LEGO Boost Sensor Part 1

Adding the sensor to MARIO and interacting with it through programming.

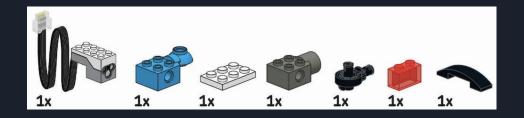
LEGO Boost Sensor

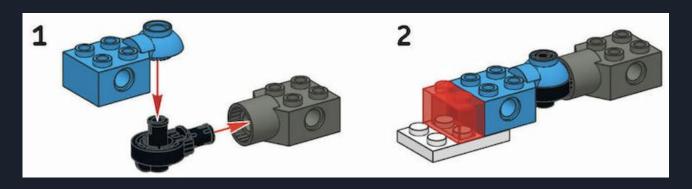


Detects distance and color and can:

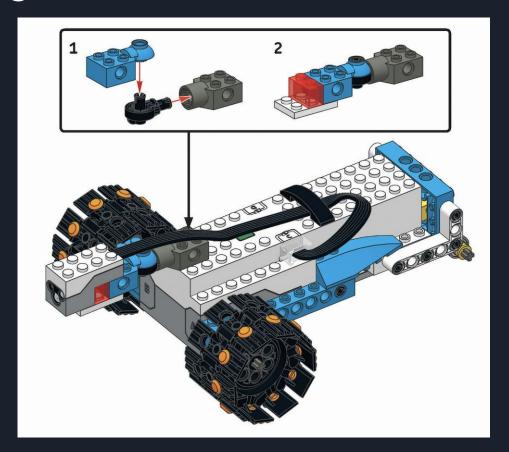
- Detect an object's relative distance to the sensor with values 0(nearest) to 10(farthest).
- Determine if an object is present.
- Detect the colors black, blue, green, yellow, red, white.
- Measure the amount of light reflected by and object.
- Display a red, green, blue, or white light.

Building the Sensor Head Part 1





Building the Sensor Head Part 2



Measure Distance with Sensor Blocks



Trigger on Distance Block

It runs your sequence of code whenever the sensor measures the distance to an object that is less than or equal to the number you specify.

*Like when a robot turns whenever it gets close to objects.



Wait for Distance Block

Pauses the program until the sensor measures the distance to an object as less than or equal to the number you specify.



Sensor Distance Reporter Block

Returns the distance to an object as a number (0-10) in real time. You would use this to monitor the distance to an object. This block must be attached to the bottom of other blocks.

Avoiding Obstacles - Possible Code Sequence

- Infinite Loop (repeat forever)
- Slowly move straight forward
- Wait for sensor to measure a distance less than or equal to 5
- Go backward and turn for a set number of degrees
- Go back to the start of the loop

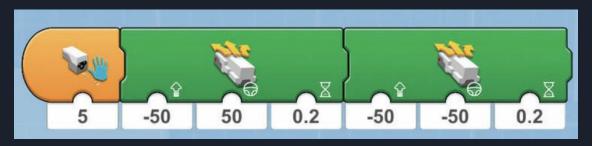
*Create a new program and call it "explore."



Triggering Actions

Create a new program and call it "trigger."

- Use the Trigger on Distance block and create the code below.
- Tap the Trigger on Distance block, and it should start flashing. The robot will not do anything yet.
- Place your hand near the sensor. The block should flash and the robot should move back.
- If you keep placing your hand in front of the sensor, your robot should keep moving backward.



Playing Sounds

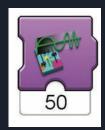
- Sounds will play from the speakers in your device.
- There are over 500 pre recorded sounds in the Boost sound library.
- You can import or record your own sounds.
- You will find the sound blocks in the tab with the purple tab.



Play Sound



Play Sound with Filters



Set Sound Filter Pitch



Set Sound Filter Distortion



Set Sound Filter Echo



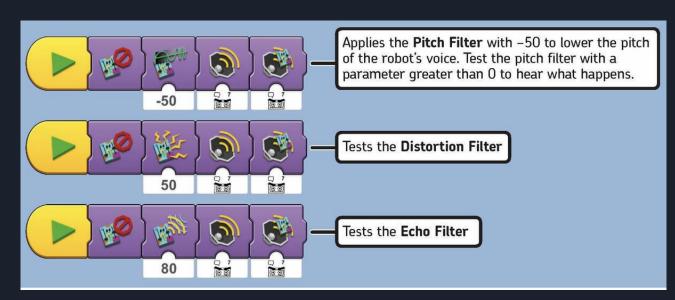
Reset Sound Filter

Testing Sound Effects

- Create a new project called "filters."
- We will experiment with the pitch, distortion, and echo filters to give you a sense of how they work.
- Use the same sound with each sequence to see how the filters change the sound.

Tap each START button to hear how the filters change the sound.

The RESET FILTER block makes sure you only have 1 filter active at a time.



Triggering a Sound

- Create a new project called "sounds."
- Use the Trigger Distance block to have your robot play a sound when it is near an object.
- You will need to wave your hand in front of the sensor to play the sound.

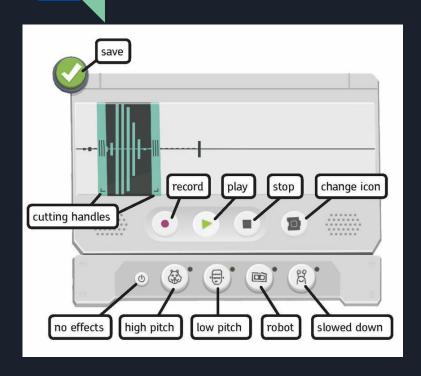


Recording Sounds - Part 1

- 1. Tap the blue tab with the microphone on it to access the Custom Sounds.
- 2. Tap the icon with the plus and the one with the microphone to open the sound-recording tools.



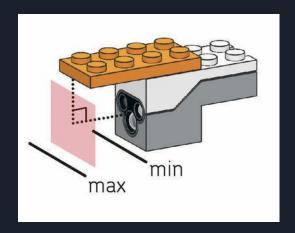
Recording Sounds - Part 2



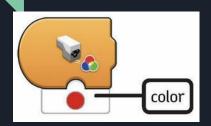
- Tap the Record button and say "Hi, I am MARIO."
- Play the sound using the Play and Stop buttons to make sure you are happy with it.
- Use the Cutting Handles if you need to trim the beginning or end.
- 4. Use the effects buttons to try out different effects. (only 1 at a time)
- 5. Choose an icon by tapping the Change Icon button and save your sound when you have it the way you want it.
- 6. Add it to your program.

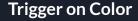
Detecting Colors

- The sensor can detect 6 colors (black, blue, green, yellow, red, white) and no color (when no object is close enough).
- The object must be really close. (2cm or closer)
- If the object is too far, the color might not be detected properly.

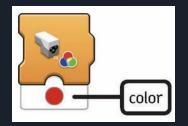


Color Sensor Blocks



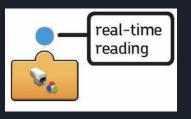


Executes code sequence when the sensor detects the color.



Wait for Color

Pauses the program until the sensor detects the color.



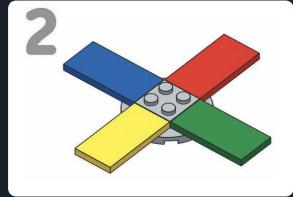
Sensor Color Reporter

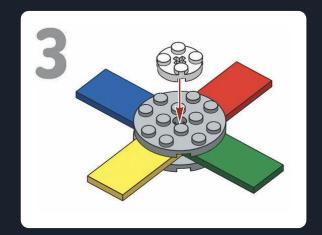
Reports the color detected by the sensor.

Building a Color Controller - PART 1

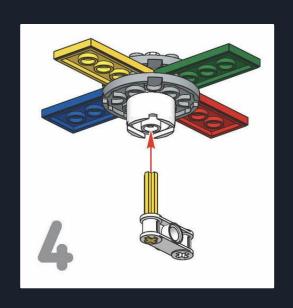
These directions will show you how to build a Color Controller and use ti to control MARIO.

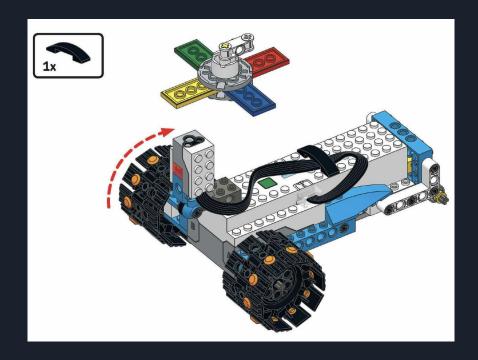






Building a Color Controller - PART 2

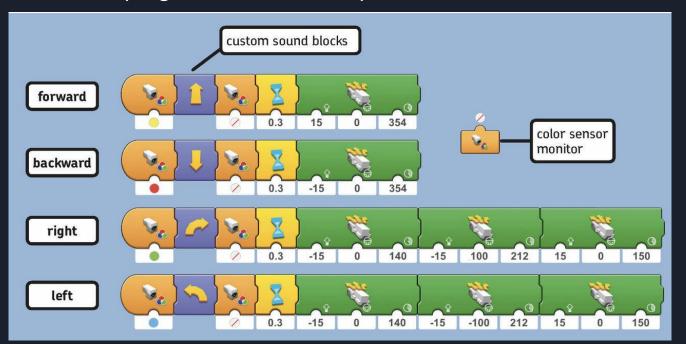




Flip the sensor head up to make it easy to show the robot color.

Color Commands - Programming

- Create a new project called "ColorCmd."
- Try to record custom sounds that say "forward," "backward," "right," "left."
- There is no Start block because the colors will trigger each sequence.
- Write the program below and use your Color Controller to control MARIO.



Testing the Program

- After the program is complete, tap the green play button to start.
- All of the Trigger on Color blocks should be blinking.
- Use the Color Controller to trigger the movements.
- Challenge yourself to follow a course instead of just making random movements. *Start simple (forward, forward, forward, left, forward)

What You Have Learned

- How to use the Sensor to detect and respond to an object.
- How to play a sound from the sound library, apply effects, and record your own sounds.
- How to use color with the Sensor and a Color Controller to move MARIO.