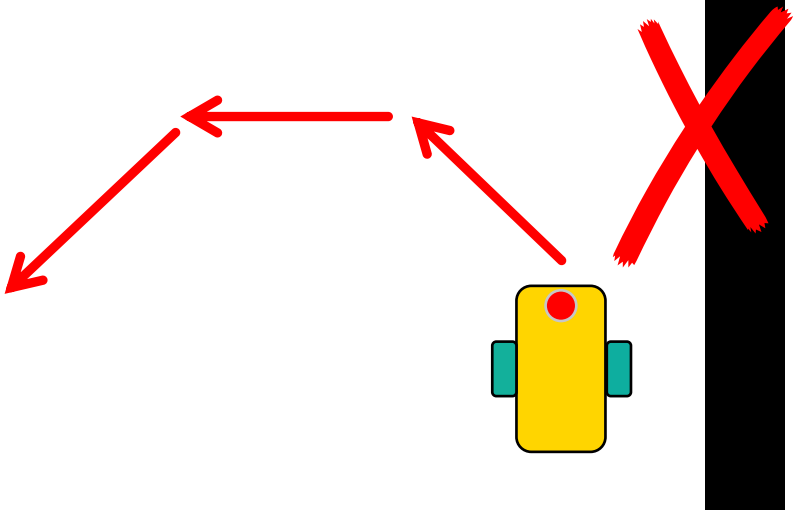
The answer depends on what side of the line you are following!



WHICH SIDE OF THE LINE SHOULD YOU START ON



If you write a line follower to follow the right side of the line, you have to start the robot on the right of the line



CHALLENGE: FOLLOW A LINE

- Write a program that follows the right edge of the line
- If your sensor sees black, turn right
- If your sensor sees white, turn left
- Use an If-Else statement to make that decision
- Repeat the line follower forever
- Use Color Mode or Reflected Light Mode

Note: To line follow with the Advanced Driving Base (ADB) in Color Mode you will have to make a modification to the design because the color sensor does not recognize black at the height in the original build instructions. See our Color Sensor lesson.

PERCENT SPEED VS. PERCENT POWER

`start_tank()`

- Motor Synchronization: The function will try to keep the number of motor rotations of each wheel proportional to each other.
- Acceleration/Deceleration: The function will increase to the desired speed over a short time.
- Speed Control: The robot will adjust the power going to the motor to maintain the same speed.

`start_tank_at_power()`

- Does not have the features on the left
- While speed functions have more features, when you use movement functions in a loop where it goes through the loop very quickly, you should use a "power" function.
- For this lesson, you will use a power function

LINE FOLLOWER – COLOR & REFLECTED MODE

This program follows a right side of a black line using the Color Mode

```
color = ColorSensor('B')
motor_pair = MotorPair('A', 'E')
while True:
    if color.get_color() == 'black':
        motor_pair.start_tank_at_power(40, 20)
    else:
        motor_pair.start_tank_at_power(20, 40)
```

```
if color.get_reflected_light() < 50:
```

To use reflected light mode, substitute the condition

When the sensor sees black, the robot turns right

When the sensor sees white, the robot turns left

EXTENSION

- CHANGING EXIT CONDITIONS
  - What if you did not want to line follow forever? What it would wanted to line follow until a Force sensor was pressed?
  - Combine this lesson with the Loops lesson to solve this problem.

CREDITS

- This lesson was created by Arvind Seshan for Prime Lessons
- More lessons are available at www.primelessons.org