Clap On, Clap Off

Introductory Presentation

Opening Activity

What is a sensor? Can you give examples?

Opening Activity

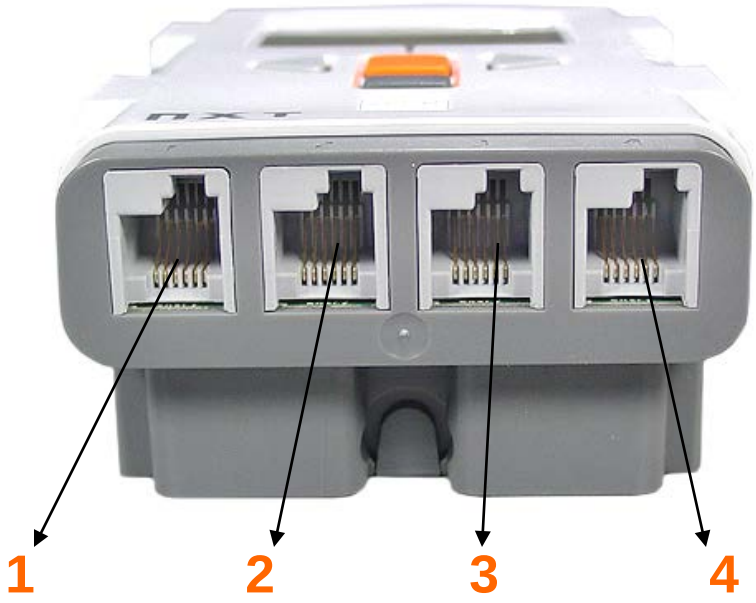
A sensor is something that receives and responds to stimuli. If the sensor is an electrical device, it can do things like measure temperature, volume, etc.

Examples:

- Eyes
- Ears
- Motion sensor (turns on your lights at your house)
- Clap-on lights
- Thermostat

Opening Activity

On your robot, sensors connect through ports on the bottom of the NXT brick. They are marked 1, 2, 3, and 4.



Discussion Questions

Can you identify the sensors on this robot?

Touch Sensor
senses when it's pressed in

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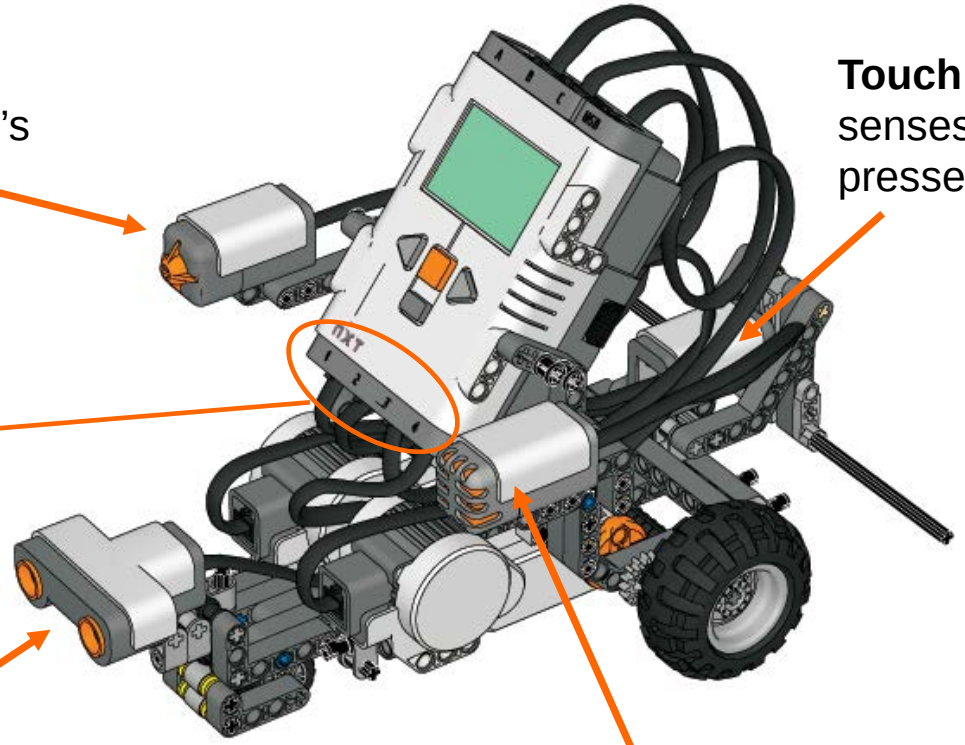
senses when it's pressed in

The sensors are attached to the ports



Ultrasonic Sensor
senses the closeness of objects

Sound Sensor
senses sound level

Review

Remember from “Right Face” and
“Full Speed Ahead” that it takes many steps
in order to get from one place to another.

Describe these steps.

Review

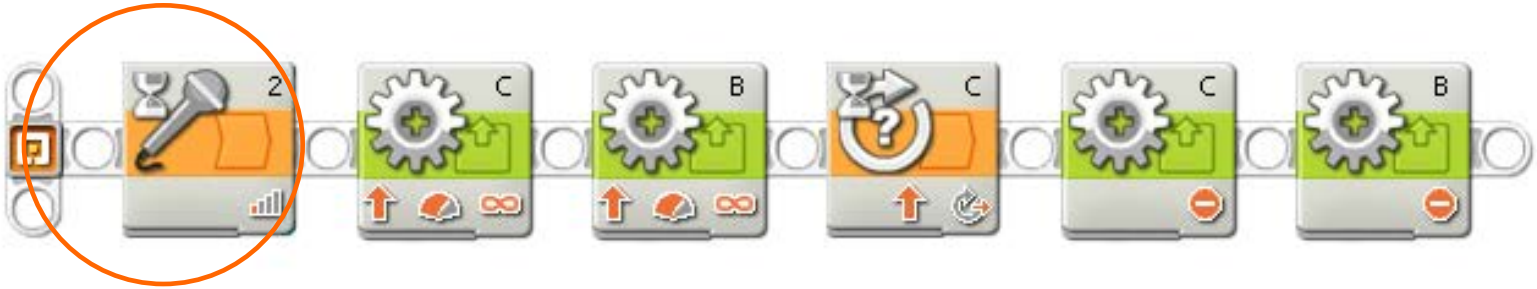
Which sensor did this program “wait for”?

The Rotation Sensor

It’s easy to forget about the Rotation Sensor (because it is contained within the motor casing), but it works just like the other sensors in the system.

Preview

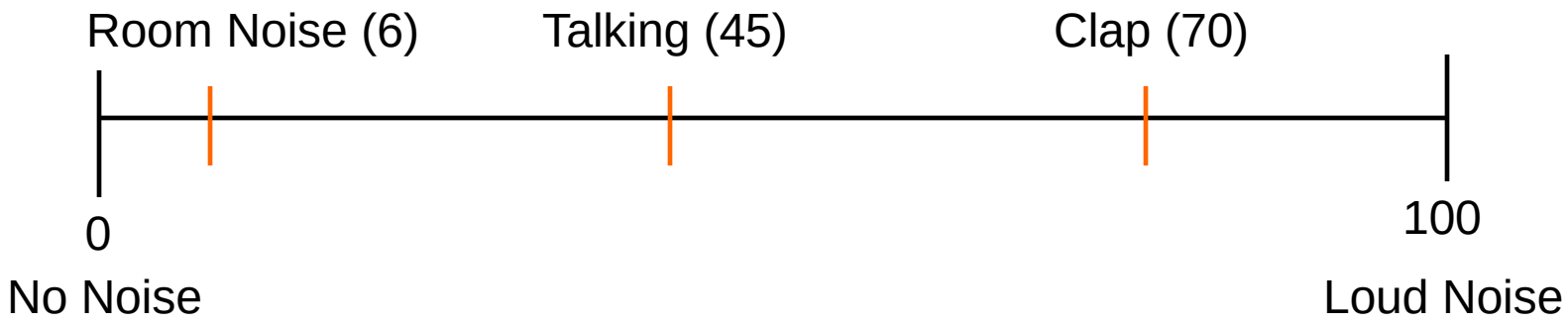
The “Clap On, Clap Off” activity will use the Sound Sensor to “wait for” a loud noise.



Preview

Sensors associate number values with sounds.
The sensor is “waiting” for a value between 0 and 100.

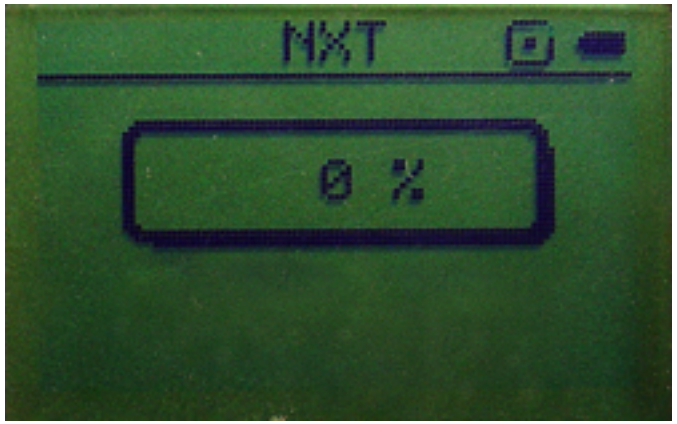
Example:



Preview

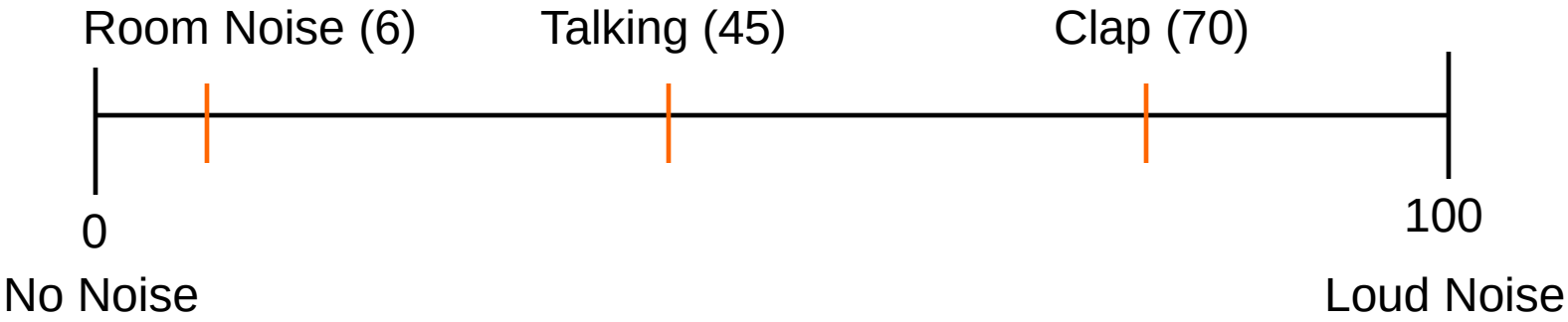
You are able to test the Sound Sensor to find what values it gets for different sounds by…

- finding View Mode
- selecting “Sound dB”
- selecting the correct port for your sensor
- viewing the value.



Preview

There are over 100 possible sound values.

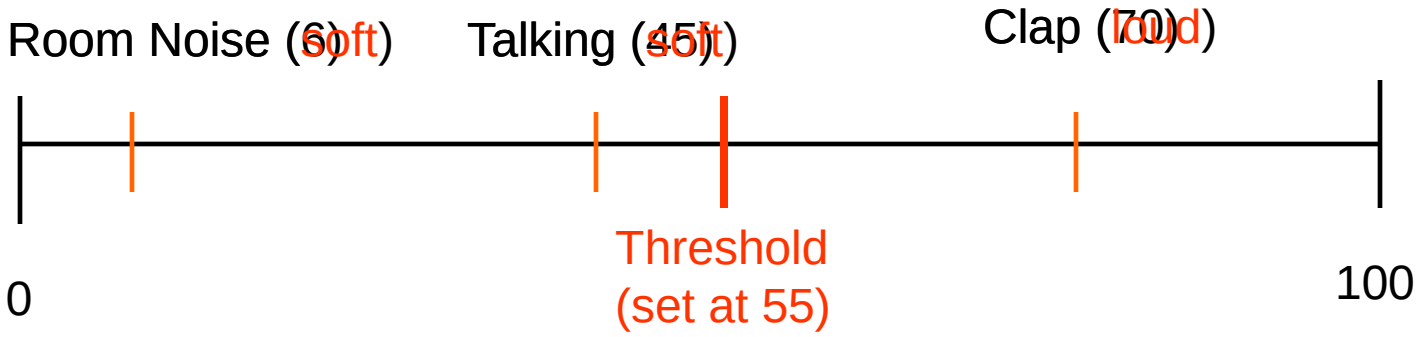


Do you really want to tell the program what to do for each of 100+ different possibilities?

No! The program would take weeks to write, and wouldn't fit on the NXT!

Preview

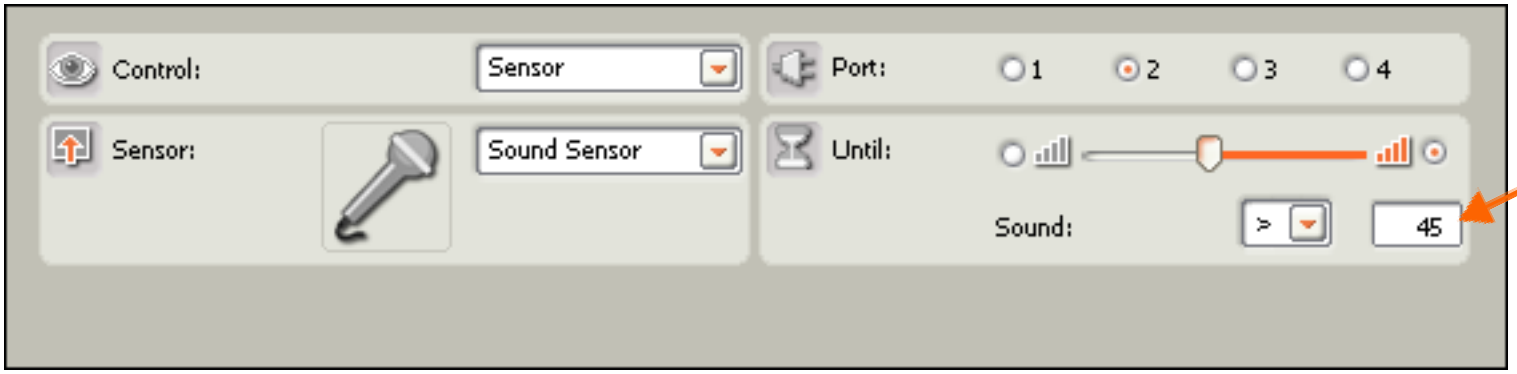
Solution: Use a sound threshold to cut the range of possible readings down to two.



A sound “threshold” is a cutoff point that divides all sound values into two possible categories, “Soft” or “Loud.”

Preview

The program then tells the robot to “wait” for a value either above or below the threshold



Can you think of other instances where thresholds are used?

Preview

Examples of Thresholds:

Example number: 55 miles per hour

90 percent

What is it: Speed Limit

Height restriction

Explanation: This number sets a boundary between who can safely ride the roller coaster and who cannot

This number may set a boundary between a "A" and a "B"

Above the threshold: You get a ride ticket

You are able to ride the roller coaster

Below the threshold: You must drive legally

You must grow taller in order to ride

Preview

How do you find a good value for the threshold, the number that divides loud and quiet for the Sound Sensor?

Value that the Sound Sensor reads for “loud” (73)
+ Value that the Sound Sensor reads for “quiet” (35)

Find the average of these numbers 108

108 / 2 = 54

We learned about averages in the Wheels and Distance slideshow

Threshold = 54

Preview

Try it!

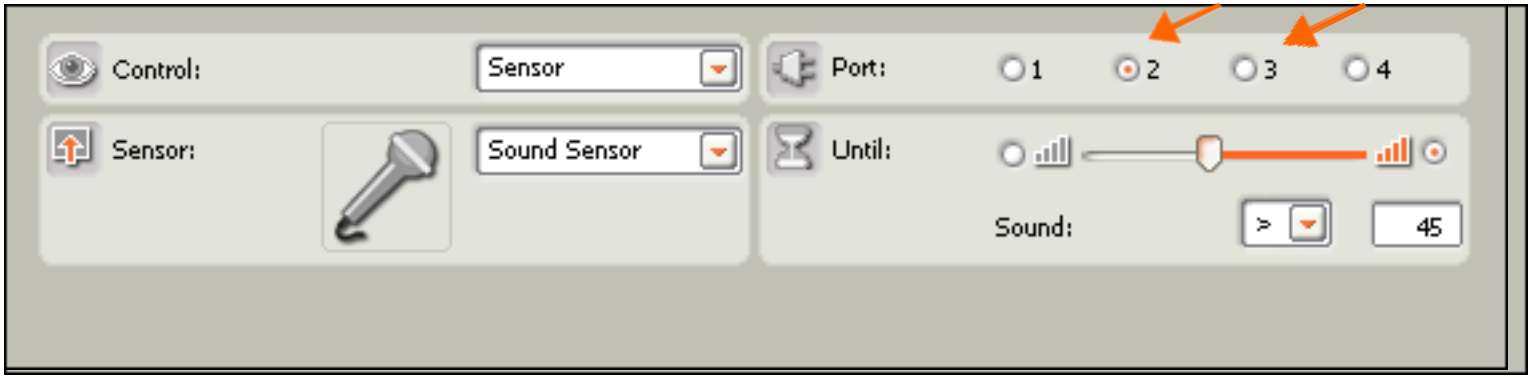
Value that the Sound Sensor read for “loud” = 65

Value that the Sound Sensor read for “quiet” = 51

Threshold = 58

Preview

Recall: With the Rotation Sensor, we had to choose which port to watch.



Remember to look at which port your Sound Sensor is connected to and choose that port.

Good Luck!

Now you have the necessary knowledge to get started in the Clap On, Clap Off Activity.