



Tutorials



'Traffic Light' with the Creative Toolbox

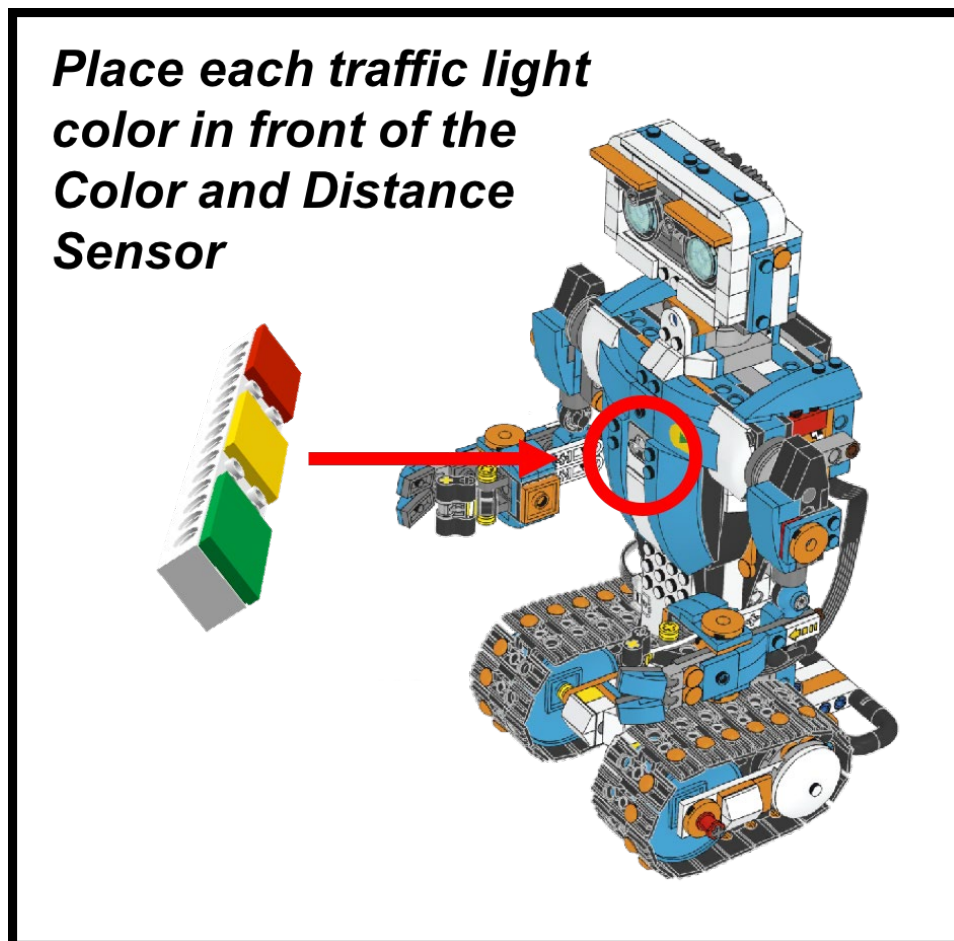
By Sanjay Seshan and Arvind Seshan

About the Authors

Sanjay and Arvind, or the Seshan Brothers, are the founders of EV3Lessons.com, a popular site for learning to program with MINDSTORMS. They enjoy teaching programming and sharing their creations with others.

Introduction

The Boost programming environment is a hidden gem. You can start with the built-in models and their programs, while the Creative Canvas allows you to explore further and make highly sophisticated programs.


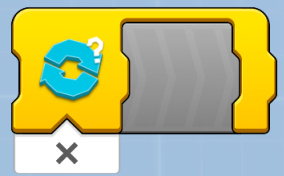
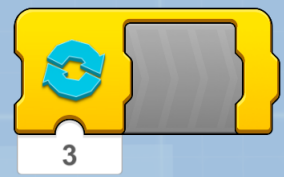


Lesson Objective

Boost lets you learn many programming concepts while having fun with the built-in models. In this lesson, you use Vernie to explore additional coding concepts. You will program Vernie to follow instructions based on the color of a traffic light. Vernie will move forward when the color sensor detects green, slow down when it identifies yellow, and stop when it detects red. In addition, Vernie will say out loud the color he detected. You will be programming using the Creative Canvas area of the App.

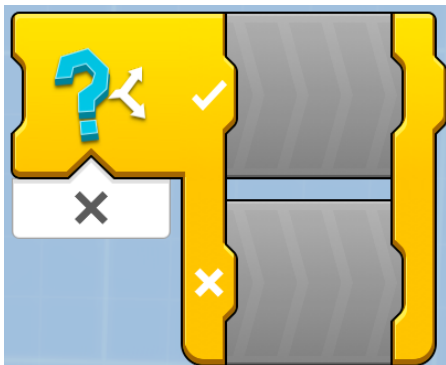
What is a loop?

A loop lets you repeat any code as many times as you want to. Boost has three Loop Blocks which can be found in the Yellow Flow Palette.

This is a Loop Forever Block. It will run your code forever.	 A yellow loop block with a blue circular arrow icon on the right side.
This is a Loop While True Block. It will run your code while that condition is true. For example, if you want Vernie to move forward until he sees red, the condition would be "does not see red".	 A yellow loop block with a blue circular arrow icon and a question mark on the left side. A white box with a black 'X' is at the bottom left.
This is a Loop For Count Block. It will run your code a certain number of times. For example, you might want Vernie to turn exactly three times.	 A yellow loop block with a blue circular arrow icon on the left side. A white box with the number '3' is at the bottom left.

In this lesson, we will use the Loop Forever Block.

What is a switch?

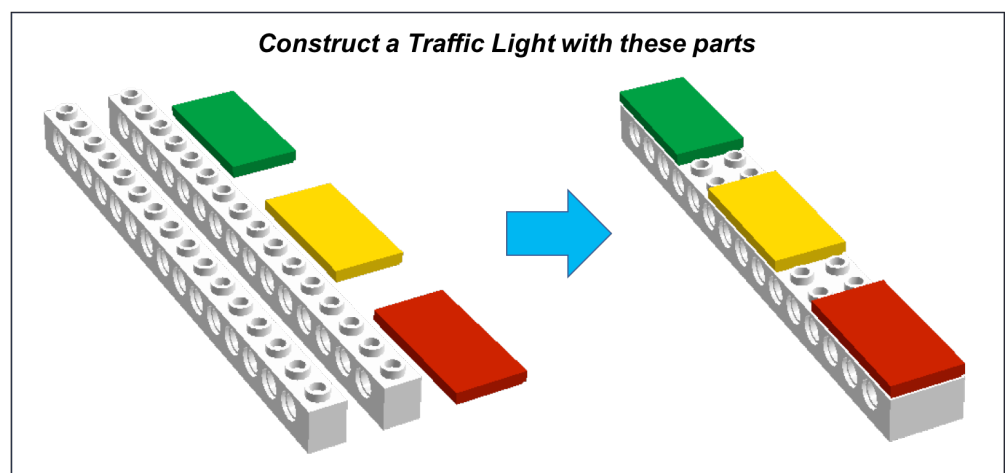


A Switch Block allows you to decide between different actions. The block can be found in the Yellow Flow Palette. In Boost, you can choose between two actions at a time using the Switch Block. If the condition is true, the top sequence is executed. Otherwise, the bottom sequence is executed. The Switch Block is like the answer to a Yes/No question.

In this lesson, we will have to use the Switch Block to choose between three conditions: whether Vernie sees a Red Light, a Yellow Light or a Green Light. Since the Boost Switch Block does not allow for three conditions, you will need to program one decision at a time using switches inside switches. The first switch will check to see if Vernie sees Red and then make a decision. If Vernie does not see Red, then we use a second switch to ask if Vernie sees Yellow. If not, we use a third switch to ask if Vernie sees Green.

Robot Design


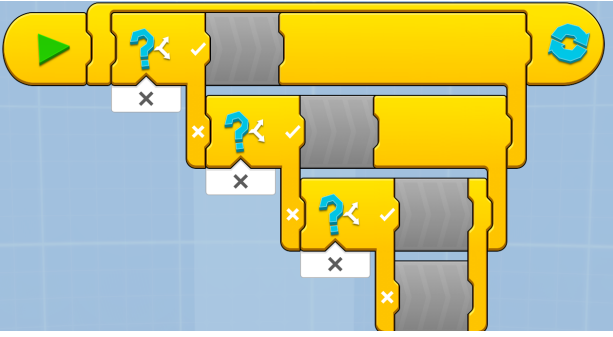
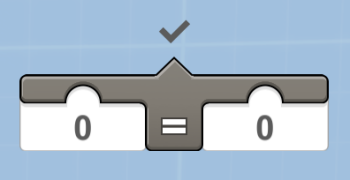
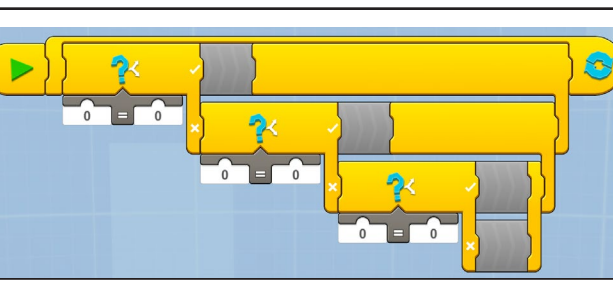

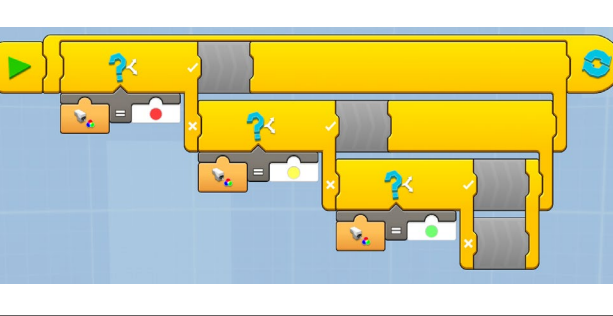
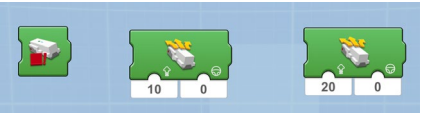
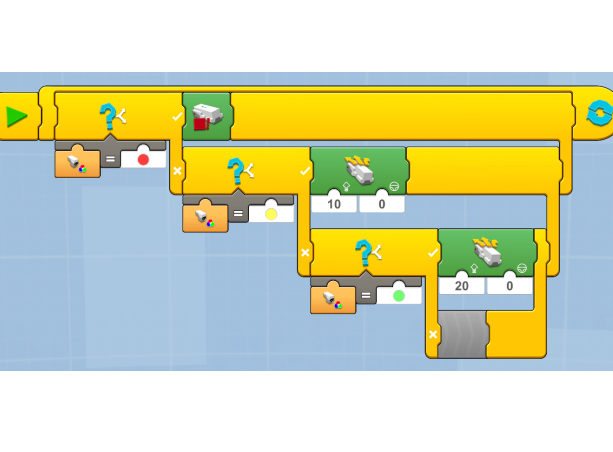
Follow the build instruction in the Boost App to construct Vernie. In addition, construct a traffic light using pieces leftover after constructing Vernie



Construct a Traffic Light with these parts

Programming Steps

Go to the Creative Canvas Area of the Boost App.

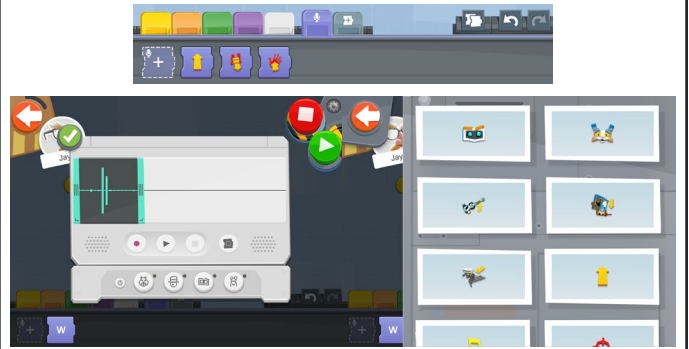
<p>Step 1: Drag in a Start Block from the Yellow Palette</p> <p>Step 2: Drag in a Loop Forever Block</p> <p>Step 3: Drag in a Switch Block inside the Loop Forever Block</p>	
<p>Step 4: Drag a Switch Block inside the lower half (false 'x' condition) on the Switch Block. Repeat until you have three Switch Blocks as in the image shown (one for each case: Red Light, Yellow Light and Green Light as explained above)</p>	
<p>Step 5: From the White Math Pallet, select the Equal To Comparison Block.</p>  <p>Place one in each of the Switch Blocks.</p>	
<p>Step 6: From the Orange Sensor Pallet, add in a Read Color Sensor Block into each condition in Step 5.</p>  <p>On the right side, change the parameter to equal each of the colors (Red, Yellow and Green)</p>	
<p>Step 7: In each of the Switches, add the appropriate Green Movement Block to stop the motors:</p> <p><u>Red Light:</u> Use the Motor Stop Block</p> <p><u>Yellow Light:</u> Use the Green Motor Block and set power = 10</p> <p><u>Green Light:</u> Use the Green Motor Block and set power = 20</p>  <p>Red Yellow Green</p>	

Step 8: Time to create some fun sounds to match the traffic light colors. To make custom sounds, select the Violet Microphone Pallet. Click on the '+' to get started. Record 'Red'. Click on the icon the shape of the Block to create an icon. Click on the arrow shape to pick direction icons. Pick the icon with a red hand for your recording of the word 'Red'.

Repeat this process to create a custom sound for 'Yellow' and 'Green'. Pick a different icon each time.

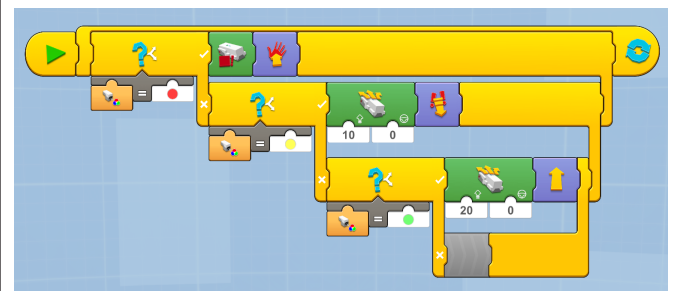


Green Yellow Red



Step 9: From the Violet Microphone Pallet, select the three sounds you created and insert them into each of the switches: Red, Yellow and Green.

Step 10: Now you are ready to play with Vernie. Hit play. Show each color of the Traffic Light in front of Vernie's Color and Distance Sensor.



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