

# INTERMEDIATE PROGRAMMING LESSON



## DATA WIRES

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By Sanjay and Arvind Seshan



# Lesson Objectives

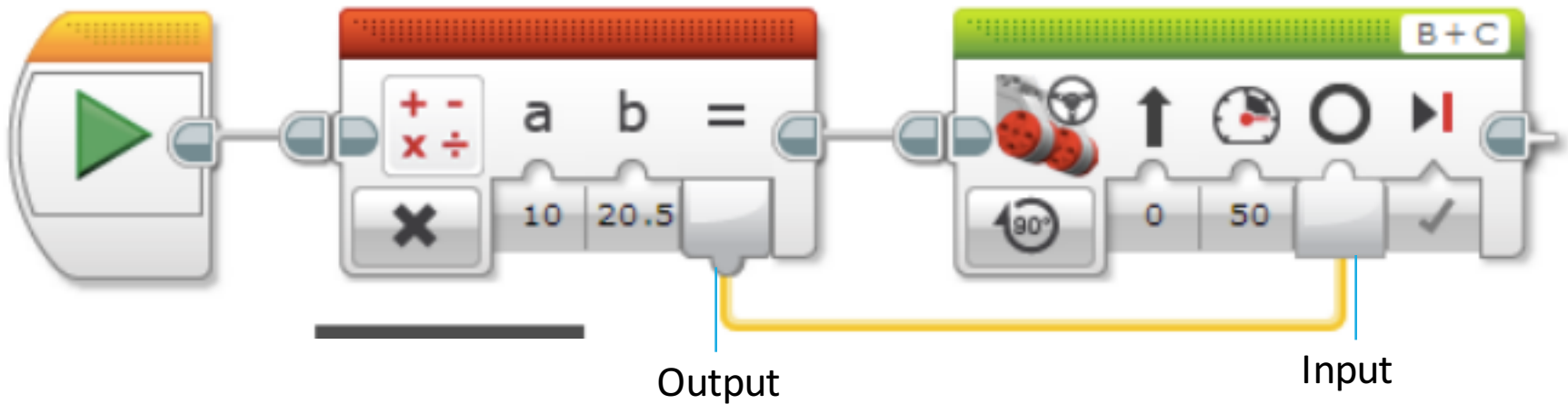
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Learn what Data Wires are and how to use them
















Prerequisites: Display Block, Sensor Block, Brick Buttons

# Data Wires

A Data Wire allows you to take an output from one programming block and input it into another.



# Data Wire Types

Data Type	Input	Output	Output Data Wire
Logic		True or False 	
Numeric		Number 	
Text		Text 	
Numeric Array			
Logic Array			

Images from EV3 Help

# Automatic Data Wire Conversions

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From Data Type	To Data Type	Output/Result
Logic	Numeric	False = 0, True = 1
Logic	Text	False = "0", True = "1"
Logic	Logic Array	Array with one element
Logic	Numeric Array	Array with one element (0 or 1)
Numeric	Text	Text that represents a number
Numeric	Numeric Array	Array with one element
Logic Array	Numeric Array	Same size array with all elements equal to 0 or 1

These conversions are automatically performed in the programming blocks. For example, you are allowed to connect a numeric value (like what color a sensor sees) to a text value (on a display block).

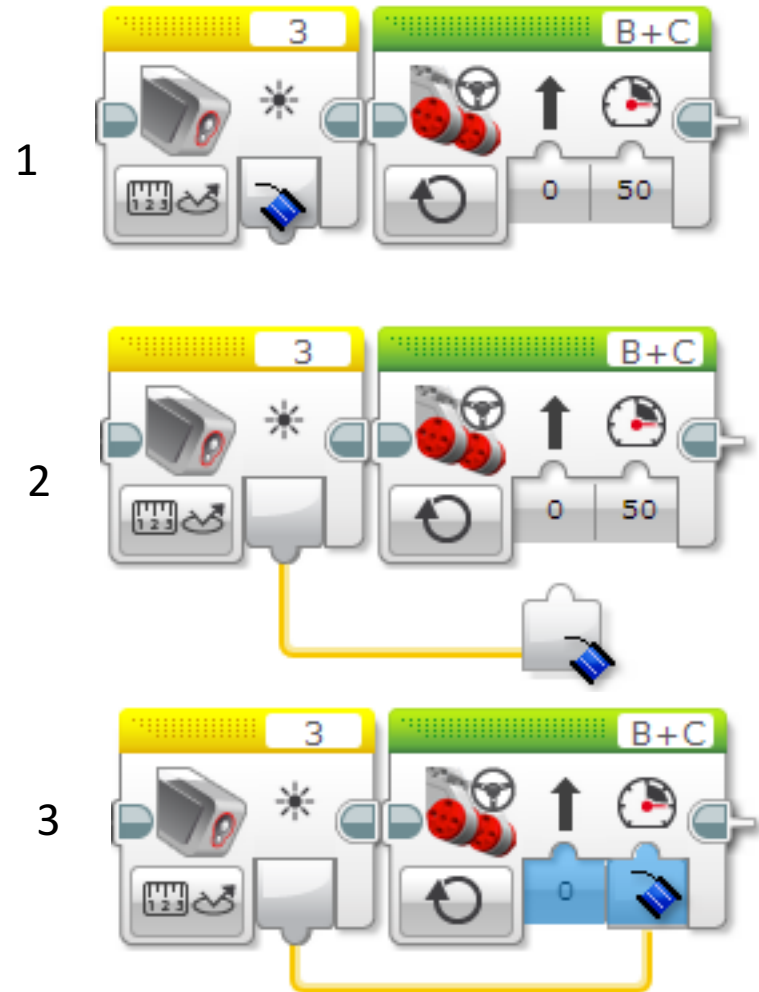
Content from EV3 Help

# How to Create a Data Wire

The block with the output must be placed before the block with the input

The input and the output must be the same data type or one that can be automatically converted (see slides 4 and 5)

1. Click on the output on the block
2. Hold and drag the wire.
3. Move the icon into the correct input and then let go of the mouse



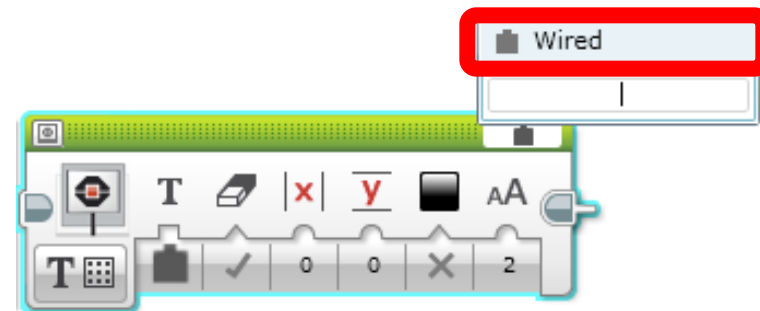
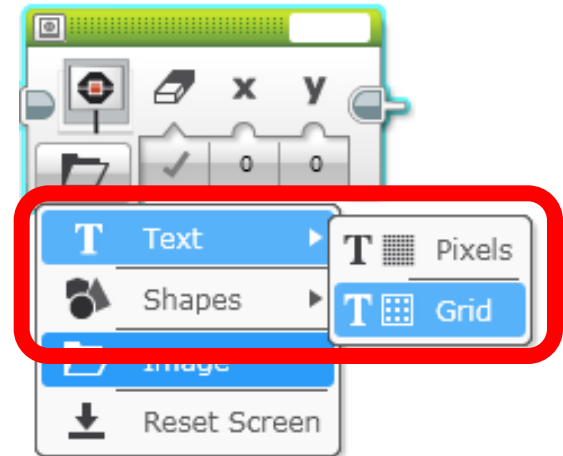
Images from EV3 Help

# Sidebar: Display Block - Wired Mode

The Display Block can be used in wired mode to display data from another block to the screen.

For the challenge, you will need to display a number on the screen. Pick Text Mode → Grid from the bottom left corner of the block.

To pick Wired Mode, click on the top right corner of the Display Block and pick wired



# Data Wires Challenge

**CHALLENGE:** Make your robot drive forward slowly over different colors. Have the robot display the color the color sensor sees as it moves. Stop when you hit a button on the brick.

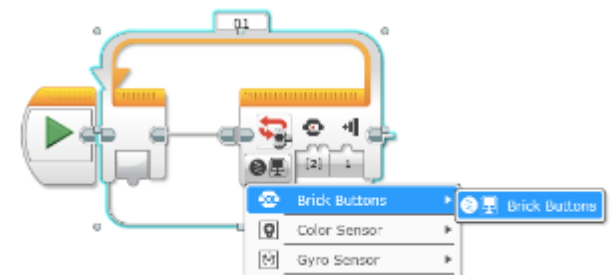
**STEP 1:** Turn the motors on in a Steering Block and drive slowly forward

**STEP 2:**

- Inside a Loop, add a Color Sensor block.
- Add a Display Block in Wired, Text Grid Modes.
- Wire the Sensor Block's output into the Display Block's text input (first input)



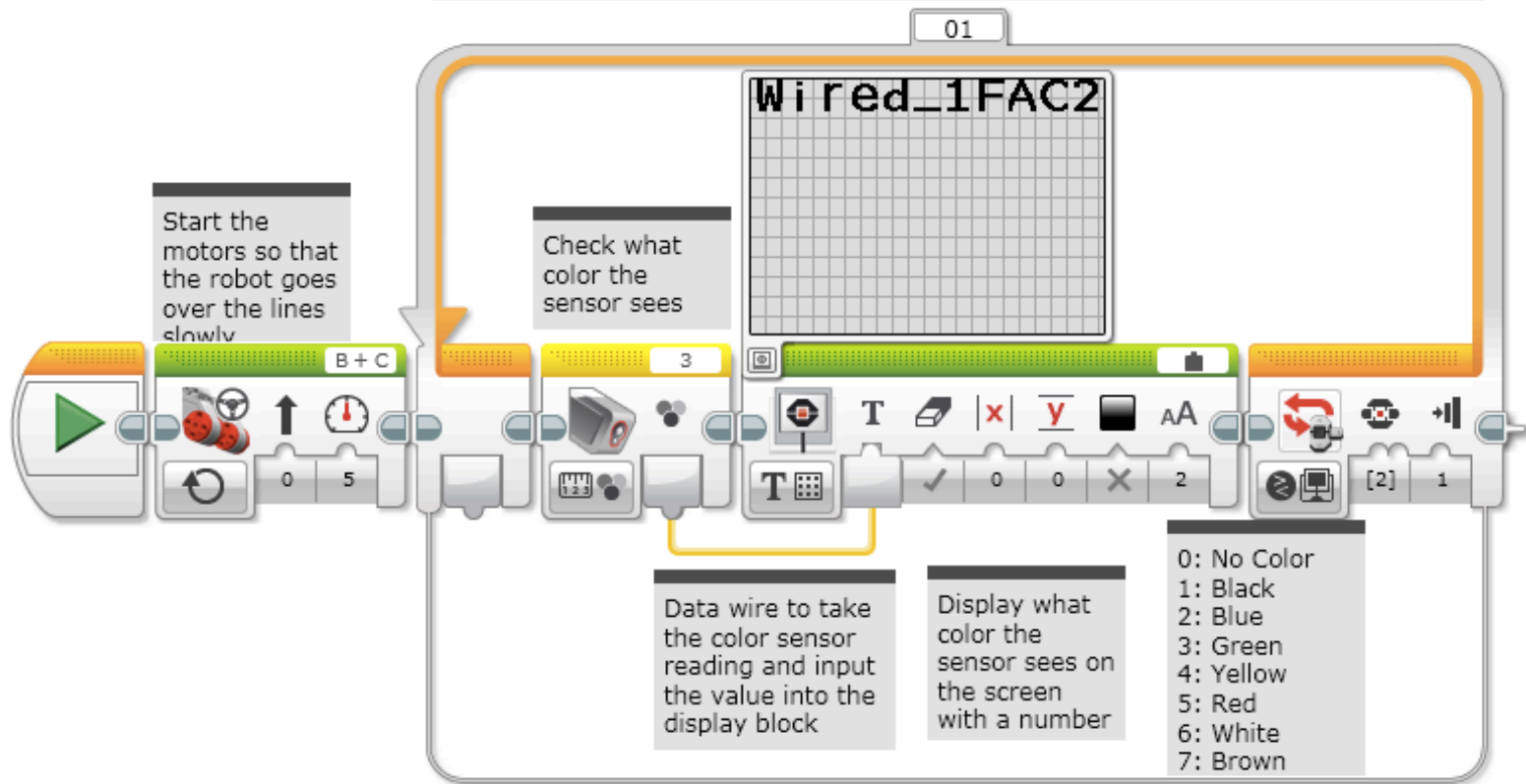
**STEP 3:** Exit the loop when a brick button is pressed





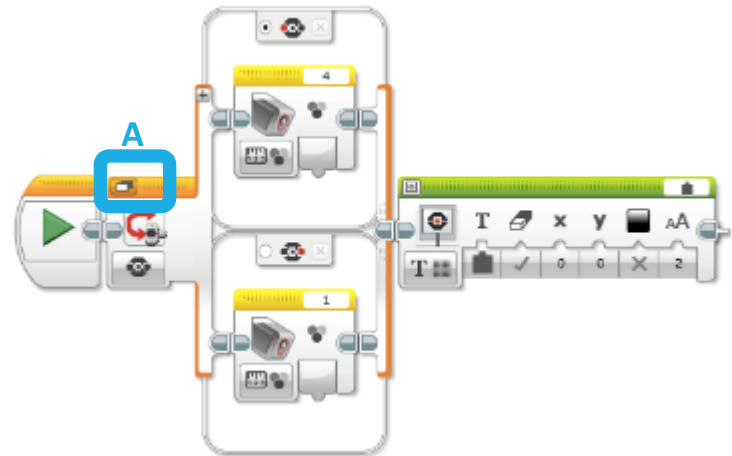
# Challenge Solution

The code is in a loop so the robot keeps checking what color the sensor sees and displays it until you press the center button and exit the program.

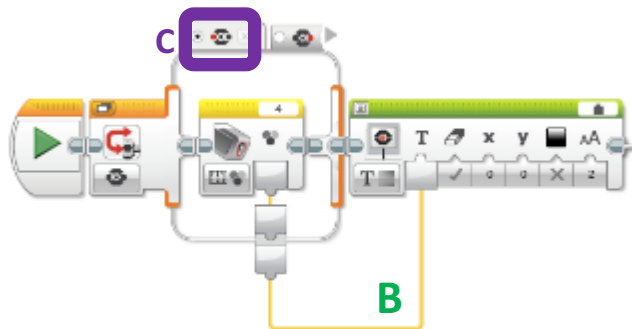


# More Complex Wiring: Switches

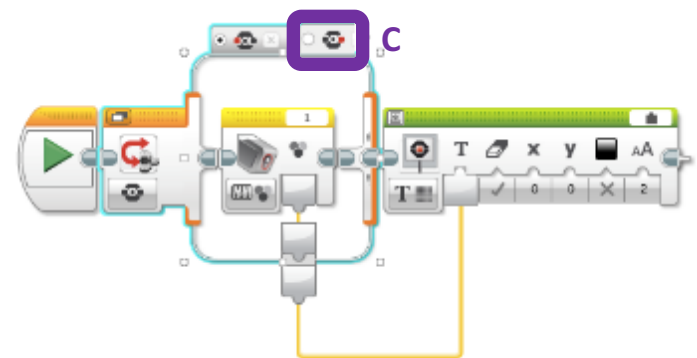
- A. If you want to drag data wires out of switches, you will need to change the switch to tabbed view



- B. Once you switch to tabbed view, you can drag data wires out

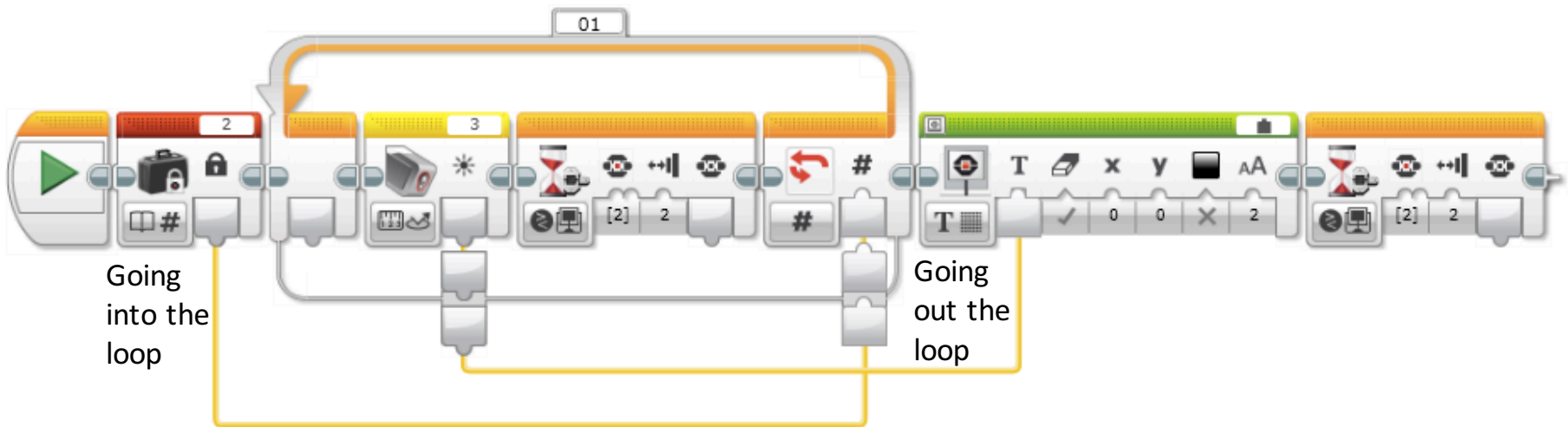


- C. Different options in the switch can connect to the same wire



# More Complex Wiring: Loops

You can connect wires both into and out of a loop like in the example below



- Note that the data coming out of the loop through the wire will only be the last pass through the loop.
- In the example above, the color sensor is read twice in the loop. However, the data wire will only have the second (and last) reading and that second reading will be displayed.

# Credits

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- This tutorial was written by Sanjay and Arvind Seshan
- More lessons at [www.ev3lessons.com](http://www.ev3lessons.com)



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