



Reacting to Sensors

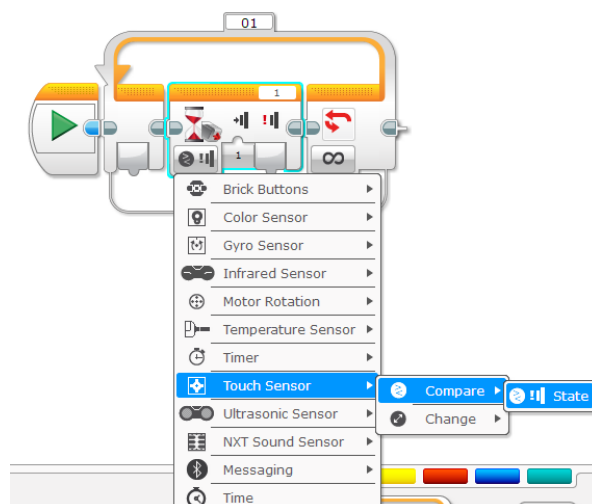
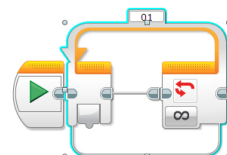
Now you can experiment with sensors, which will be used to make your project interactive.

Reacting to Touch

We will use the touch sensor (pictured to the right) to react to touch by pressing the button on the sensor. Plug it into **port 1** on the EV3 brick using a connector cable, and plug one large motor into **port B**.

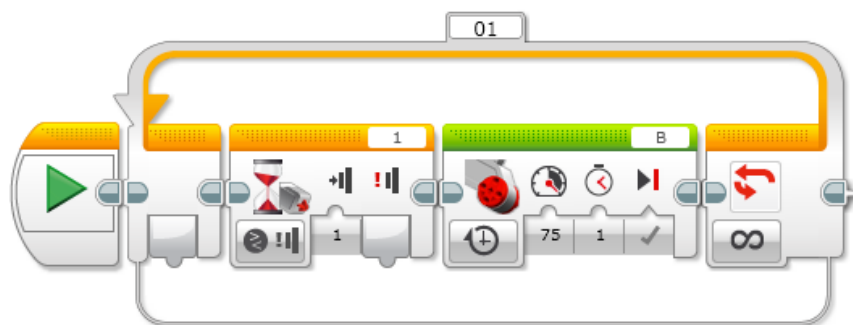


1. Start the sequence beam with a **Loop** block from **Flow Control** (orange/2nd tab) on the color palette located at the bottom of the screen.
2. Place a **Wait** block inside of the **Loop**. Click the clock icon in the bottom left and change it from "Time" to "Touch Sensor > Compare > State". This block will now pause your program until the switch is hit, at which point it will continue.
3. The number in the top right of the block should be set to port "1". If it is not, click the number there and select "1".
4. Place a **Large Motor** block from the **Action** (green/1st tab) inside of the **Loop** in front of the **Wait** block. Set it to **port B**, and set its **power** to 75 for a **duration** of 1 second.



Action: Once the switch is hit, the motor will spin for 1 second.
If you hold down the switch the motor will continue to spin.

Final Sequence Beam



Reacting to Distance 1

We will use the distance sensor (pictured to the right) to react to objects in front of the sensor. Plug it into **port 1** on the EV3, and plug one large motor into **port B**.



It will be called the ultrasonic sensor by the EV3 software, but for simplicity it will be called a distance sensor in the following exercises.

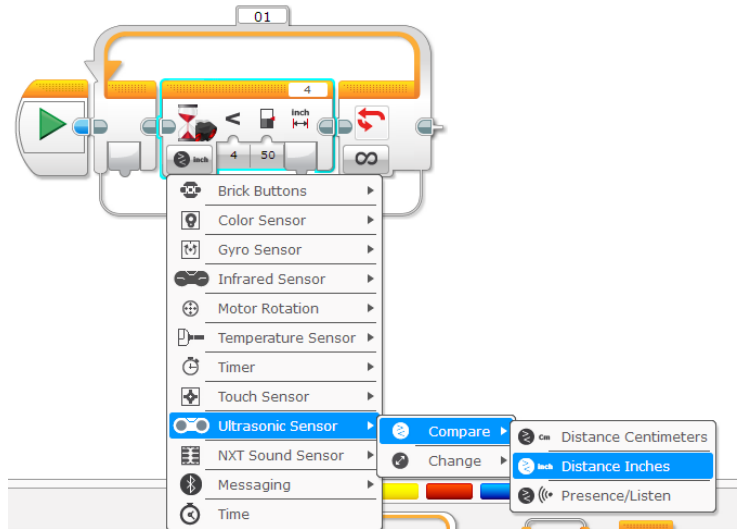
1. First we will test the values that the distance sensor receives. In the bottom right of the screen click the "Port View" icon.



2. Click port 1 and select "Ultrasonic Sensor > Distance Inches." You should now be able to move your hand in front of the distance sensor and see the values it generates. Try slowly moving your hand closer and further away from the distance sensor. Note that the values decrease as you move closer.



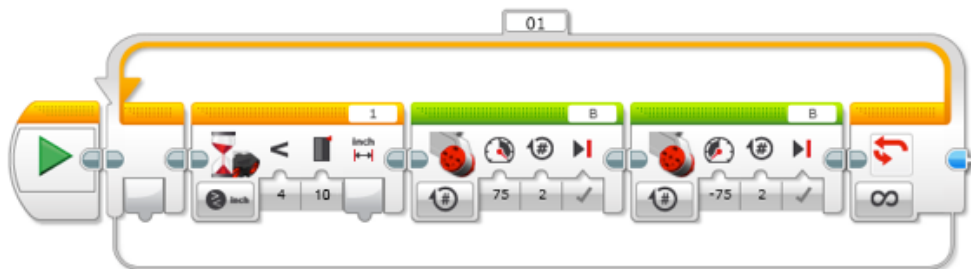
3. Start the sequence beam with a **Loop** block.
4. Place a **Wait** block inside of the **Loop**. Click the clock icon in the bottom left and change it from "Time" to "Ultrasonic Sensor > Compare > Distance Inches". Make sure the port is set to "1" in the top right of this block.



5. Now set the block's **compare type** to 4, which is "<", or "less than." Set the block's **threshold** to 10. This block will now pause your program until the distance sensor reaches a value of 10 or less.
6. Place a **Large Motor** block from the **Action** (green/1st tab) inside of the **Loop** and set its **power** to 75 for **duration** of 2 rotations.
7. Add another **Large Motor** block inside of the **Loop** and set its **power** to -75 for **duration** of 2 rotations.

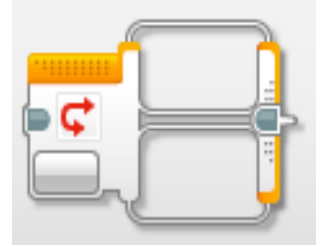
Action: When an object comes within the distance sensor's value threshold, the motor will spin twice in one direction and then twice in the opposite direction.

Final Sequence Beam

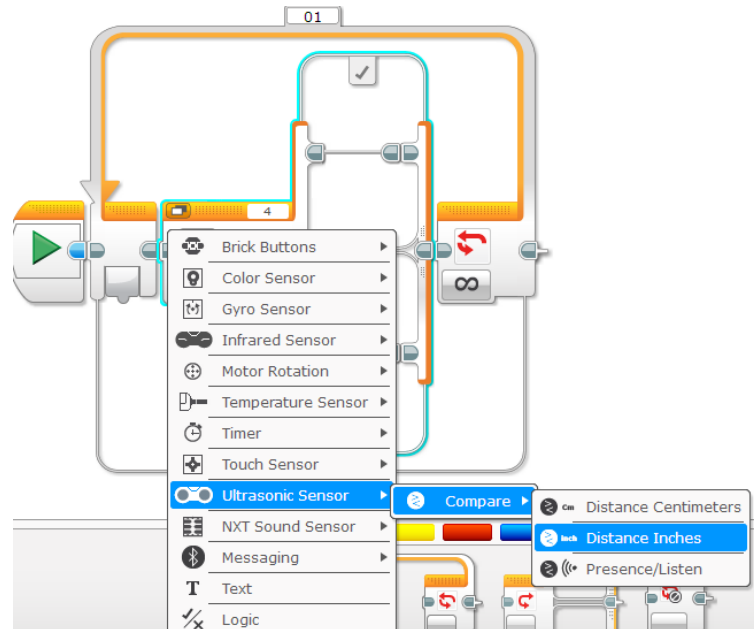


Reacting to Distance 2

In this exercise, we'll use a **Switch** block, which tells the EV3 to look for two different conditions, and will react differently for each condition. If you have programmed in any other language before, it is equivalent to an "if" or "if else" statement.



1. Start with placing a **Loop** block on the sequence beam
2. Place a **Switch** block within the **Loop** block. The **Switch** block's default setting is to use a touch sensor, which must be changed to "Ultrasonic Sensor > Compare > Distance Inches". Make sure the port is set to "1" in the top right of this block.



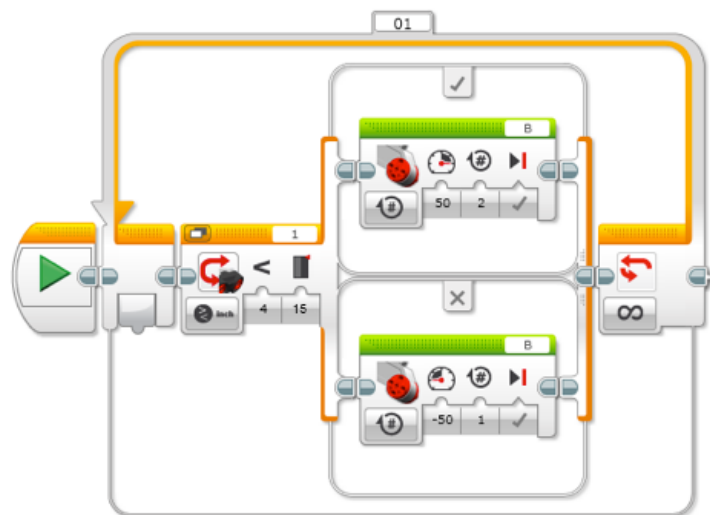
3. Now set the **Switch** block's **compare type** to 4, which is "<", or "less than." Set the block's **threshold** to 15. Blocks placed in the top beam will be executed if the condition is true (if an object in front of the distance sensor is within a threshold of 15 inches or less) and blocks placed in the bottom beam will be executed if the condition is false (within a threshold of 15 inches or greater).

4. Place a **Large Motor** block in the top beam of the **Switch** block and set its **power** to 50 for a **duration** of 2 rotations

5. Place a **Large Motor** block in the bottom beam of the **switch** block and set its **power** to -50 for **duration** of 1 rotation.

Action: If an object in front of the distance sensor is within a threshold of 15 inches or less, then the motor will spin forward twice. Otherwise, the motor will spin backwards once.

Final Sequence Beam



Reacting to Color

We will use the color sensor (pictured below) to react to color. Plug it into **port 1** on the EV3, and plug one large motor into **port B**.

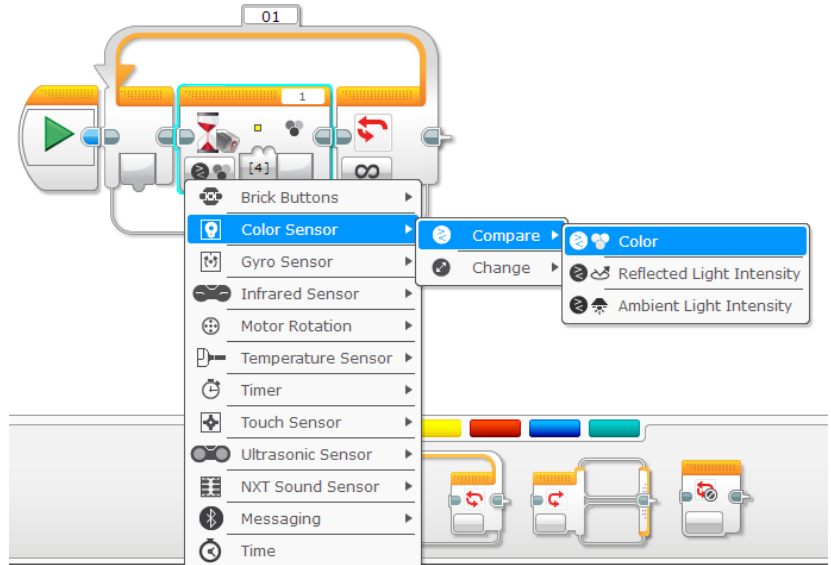


1. Start with placing a **Loop** block on the sequence beam

2. Place a **Wait** block inside of the **Loop**. Click the clock icon in the bottom left and change it from "Time" to "Color Sensor > Compare > Color". This block will now pause your program until the sensor detects the color that you chose.

3. Now choose "4" from the "Set of Colors" which makes you choose the yellow color.

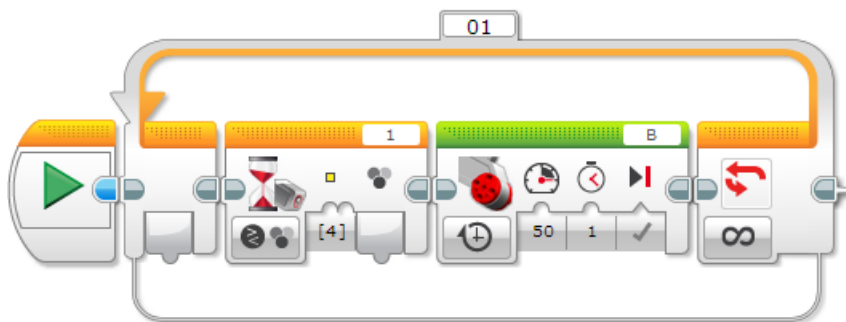
4. The number in the top right of the block should be set to port "1". If it is not, click the number there and change it to "1".



5. Place a **Large Motor** block from the **Action** (green/1st tab) inside of the **Loop** and set its **power** to 50 for a **duration** of 1 second.

Action: Once the color sensor detects yellow color, the motor will spin for 1 second.

Final Sequence Beam



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Please send any questions or comments to Adam Norton at anorton@cs.uml.edu