ADVANCED EV3 PROGRAMMING LESSON

Menu System

By Droids Robotics

Lesson Objectives

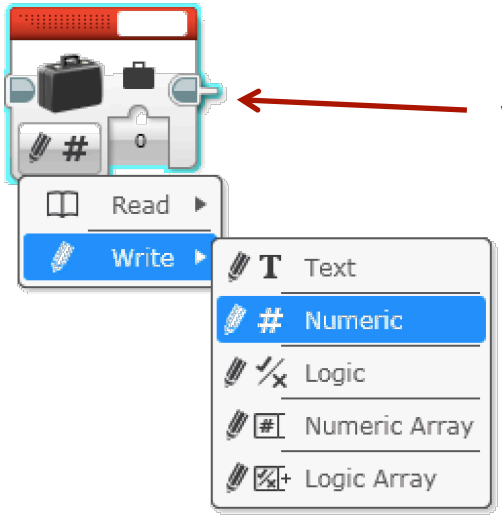
1. Learn and apply knowledge of variables
2. Learn to create a menu system that is not limited to a particular number of choices
3. Learn to create a menu system that updates the menu view

Prerequisites: Simple Sequencer, Intermediate Menu System, Variables, My Blocks, Math Blocks

A Fancier Menu System

- The Intermediate Menu System was limited to 4 choices and a single screen display for the entire menu
- In this version, we build a menu system that updates the menu view each time you change your selection and lets you have a larger number of menu choices
- To make this menu, you will need to learn how to use variables

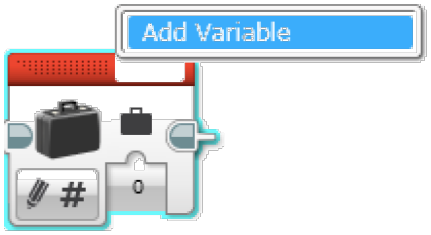
New Tool: Variables



Variables can store values for later use

There are different types of variables (described on next slide). You must chose the type of variable before creating one.

You must create a variable and give it a name before using it.



Once created, you can read and write values to the variable.

Variable Types

- Different types of variables can store different types of information.

1. Text – any text, e.g.: “Robots are great” or ”Run 2”
2. Numeric – any number, e.g.: 5, 5.2 or -4.22
3. Logic – True or False
4. Numeric Array – a collection of numbers, e.g.: (5,2,2) or (3,4,5,6)
5. Logic Array – a collection of true/false values, e.g.: (T, F) or (F, F, T, F)

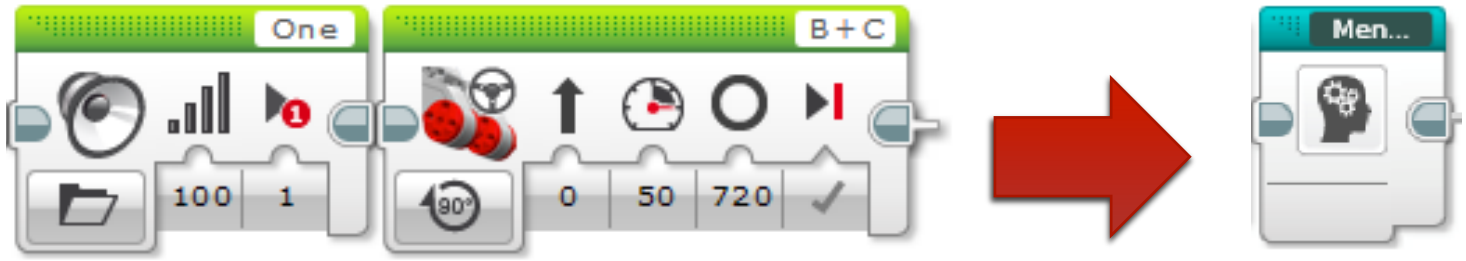
- In this lesson, we only use numeric variables. Logic variables and arrays will be covered in another lesson.

Menu Challenge

Challenge: Make a menu system that lets you perform 4 actions based on the button pressed

1. Use a variable to store the current menu choice.
2. Display the menu description for the current menu choice
3. Wait for the user to press a button
4. Based on the button press: run the code for the menu choice (for middle button), or increase/decrease the menu choice variable (for up/down buttons)
5. Go back to 2…

Step 1: Convert Menu Item Code to My Blocks



- You need to convert long set of actions into its own My Block
- If you don't know how to make a My Block, see the Intermediate lesson on My Blocks

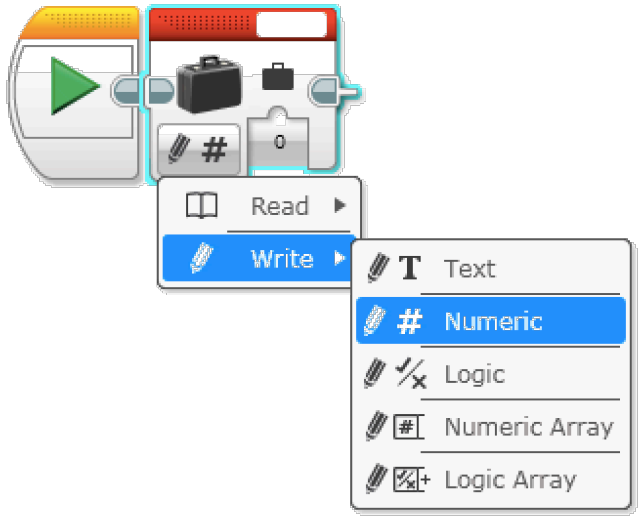
There is no Step 1 and 2 in the EV3 Code file. Learn Step 1 and 2 from the Powerpoint/PDF and then continue with Step 3 in the EV3 Code file.

Step 2: Add a Current Menu Choice Variable

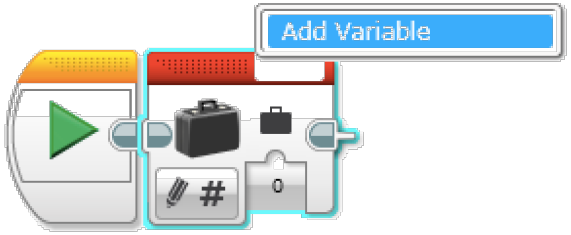
- Variables can be used to store information such as a sensor reading. In this program, we are going to use a variable to store the current menu choice.

To create a variable:

1. Add a variable block
2. Select the type of variable by changing the mode to "Write X" where X is one of Text, Numeric, Logic, Numeric Array or Logic Array. Since we are storing the menu choice number – chose Numeric.

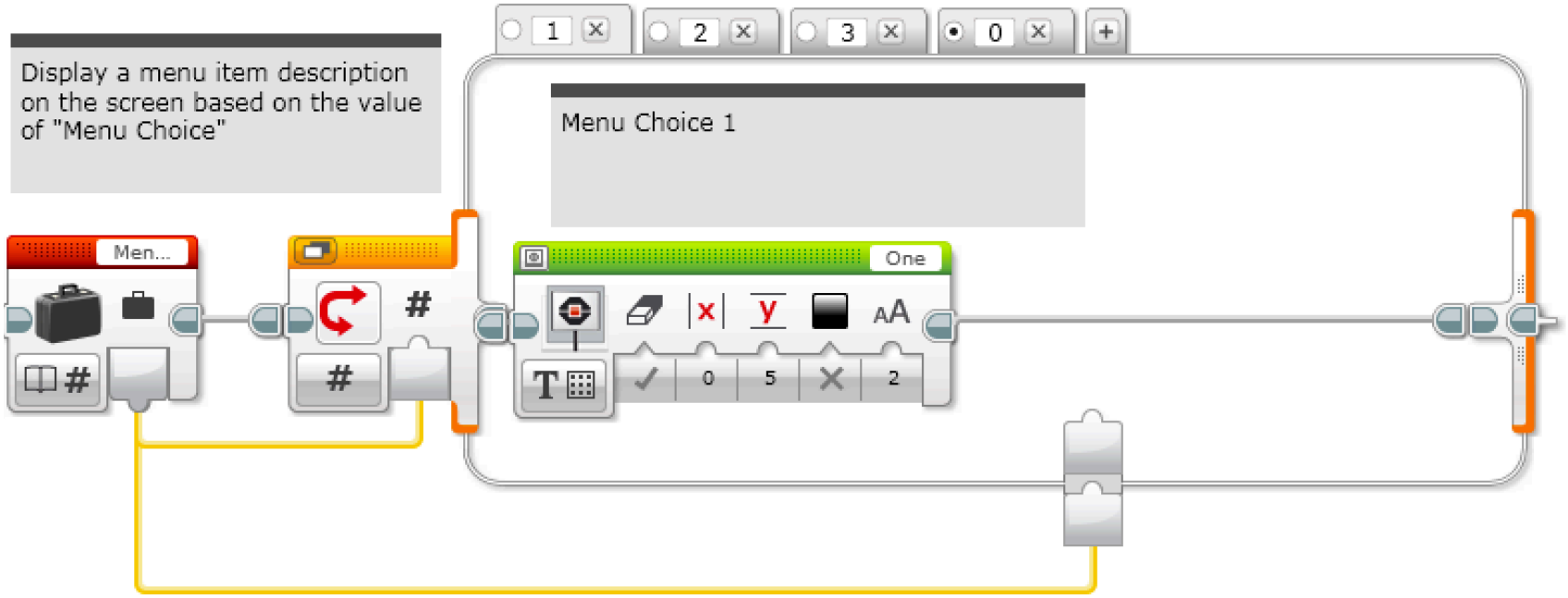


3. Click on the box at the top right and select Add Variable. For this program, create a variable called "Menu Choice"



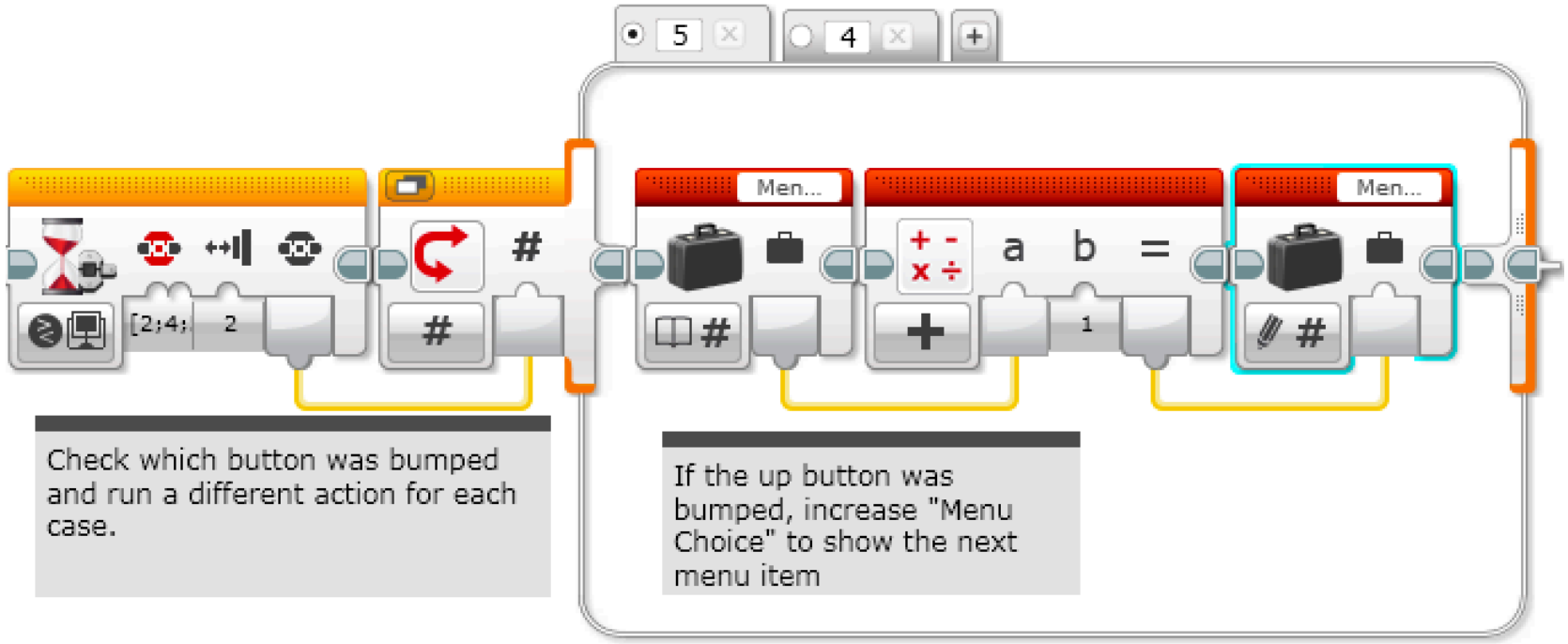
Step 3: Display Current Menu Choice

- You can combine a switch block set to numeric mode and a variable block set to read to display the current menu choice
- You should select just the switch block and create a My Block called Display_Menu.



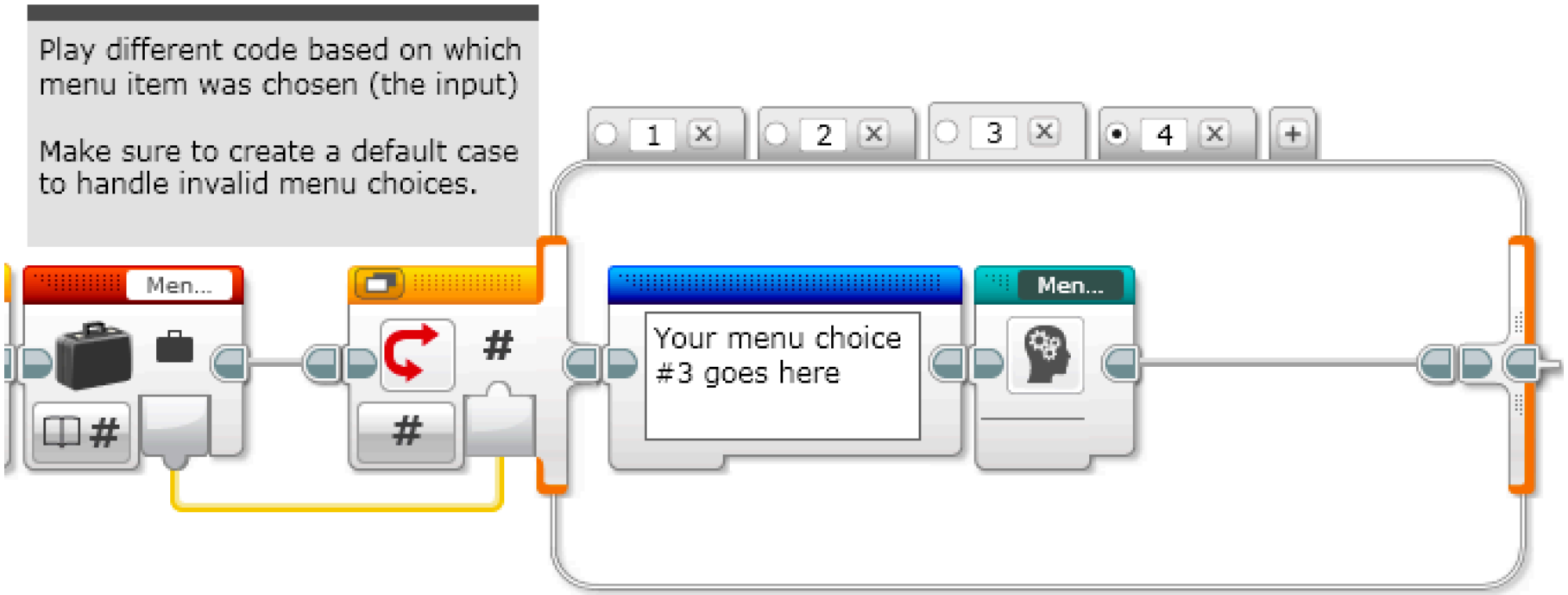
Step 4: Increasing/Decreasing Menu Choice

- You can use a wait for menu button block and a switch to decrease the menu choice if you hit the up button. The down button (Tab 5) is similar but increases the menu choice.



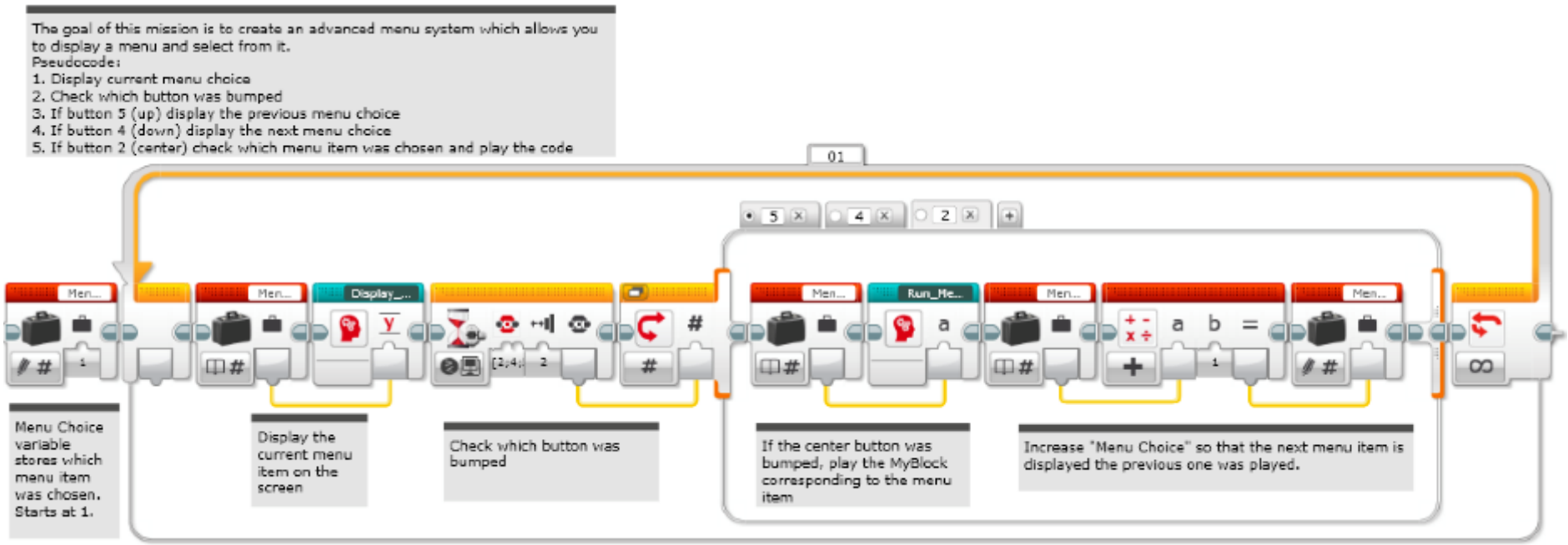
Step 5: Using a Variable to Run Menu Item Chosen

- You can combine a switch block set to numeric mode and a variable block set to read to run the chosen menu item.



Final Solution

- You can combine the previous steps to create a menu system that lets you select from a menu using the up and down arrows



Next Steps

- The ideas in this lesson can be adapted to help you build a mission sequencer for FLL. Sequencers are useful because they:
  - Allow you to skip missions if you are short of time
  - Allow you to repeat failed missions
  - Allow you access missions quickly (find them easily)

Credits

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