INTERMEDIATE PROGRAMMING LESSON

LOGIC OPERATIONS & DECISION MAKING

By Sanjay and Seshan

Lesson Objectives

Learn what the Logic Block does

Learn how to use the Logic Block

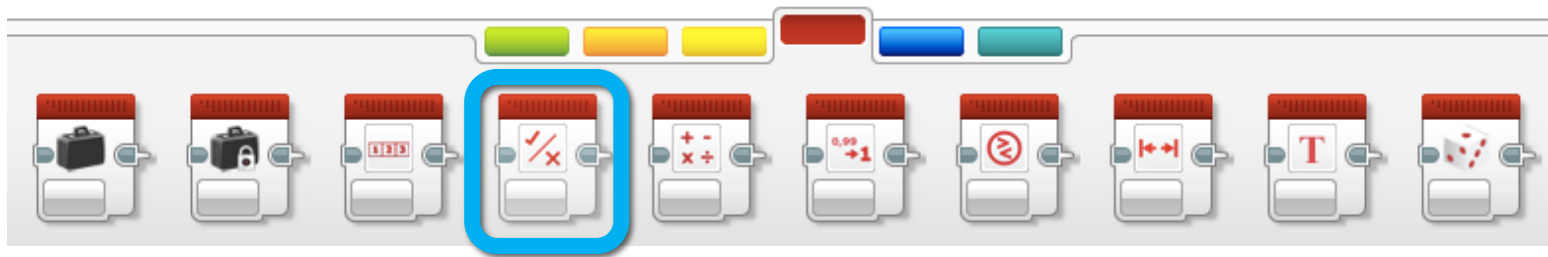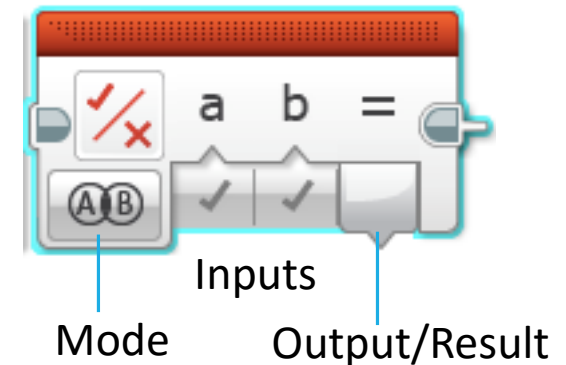Prerequisites: Data Wires, Sensor Blocks

Logic Operations Block

The Logic Bock does a Logic operation on its inputs, and outputs the result

A Logic Block takes inputs that are True or False, and produces a True or False output

Logic values can be used as inputs into loop exists and switch conditions.

It is found in the Red Programming Pallet tab

Inputs

Mode

Output/Result

Different Modes in the Logic Block

Icon	Mode	Inputs	Output/Result
	AND	A, B	• True if both A **and** B are both true, otherwise the result is False
	OR	A, B	• True if either A **or** B (or both) is/are True. The result is False if both A and B are False
	XOR	A, B	• True only if one (and exactly one) of A and B is True • The result is False if both A and B are True • The result is False if both A and B are False
	NOT	A	• Outputs the opposite of what you input. • The result is True if A is False • The result is False if A is True

The icons are Venn Diagrams. The dark shaded areas identify what needs to happen for the block to output True.

Logic Blocks in Three Easy Steps

CHALLENGE: Make your robot drive forward until EITHER the Touch Sensor is pressed or the Color Sensor detects black.

STEP 1: Turn the motors on

STEP 2: Add the Logic and Sensor Blocks
- ◦ A. Use a Logic Block in the OR mode
- ◦ B. Add the inputs: Take a color sensor and a touch sensor blocks and wire them into the Logic Block as inputs

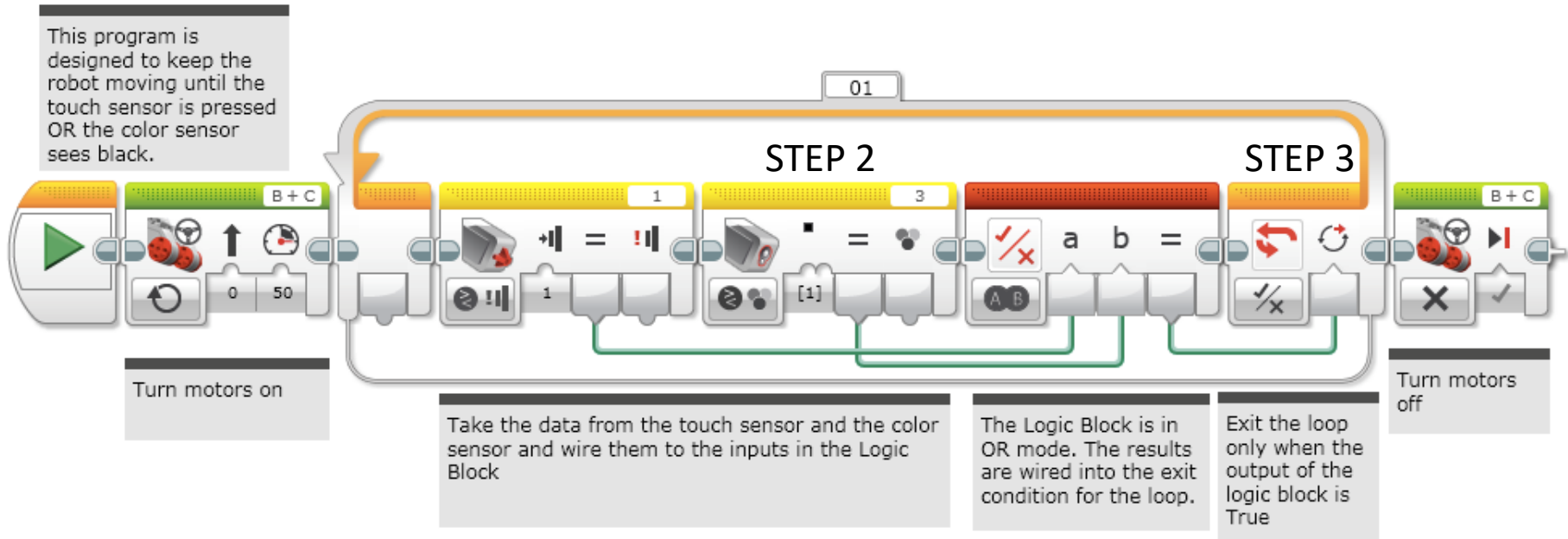**STEP 3:** Add a Loop and loop exit condition:
- ◦ Place the Sensor and Logic Blocks in a loop
- ◦ For the exit condition of the loop, select logic. Wire the result of the Logic Block into the exit condition
- ◦ If the result of STEP 2 is True, you should exit the loop and stop the robot
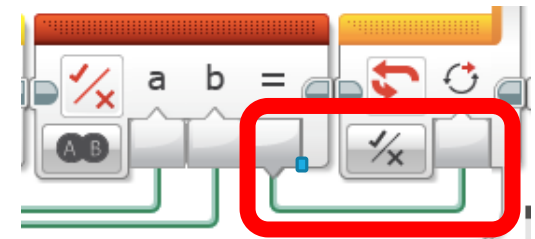
Challenge Solution

STEP 1

This program is designed to keep the robot moving until the touch sensor is pressed OR the color sensor sees black.

STEP 2

STEP 3

Turn motors on

Take the data from the touch sensor and the color sensor and wire them to the inputs in the Logic Block

The Logic Block is in OR mode. The results are wired into the exit condition for the loop.

Exit the loop only when the output of the logic block is True

Turn motors off

Credits

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

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