INTERMEDIATE PROGRAMMING LESSON

VARIABLES

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Objectives

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

- Text to be displayed
- Click on field to choose wired

Text supplied on a wire
Erase screen before display
Column to start display
Row to start display
Black or white text
Text size

0 – small font
1 – small bold font
2 – large font
Variables

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?

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

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

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

Write to the variable

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Challenges

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 1 Solution: Count Clicks
Challenge 2 Solution: Count the Lines

1. Set the variable to 0 and turn on the motors.
2. Wait until the robot reads the black line.
3. Add 1 to the variable then write it back.
4. Also print the value to the screen.
5. Move past the line.
6. Turn on the motors.

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Next Steps

We use variables in the following lessons:

◦ Advanced: Menu System
◦ Advanced: Parallel Beam Synchronization
Credits

- This tutorial was created by Sanjay Seshan and Arvind Seshan
- More lessons at www.ev3lessons.com

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