Traffic Light: Loops & Switches

BOOST Lessons

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Objectives

- You will use Vernie to learn about loops and switches
- You will program Vernie to follow instruction 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 you want to 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.

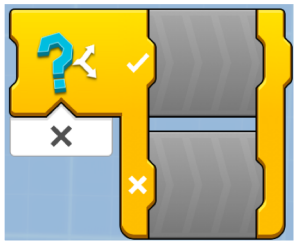
This is a *Loop While True Block*. It will run your code while that condition is true. For example, if you want Vernie to move forward until he sees red, the condition would be "does not see red".

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.

- 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. Else, the bottom sequence is executed.
- The *Switch Block* is like the answer to a Yes/No question.

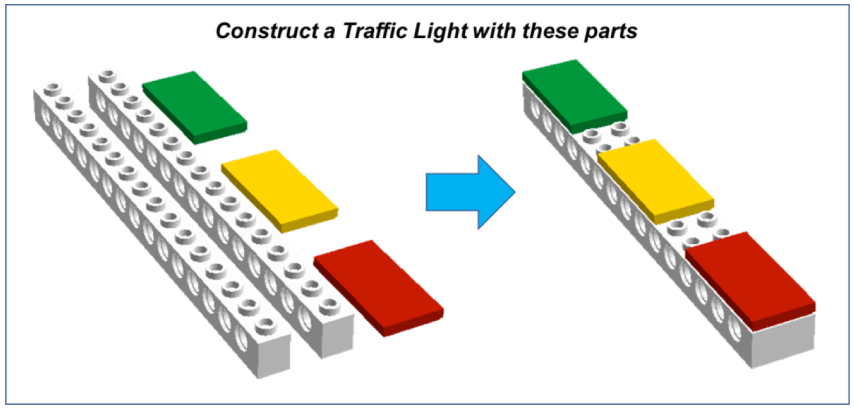


- In this lesson, we will have to use the Switch Block to choose between three conditions: whether Vernie sees a Red Light, a Yellow Light or a Green Light.
- Since the Boost Switch Block does not allow for three conditions, you will need to program each decision at a time using *Switches* inside *Switches*.
- 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 It can be found in the *Yellow Flow Palette*

What do you need to build for this project?

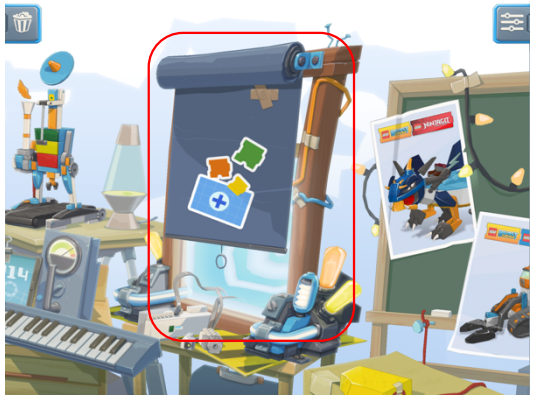
- Follow the build instructions in the Boost App to construct Vernie.

- Construct a traffic light using pieces leftover after constructing Vernie



Creative Canvas

- The Creative Canvas area of the App allows you to use the App in a free play mode
- You will have access to all the programming blocks needed to complete this project

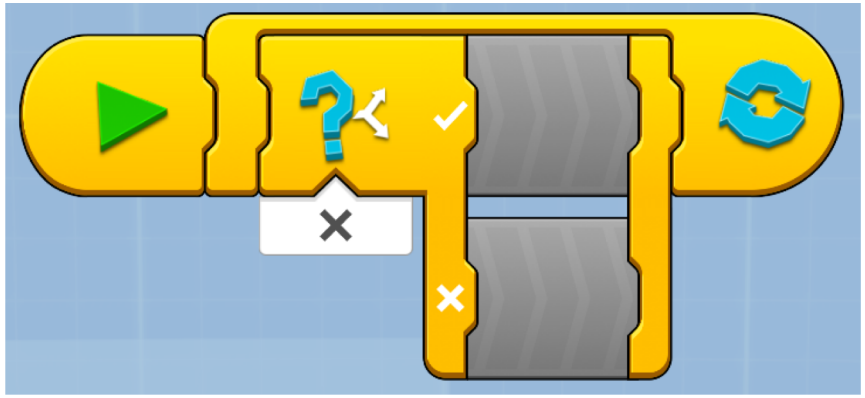


First steps with a loop and a switch

- **Step 1:** Drag in a *Start Sequence Block* from the *Yellow Palette*

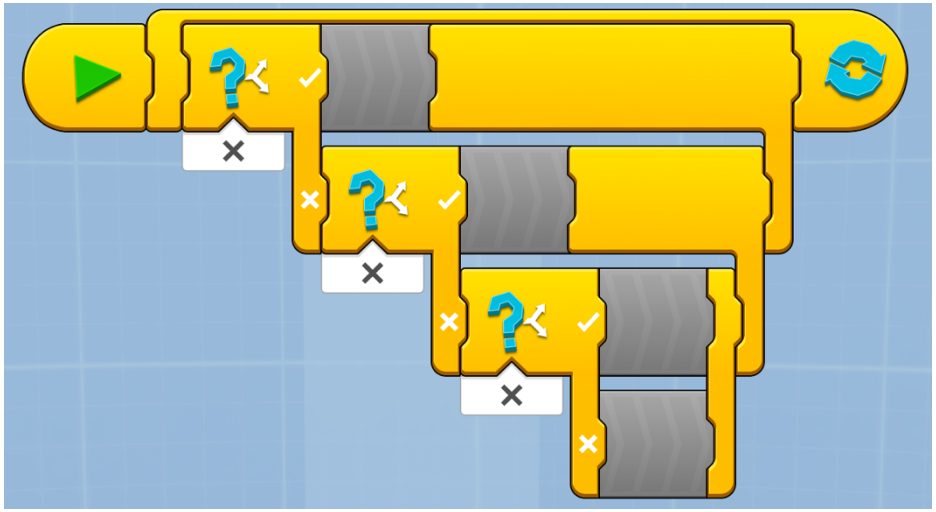
  Step 2: Drag in a *Loop Forever Block*

  Step 3: Drag in a *If/Else Block* inside the *Loop Forever Block*



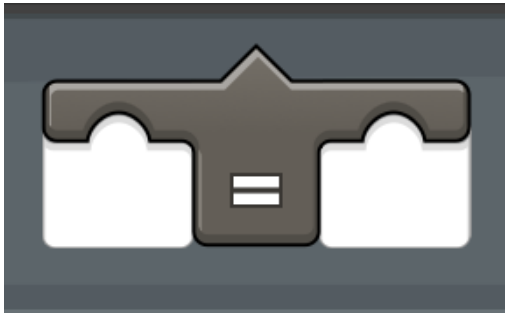
Switch inside a switch for three cases

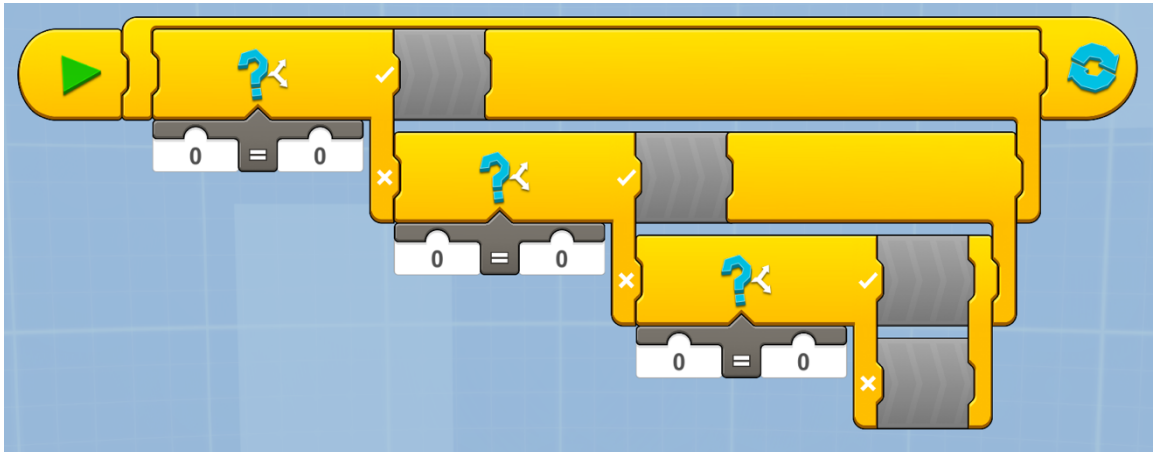
- **Step 4:** Drag a *If/Else Block* inside the lower half (false "x" condition) on the *previous If/Else Block*.
- Repeat until you have three *If/Else Blocks* like in the image (one for each case: Red Light, Yellow Light and Green Light)



Adding Math Blocks

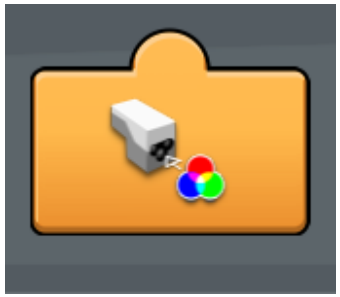
- **Step 5:** From the *White Math Pallet*, select the *Equal To Comparison Block*. Place one in each of *If/Else Blocks*.



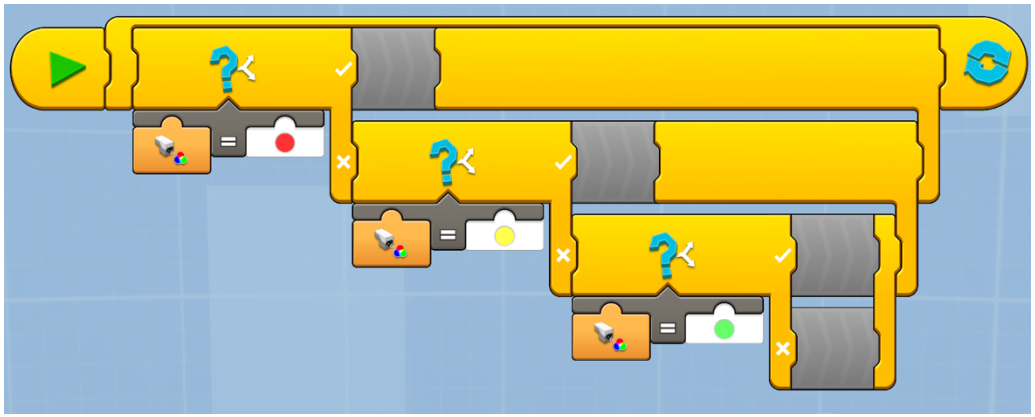


Adding Sensor Blocks

- **Step 6:** From the *Orange Sensor Pallet*, add in a *Color Sensor Reporter Block* into each condition in Step 5.

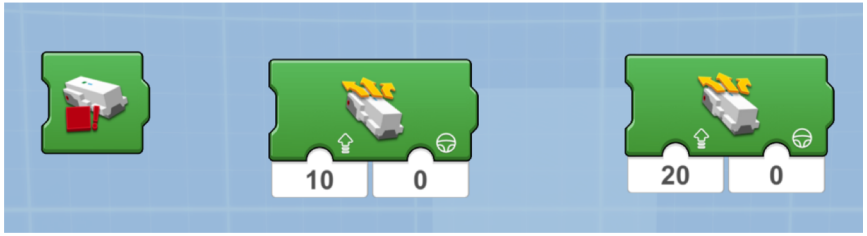


- On the right side, change the parameter to equal each of the colors (Red, Yellow and Green)

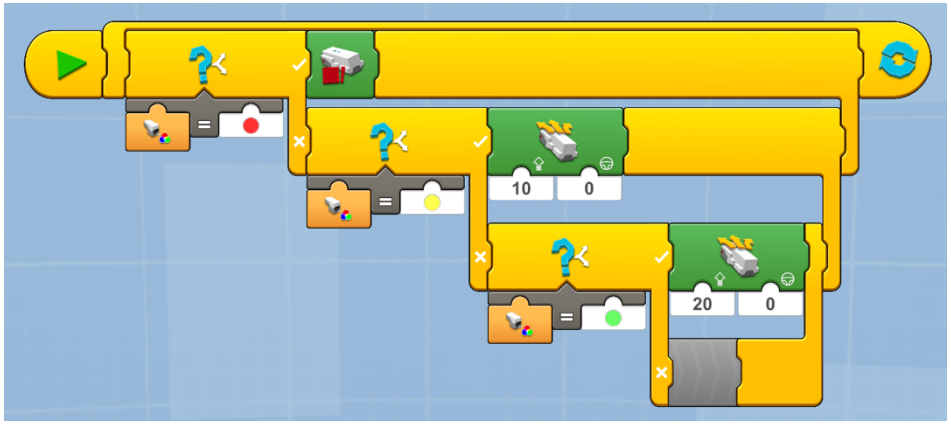


Stopping, Slowing and Speeding Up

- **Step 7:** In each of the *If/Else Blocks*, add the appropriate *Green Movement Block* to stop the motors, slow them down or speed up

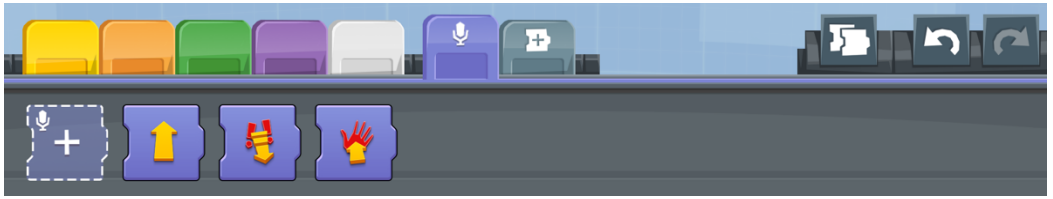


- Red Light*:* Use the *Drivebase Stop Block*
- Yellow Light*:* Use the *Drivebase Move Steering Block* and set power = 10
- Green Light*:* Use the *Drivebase Move Steering Block* and set power = 20

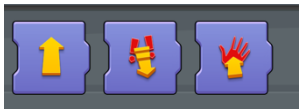


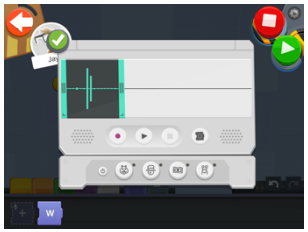
Adding Custom Sounds

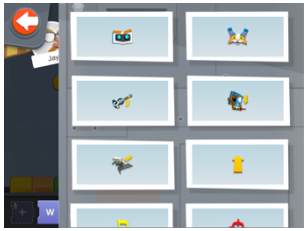
- **Step 7:**. To make custom sounds, select the *Violet Microphone Pallet*. Click on the "+" to get started. Record "Red". Click on the icon the shape of the Block to create an icon. Click on the arrow shape to pick direction icons. Pick the icon with a red hand for your recording of the word "Red".



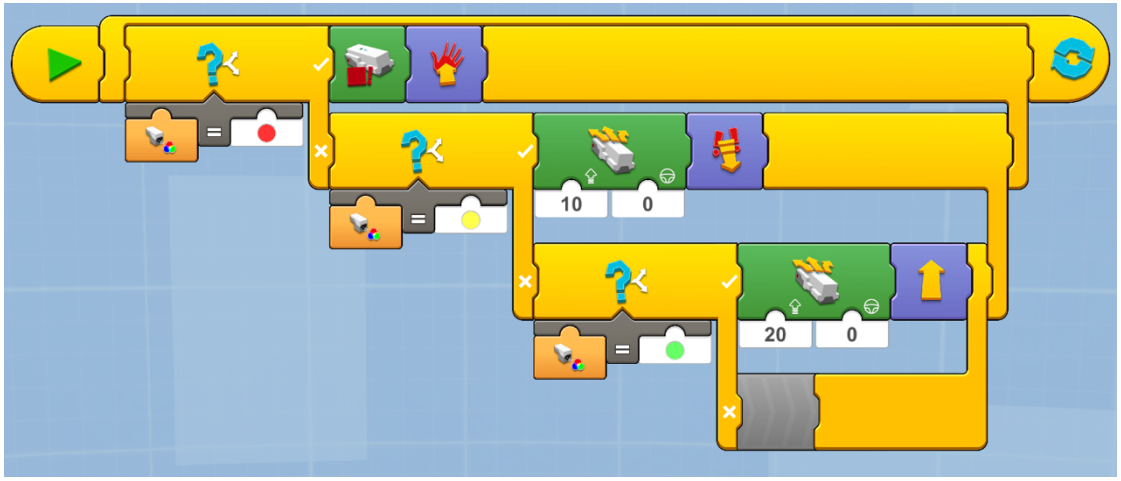
- Repeat process to create a custom sound for "Yellow" and "Green". Pick a different icon each time.





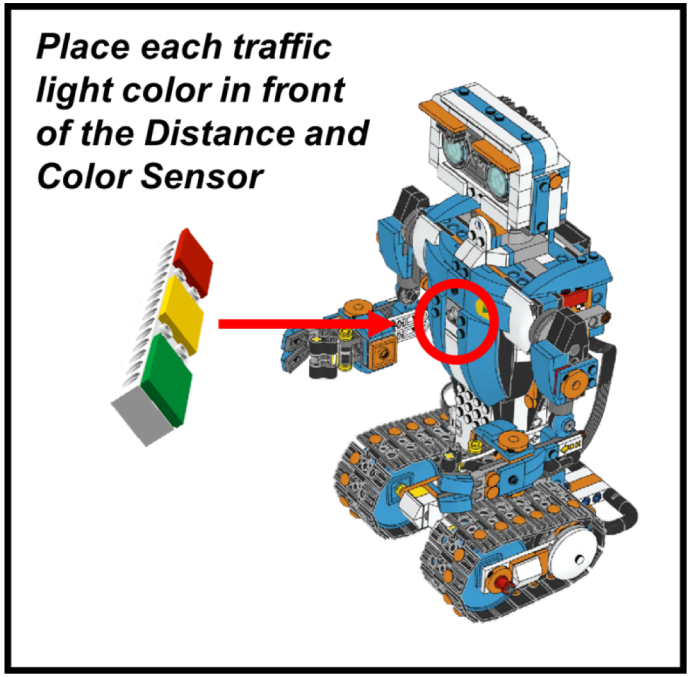


- **Step 8:** From the Violet *Microphone Pallet*, select the three sounds you created and insert them into each of the switches: Red, Yellow and Green.



Ready to play

- Connect to the hub. Hit play
- Show each color of the Traffic Light you made earlier in front of Vernie's Color and Distance Sensor
- Vernie will respond based on the color you show him.



Credits

- Lesson by Sanjay and Arvind Seshan
- More lessons available at BoostLessons.com
- MINDSTORMS lessons available at EV3Lessons.com