

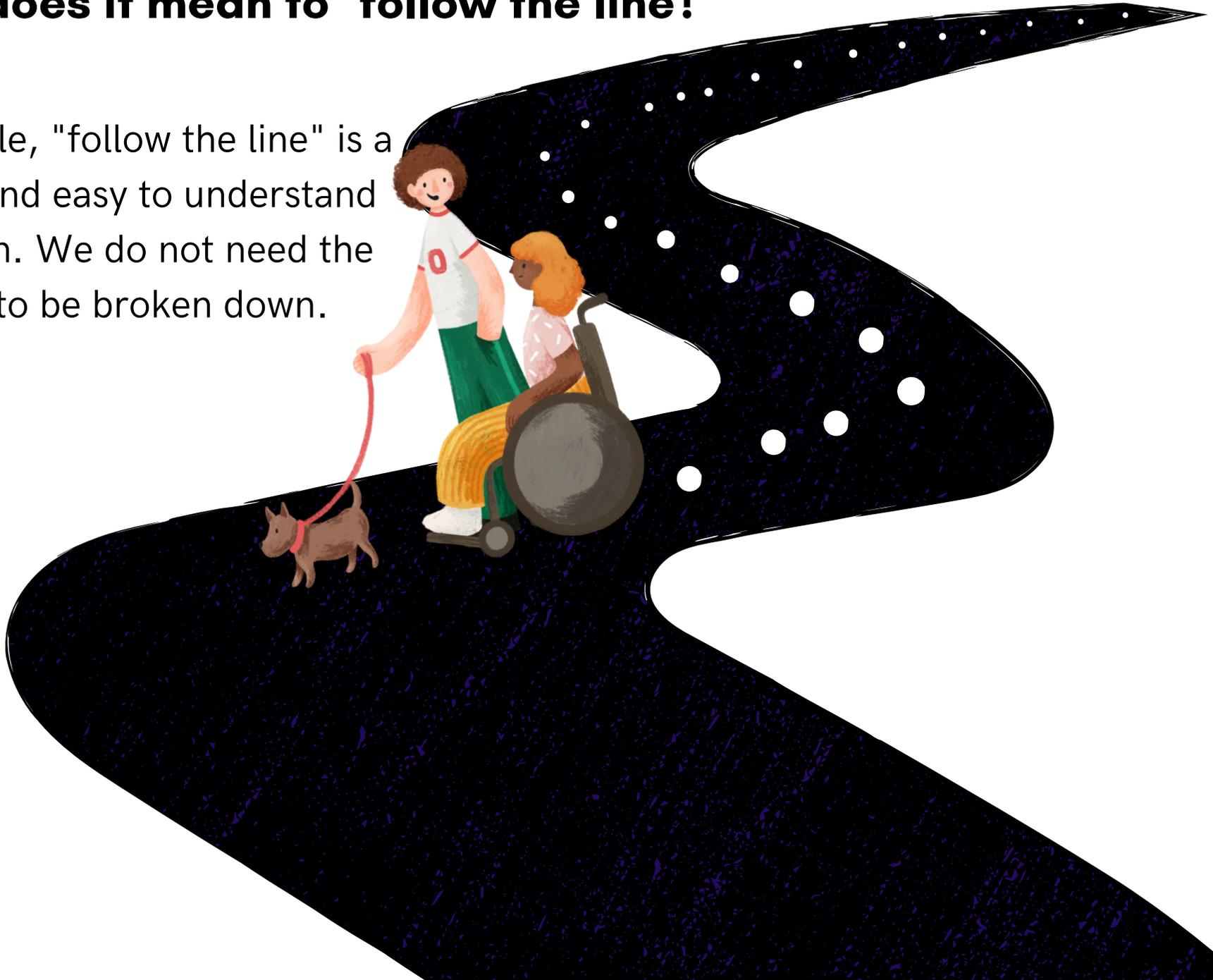
'LINE FOLLOW'

Learn to Program

by Acadia Robotics

What does it mean to "follow the line?"

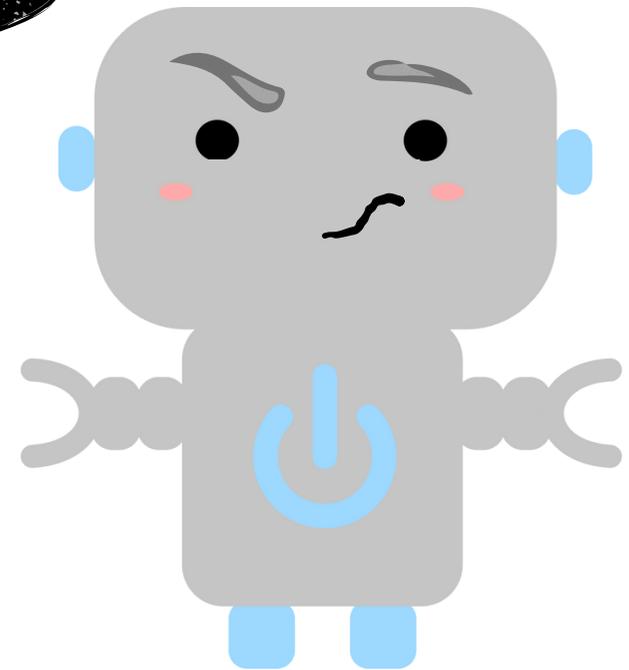
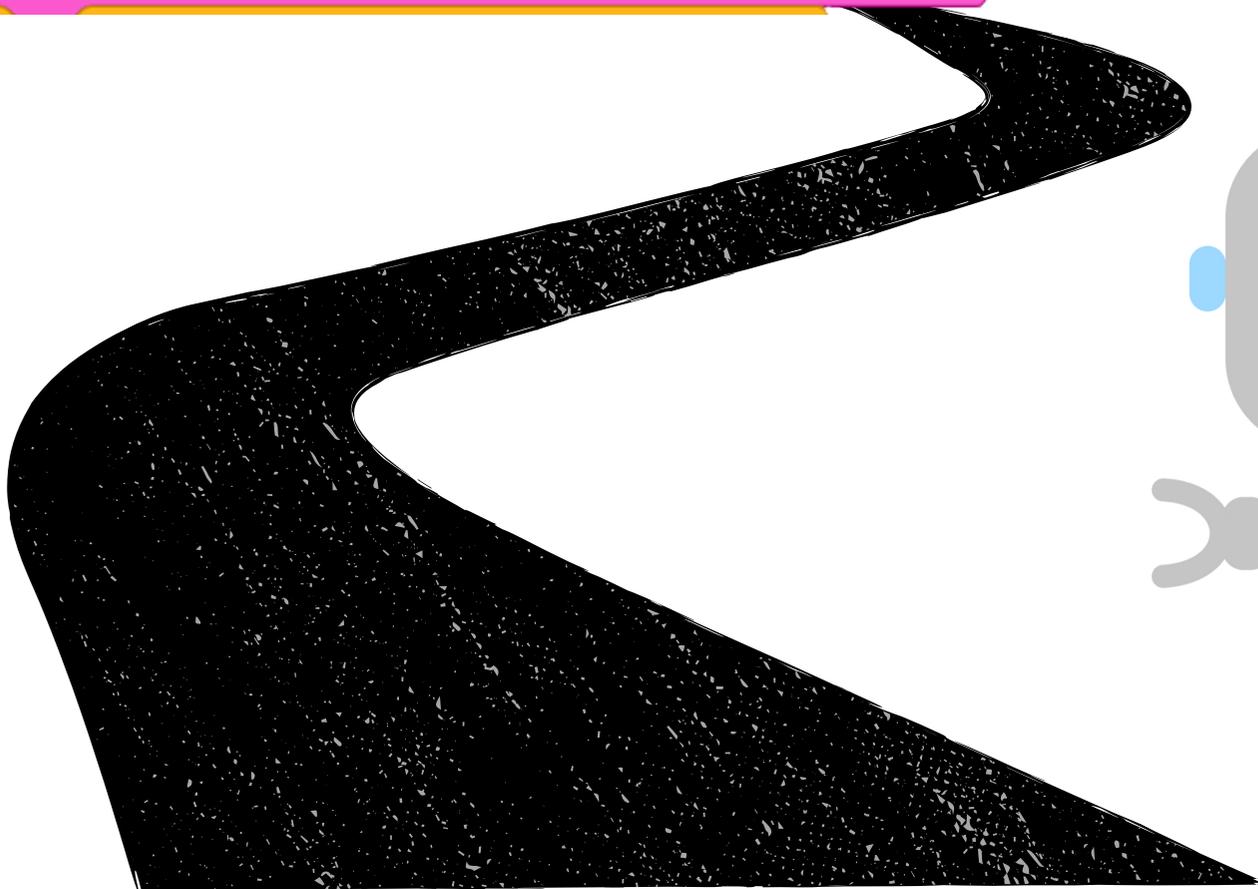
For people, "follow the line" is a simple and easy to understand direction. We do not need the steps to be broken down.



But to our robots, this direction is not so simple.

▶ when program starts

🎮 follow the line



There are actually several things that happen when we follow a line. They appear so obvious to us that we don't even have to think about them.

What we really mean by "follow the line" is...

Move only on the black part of the floor.

If the black turns to the left, turn to the left, too.

If it turns right, go right.

If you are on the white part of the floor, you are not on the line.



These 'obvious' directions are fundamental to programming the robot.

The simple task needs to be broken down into smaller ideas and actions that the robot is capable of understanding and doing.

Follow the Line = Fold in the Cheese



<https://www.youtube.com/watch?v=fCVKUB5w50&t=29s>



Understanding the Robot's capabilities

So how do we make this simple command understandable to our robots?

The concept of "a line" isn't evident to a robot, but...



Our robots CAN recognize light reflection and colour

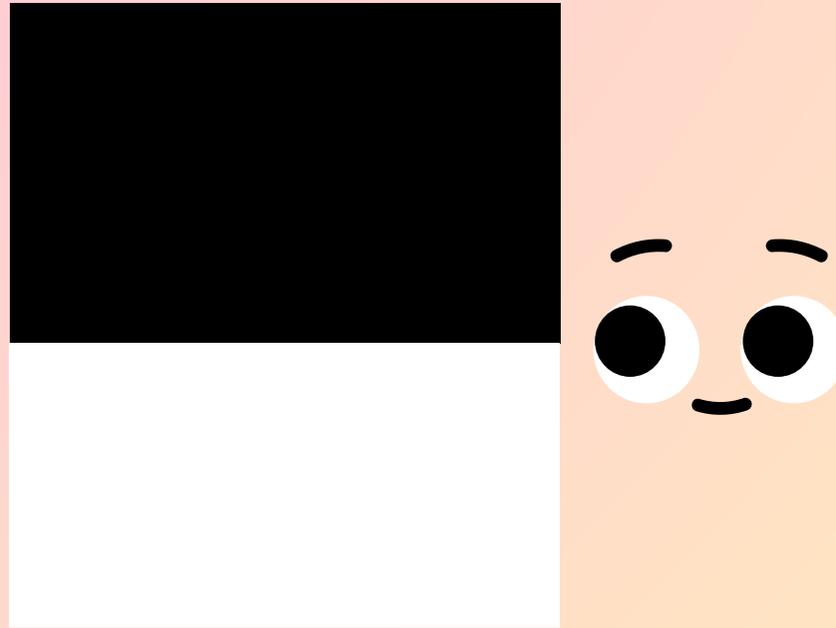
COLOUR SENSOR:

Detects colour by measuring intensity of reflected light. The lighter the colour, the higher the number.



Application:

We need the robot to detect when it is close to blackness (the line), and when it has gone onto the lighter section (not the line / off the course), and then adjust its direction accordingly.



TRY THESE IN YOUR PROGRAM:



LIGHT SENSOR

WHICH PORT THE SENSOR IS IN



HIGHER NUMBER = LIGHTER COLOUR

OR



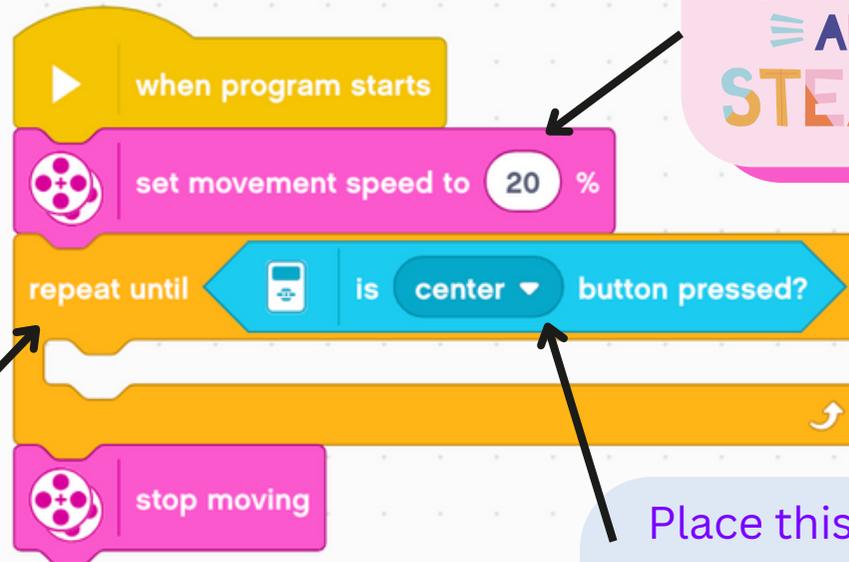


TRY MAKING A
PROGRAM!

AND THEN
COMPARE
SOLUTIONS

GETTING STARTED

This block will repeat the enclosed actions until the event you place in the hexagonal block occurs.

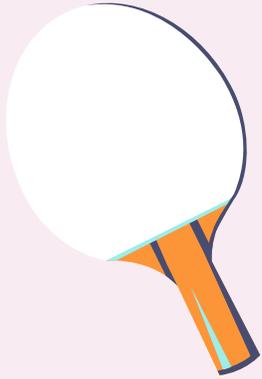


SLOW
AND
STEADY

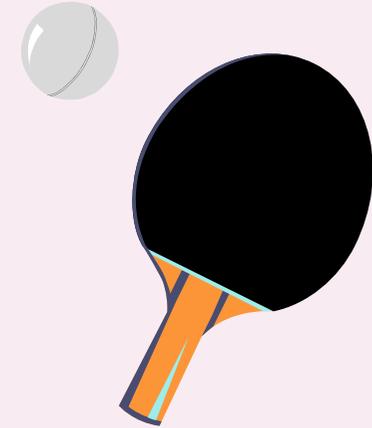
Start by slowing down your motors. Click on the number and type in '20.'

Place this block inside the 'repeat until' block. It will tell your robot to cease action when you press the centre button on the brick.

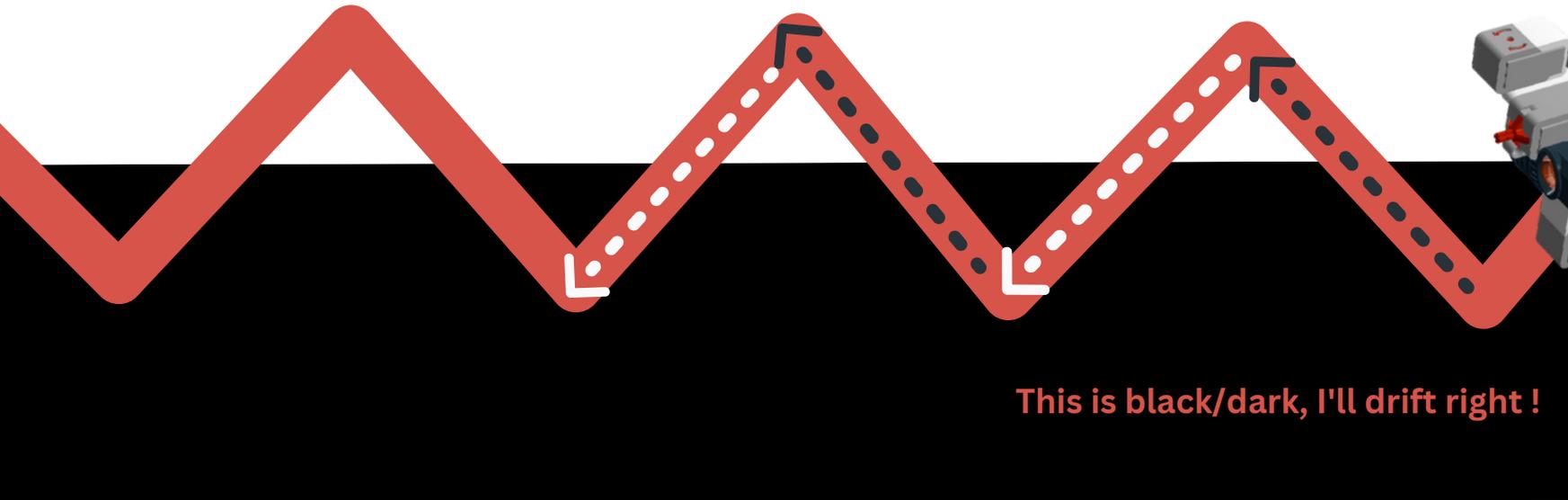
This block, when placed after the 'repeat until' block, tells your robot to stop when you press the centre button.



Our Robot is going to travel by ping-ponging between black and white so that it stays on course



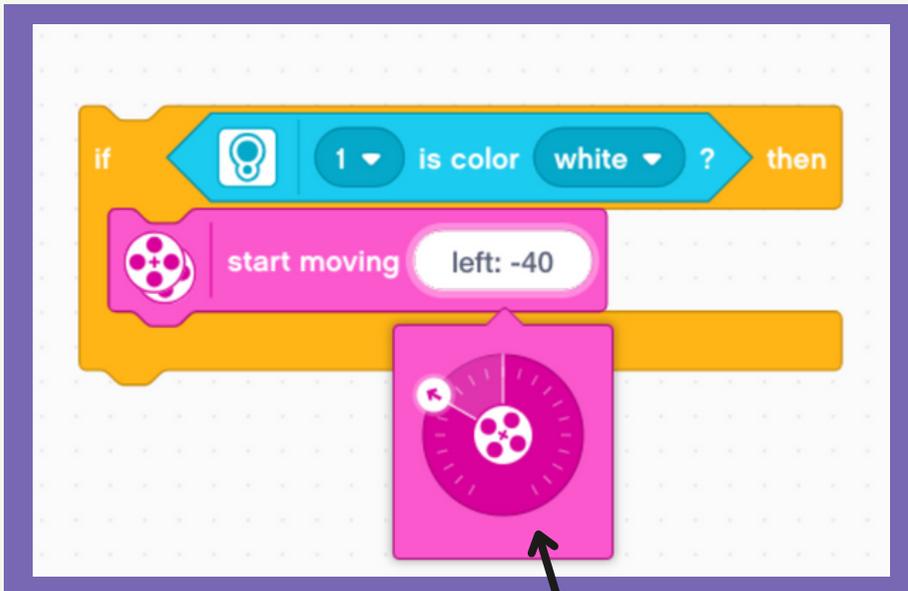
This is white/light, I'll drift left !



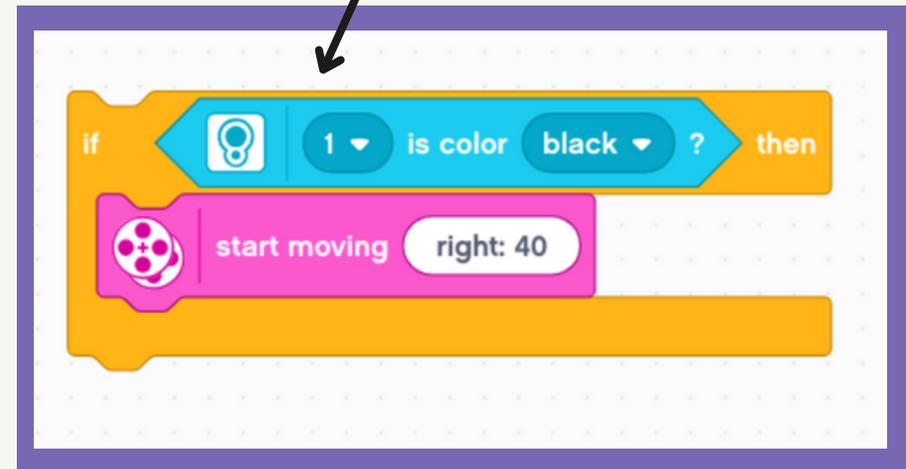
This is black/dark, I'll drift right !

PROGRAMMING THE PING-PONG

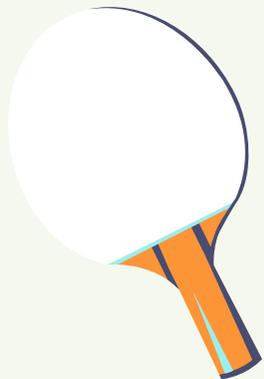
Use these blocks we saw earlier to create 'if...then...' commands.



A Scratch code block with an orange 'if' block containing a lightbulb icon, a dropdown menu with '1', and the text 'is color white?'. Below it is a pink 'start moving' block with a dial icon and the text 'left: -40'. A separate pink dial block is shown below the 'start moving' block, with an arrow pointing to it from a text box.

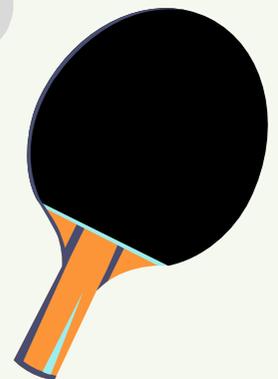


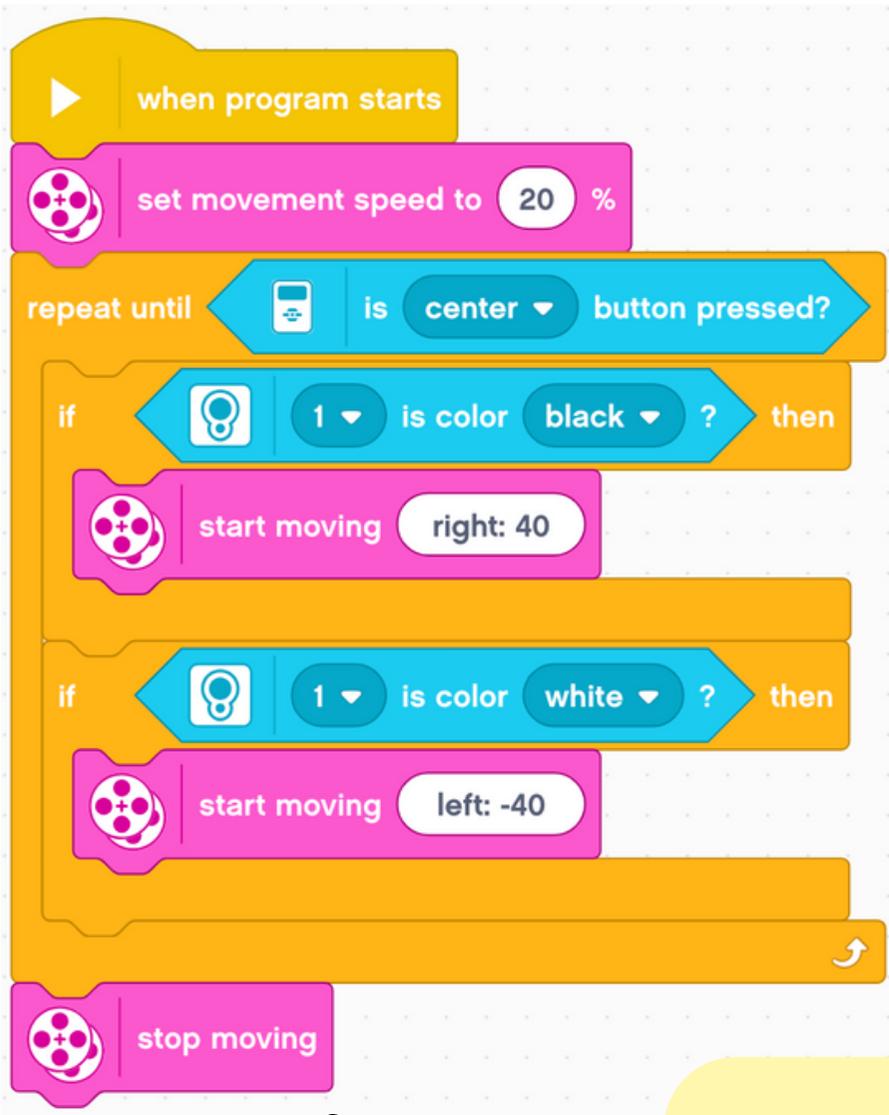
A Scratch code block with an orange 'if' block containing a lightbulb icon, a dropdown menu with '1', and the text 'is color black?'. Below it is a pink 'start moving' block with a dial icon and the text 'right: 40'. An arrow from the text box above points to the 'if' block.



Spin the dial to select the direction, or type in a value, in degrees.

You will have to play with these values by running the robot and making light adjustments to your program.





Place both blocks into the earlier 'repeat until' bracket.

This block, placed here, tells the robot to stop ping-ponging along the line once the centre button has been pressed