BEGINNER PROGRAMMING LESSON

EV3 Classroom: Touch Sensor

By Sanjay and Arvind Seshan

LESSON OBJECTIVES

1. Learn how to use the Touch Sensor

2. Learn how to use the Wait For Block

3. Learn the difference between the Wait For Block and the Sensor Blocks

4. Learn when to use Start Moving Block

WHAT IS A SENSOR?

- **A sensor lets an EV3 program measure and collect data about is surroundings**

- **The EV3 sensors include:**

  - Color – measures color and darkness
  - Gyro – measures rotation of robot
  - Ultrasonic – measures distance to nearby surfaces
  - Touch – measures contact with surface
  - Infrared – measures IR remote's signals

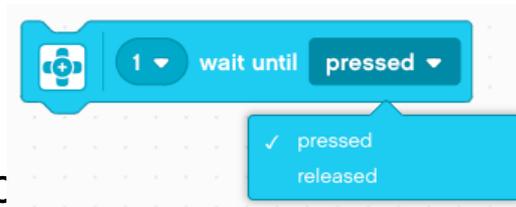Image from: http://www.ucalgary.ca/IOSTEM/files/IOSTEM/media_crop/44/public/sensors.jpg

WHAT IS A TOUCH SENSOR?

- Touch Sensor can detect when the sensor's red button has been pressed or released

- With this information, you can program an action when the sensor is:

  Currently Pressed

  Currently Released

- When might you use this senso

  - Useful for programming "moving until touch sensor is pressed/released"
  - For example, if you put a touch sensor on the front the robot, you can have it stop moving if it runs into something.
  - You can also have your program start or stop when a touch sensor is pressed.

Note that unlike EV3-G, there is no longer a Bumped mode. The equivalent would be to check for both pressed and then released.

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HOW DO YOU PROGRAM WITH THE TOUCH SENSOR?

There are two different touch sensor blocks (found in the Sensors palette). What is the difference?

Used to Read Sensor Values

Used to wait for a touch sensor reading

The first input in both is the port number. Change this to the port (1 to 4) that the touch sensor is connected to. The default port is usually 1.

In this lesson, we will use the "Wait Until" version of the block

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# START MOVING AND STOP MOVING BLOCKS

- **Both are found in the Movement palette.**

- **Start moving will turn on your drive motors at the given steering and speed. The subsequent blocks will run after this block has been initiated.**

- **Stop moving will halt your drive motors no matter what action they are running.**

START AND STOP MOVING

What would happen if you placed a Start Moving block?

Would the robot…

    1) Move?

    2) Move for a little while?

    3) Not move at all?
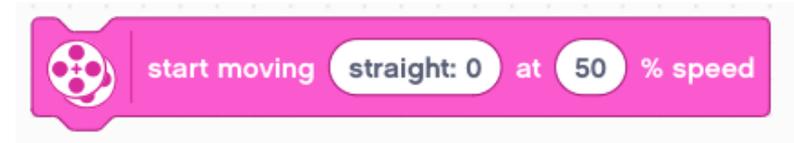
ANS. Move until stopped or the program ends. Note that the program will not end unless you have a Stop Program block.
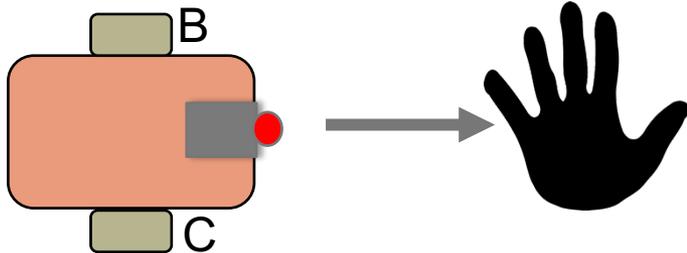
Note that this is a different behavior than EV3-G users might be familiar with.

What does Motor Off do?

ANS. Turn off the motors.
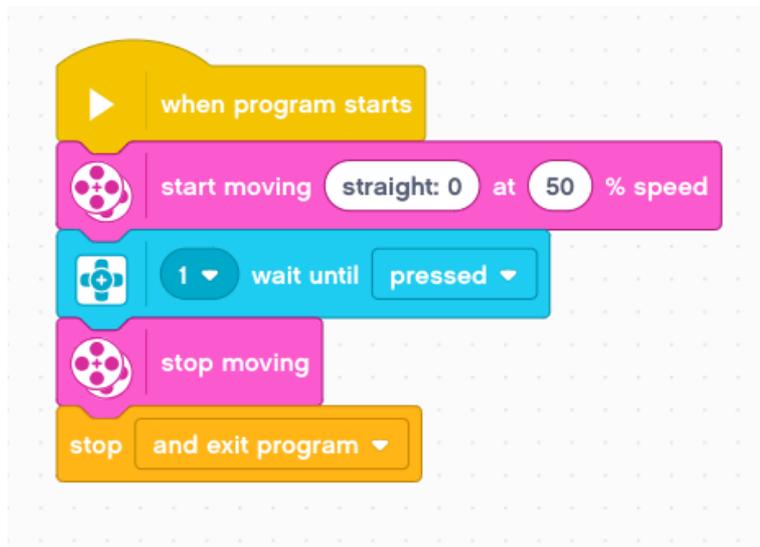
CHALLENGE 1

Program your robot to move straight until you press the sensor with your hand.

Hint: You will combine: Movement and Sensor Blocks

Extra challenge: modify the program to back up when the touch sensor is pressed (i.e. wait until released)

CHALLENGE 1 SOLUTION

When the program is run:

1. **Start moving the motors**

2. **Wait until the touch sensor is pressed (motors are still moving)**

3. **Stop motors (touch sensor has been pressed)**

4. **End program**

Extra Challenge:

CHALLENGE 2

Program your robot to move until it hits the edge of a wall. Then back up and turn right 90 degrees.

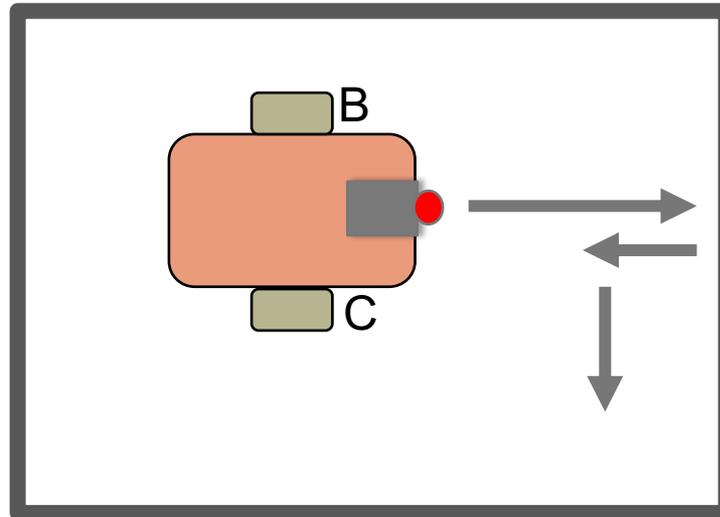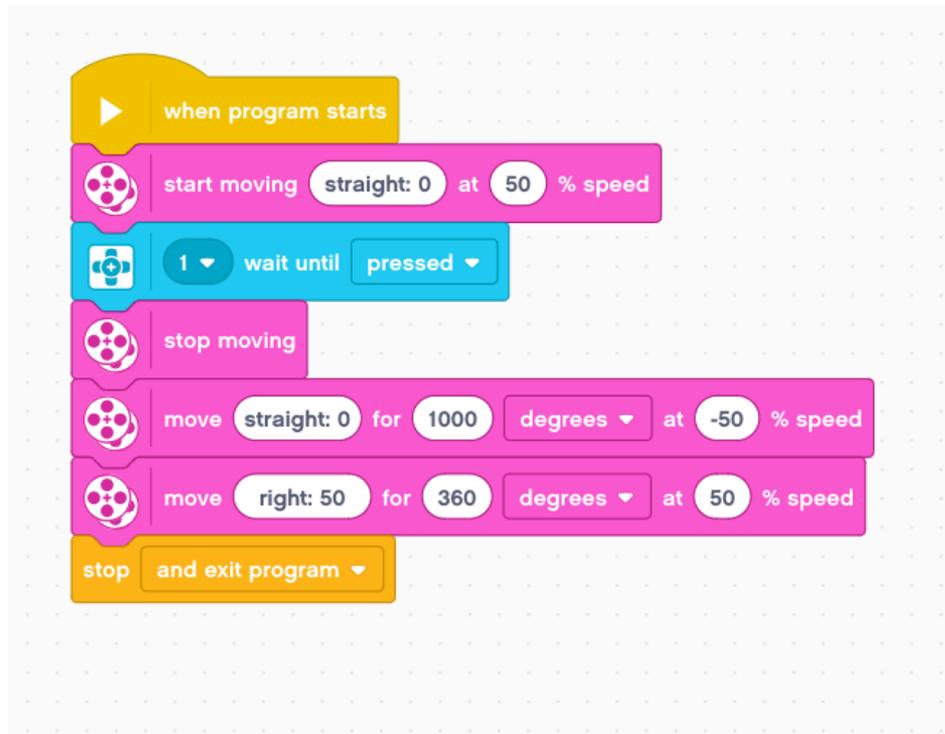# CHALLENGE 2 SOLUTION

When the program starts:
1. Start moving the motors
2. Wait until the touch sensor is pressed (motors are still moving)
3. Stop motors (touch sensor has been pressed)
4. Move backwards (negative speed) for 1000 degrees
5. Turn right 360 degrees (90 physical degrees on the EV3 Educator Robot)
6. Exit the program

DISCUSSION

Why did you use START MOVING Block for these challenges?

You want to read the sensor while the motor is on.

Why do we use the TOUCH SENSOR WAIT UNTIL BLOCK in these challenges?

We need to program to wait for the correct reading

What is the difference between PRESSED and RELEASED?

PRESSED = pushed in

RELEASED = not pushed

What are some situations you might want to use each of these for?

PRESSED = running into a wall

RELEASED = no longer touching a wall

CREDITS

- **This tutorial was created by Sanjay Seshan and Arvind Seshan**

- **More lessons are available at www.ev3lessons.com**

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