

# INTERMEDIATE PROGRAMMING LESSON



## VARIABLES

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By Sanjay and Arvind Seshan



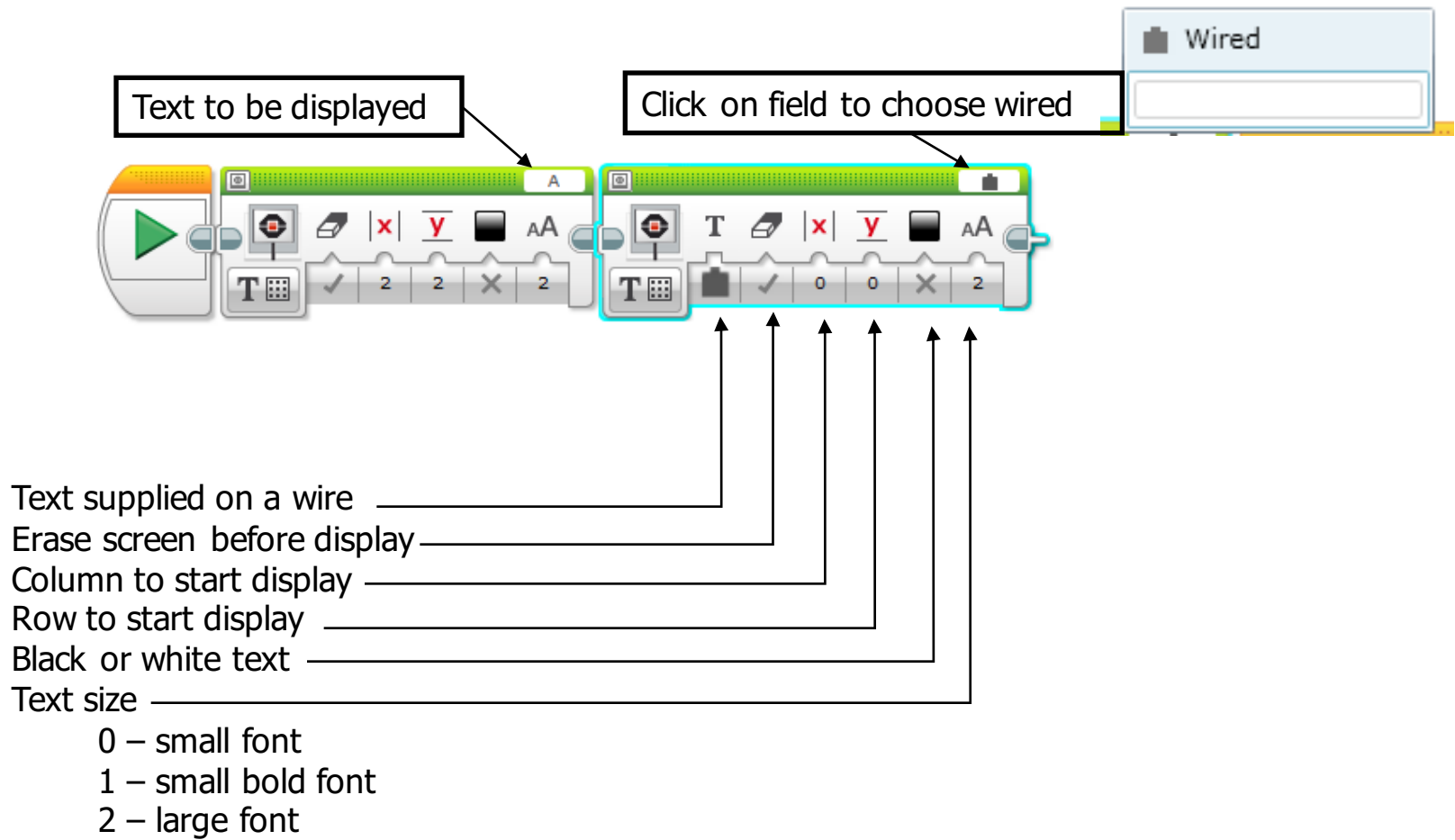
# Objectives

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1. Learn about different types of variables
2. Learn how to read and write to variables

Prerequisites: Data wires, Color Sensor, and Display Blocks, Wait blocks

# Additional Tool: Wired Display Blocks



# Variables

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What is a variable? Ans. A variable stores a value that you can use later in your program. Think of it like a notepad or a box that holds a value for you.

You can name the variable whatever you want

You can define the type of variable:

- Numeric (Holds a number)
- Logic (Holds True/False)
- Text (Holds lines of text ... "Hello World")
- Numeric Array (Holds a set of numbers ... 1,2,3,10,55)
- Logic Array (Holds a set of logic ... True, True, False)

They can be used as either Inputs or Outputs so you can either....

- Write – put a value into the variable
- Read – retrieve the last value written to the variable

# Why Variables?

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Variables are an easy way to transfer data across code without too many data wires

You can also use variables to transfer data into a My Block without an input (eg. A variable for wheel size in Move Inches – You probably do not want this to be an input since it rarely changes. You may also use the value in other locations and want to change it just in one spot.)

Array variables can store multiple data items without needing several wires or variables

Having too many data wires or variables makes your code messy

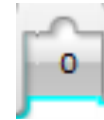
# Variable Blocks

Numeric

Logic

Text

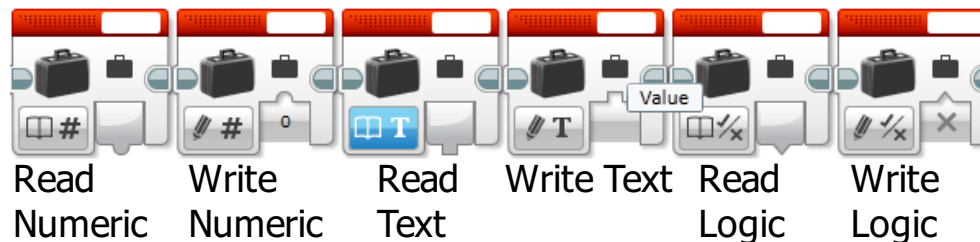
Write (Inputs) have a bump up



Read (Outputs) have a bump down



Use the key above to identify if the variables are Inputs or Outputs and if they are Numeric, Logic or Text



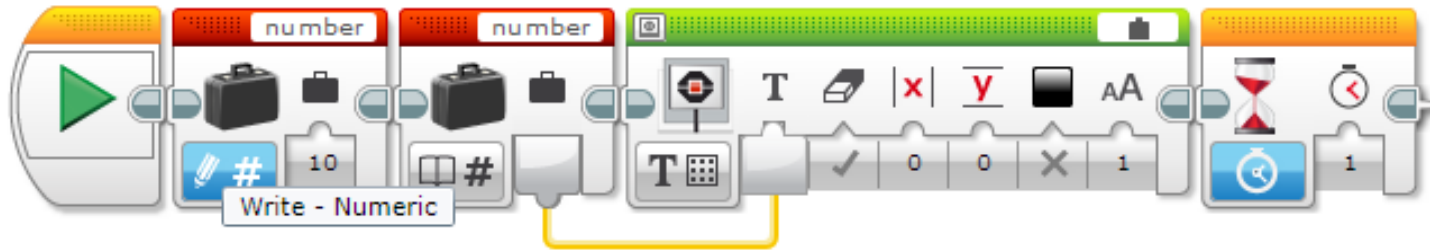
**TIP: You can change the type of variable at the bottom-left part of the block. When you display logic to the screen it will show 1 for True or 0 for False**

# Outputs of Different Types of Variables

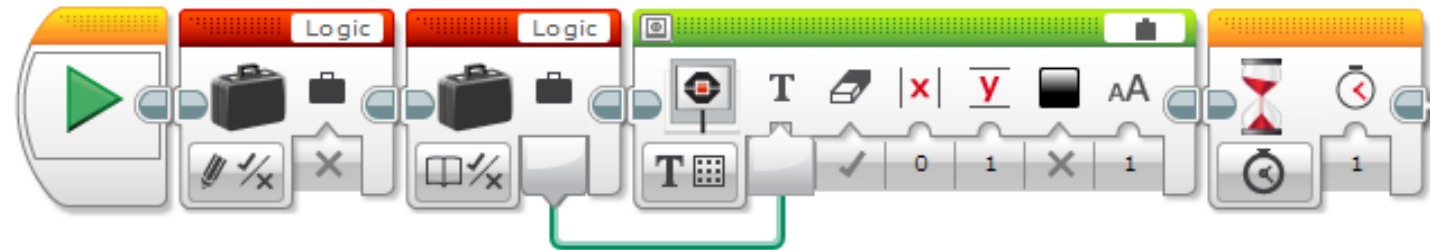
Write to  
the  
variable

Can you guess what each of these do?

Here we display the value of the variable to the  
screen



Numeric Variables:  
This will display 10  
on the screen



Logic Variables:  
This will display 0  
on the screen



Text Variables:  
This will display  
Hello on the  
screen

# Challenges

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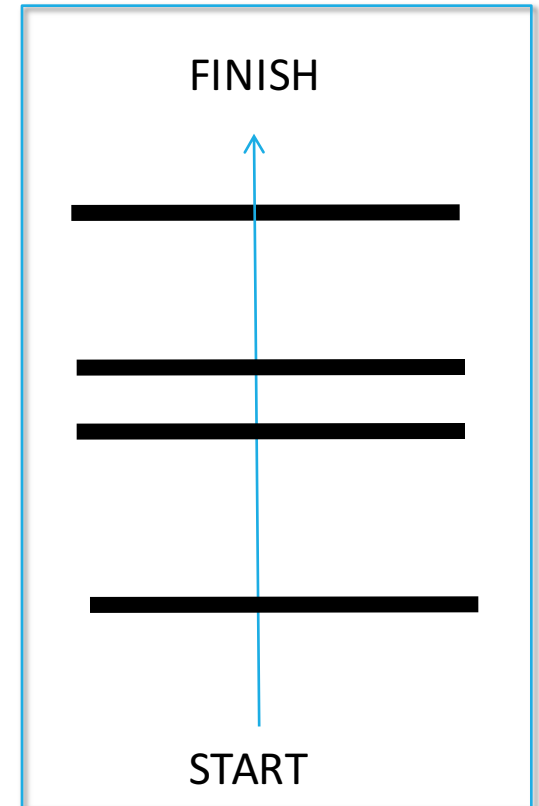
## Challenge 1:

- Can you make a program that displays the number of times that you have clicked the up button?

## Challenge 2:

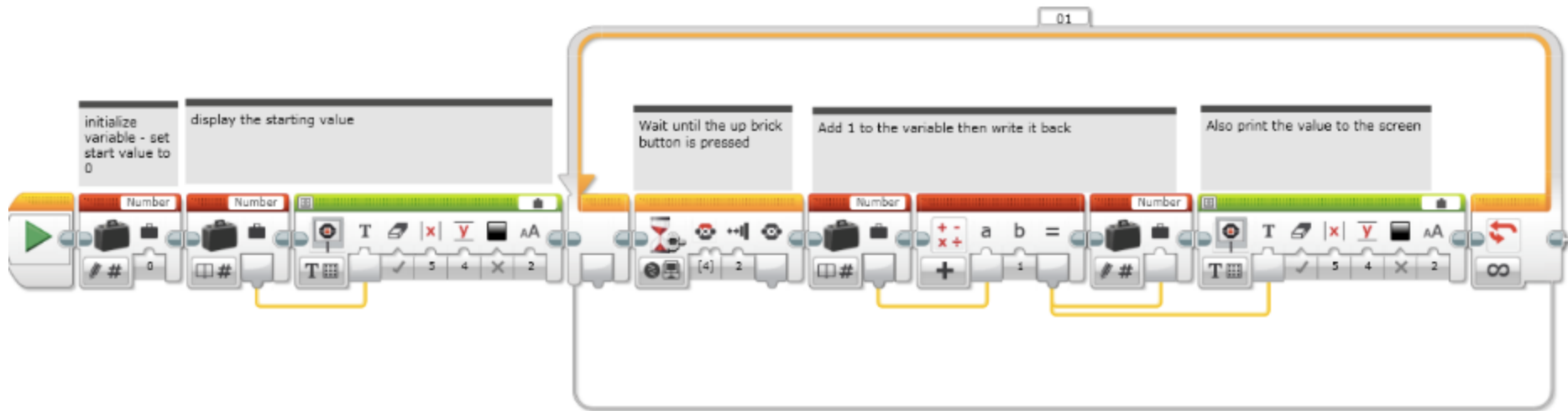
- Can you write a program that counts the number of black lines you have crossed?

## Challenge 2

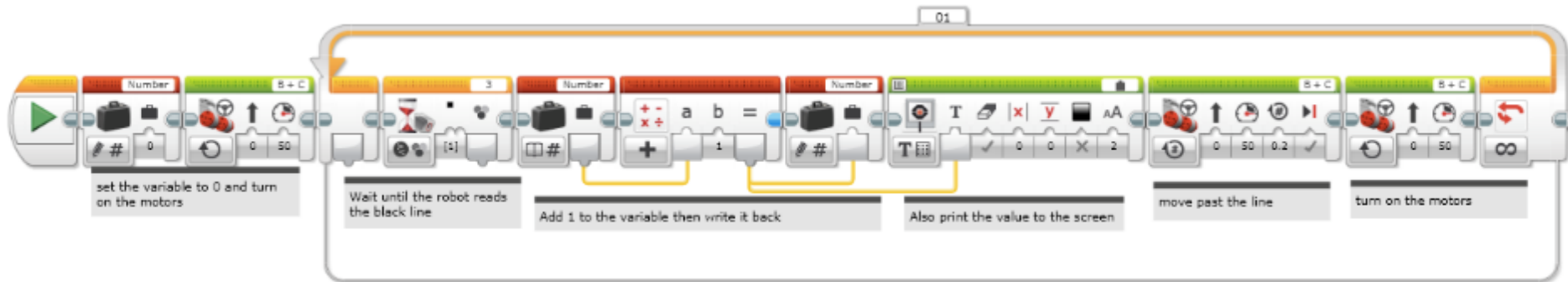




# Challenge 1 Solution: Count Clicks



# Challenge 2 Solution: Count the Lines



# Next Steps

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We use variables in the following lessons:

- Advanced: Menu System
- Advanced: Parallel Beam Synchronization

# Credits

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



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