

LEGO NXT g Programming

Basic Creating and Using Variables

What is a Variable?

A basic application of a Variable allows the program to store information (data) such as sensor readings (numbers) and other information and use this information later within a program .

In NXT g programming this data is passed between sensors and the variable block using data wires plugged into each blocks data hub plugs. (see using data hubs document)



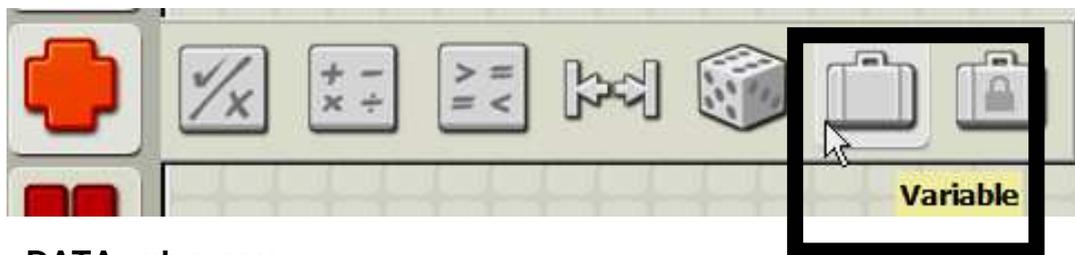
By using a combination of sensor, variable and math's programming blocks the programmer can get the robot to do a lot more by itself rather than the programmer having to put in this information. i.e. a more automatic/autonomous robot.

Line following example

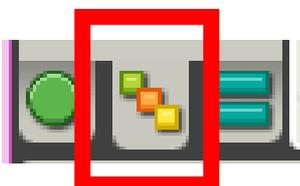
To make using a variable worthwhile you will need a combination of blocks. In the following line following example the robot will take a reading from the light sensor with the robot on a light colour, then subtract 5 (or more) using a Math's block (this number will be used to represent the dark colour , the colour of the line) then send this number calculation through to the Variable block so that this number calculation for the dark colour can be used with the light sensor to follow the edge of a black line against a white background.

In NXT g the Variable block is also used to pass readings and data through into loops using data wires where this information can't be passed using standard methods.

Steps to using a variable



Select the **VARIABLE** block from the **DATA** sub menu in the **COMPLETE PALETTE**.



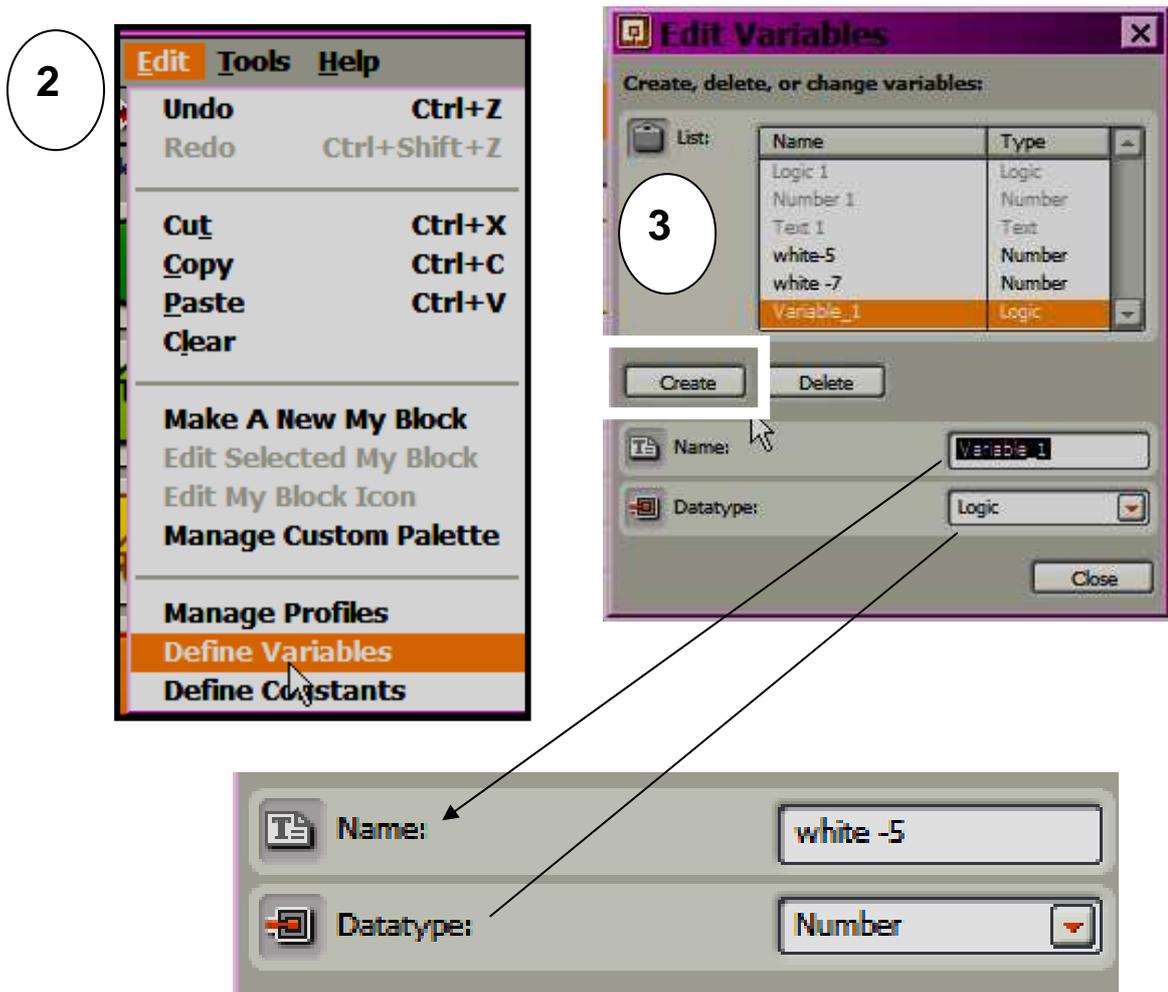
Access the **COMPLETE PALETTE** by clicking on the middle tab at the bottom of the palette bar on the left of the screen

Define the Variable

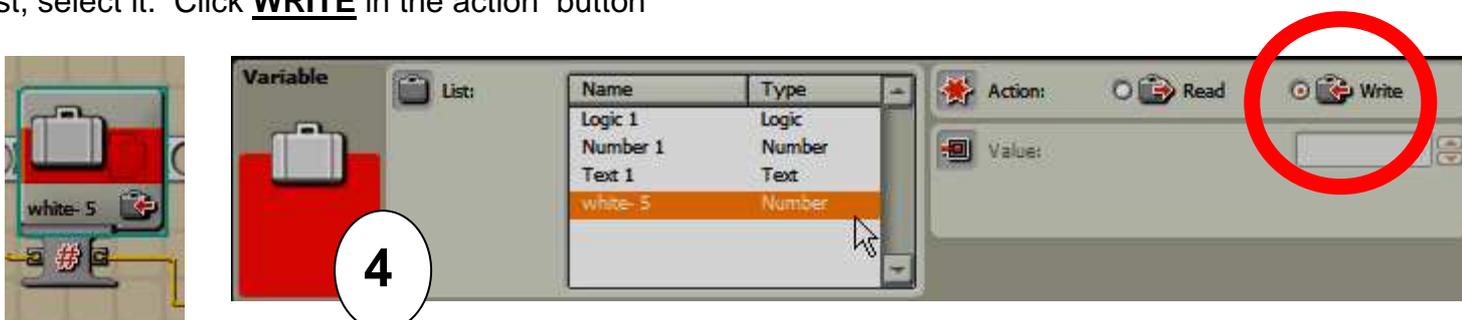
This process will give the Variable a name that is readily identifiable in your program, the name will be displayed on the block. You will also specify the type of data that the Variable will contain. In basic applications this is usually a number. We'll use an automatic line following program as an example to explain basic variables.

2 Click on the **EDIT** pull down menu and select **DEFINE VARIABLES**

3 In the **EDIT VARIABLES** screen, click **CREATE**, type a short name for your variable and select your data type from the drop down list. Click close



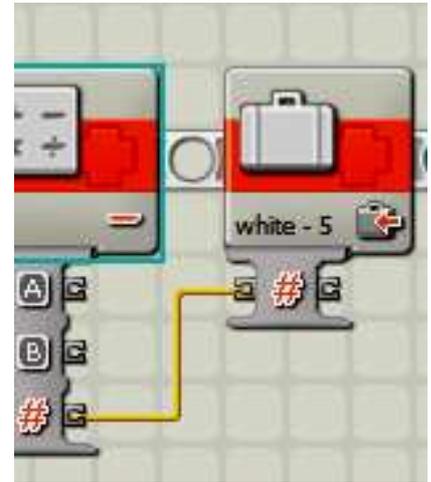
4 Now you have created a unique variable you can **select it** in the Variable configuration panel at the bottom of the screen. Make sure you have clicked on the Variable block on your program to open the configuration. You will now see the name of the variable you created in the list, select it. Click **WRITE** in the action button



5 **Give the variable a number** (supply the data) - Now you have created the variable you need to supply it with the data (a number) because currently it's empty!

In this example it will be a number. The number is supplied directly using a yellow DATA WIRE connected from a Math's block output plug to the variable block's input plug..

The hash # symbol means "number". The yellow wire connects the number from the Math's block to the Variables input plug.

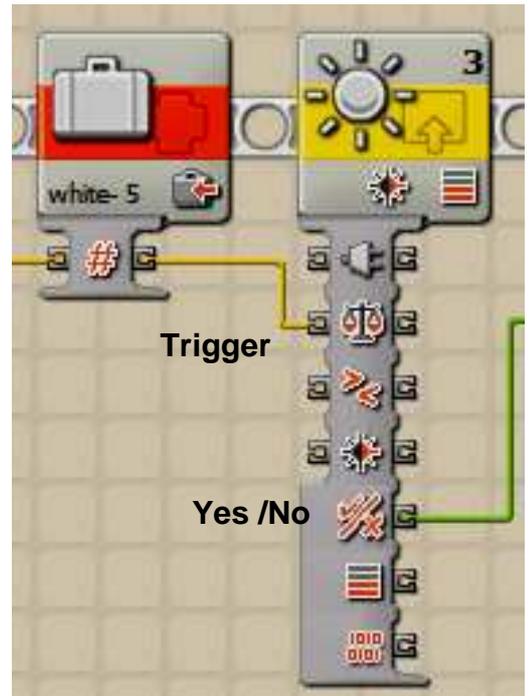


6 **Use the variable** - The next step has the Variable block supplying it's number to the Light Sensor **TRIGGER** input plug.

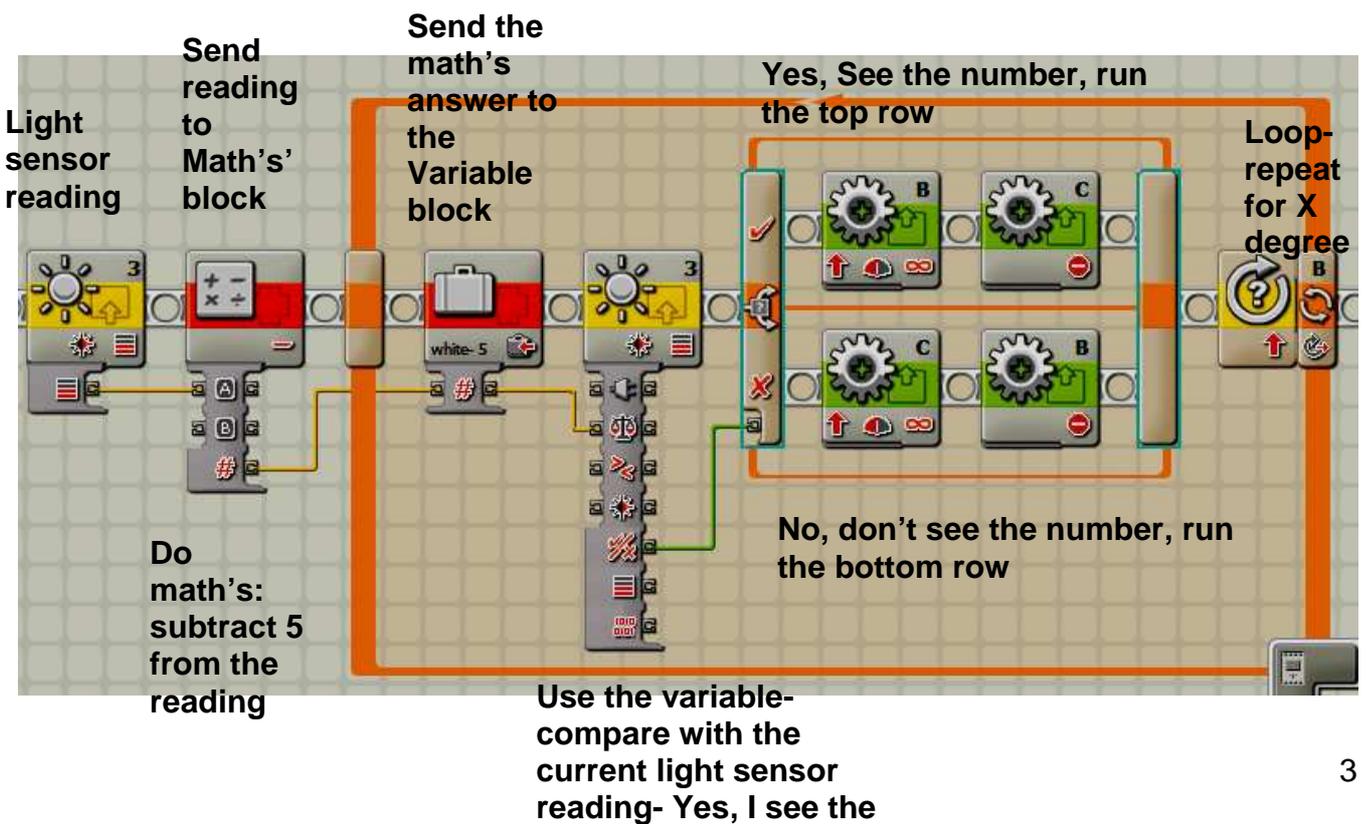
The light sensor will constantly look for the number that the variable block has supplied and compare the light value it is currently seeing with the variable's number.

The variable number is used as a trigger to cause the program to look for Yes , I see that number or NO , I don't see that number. Depending on the answer, Yes/ No, the program will cause different actions.

This is just one example of using a variable to compare with a dynamic sensor reading to initiate an action

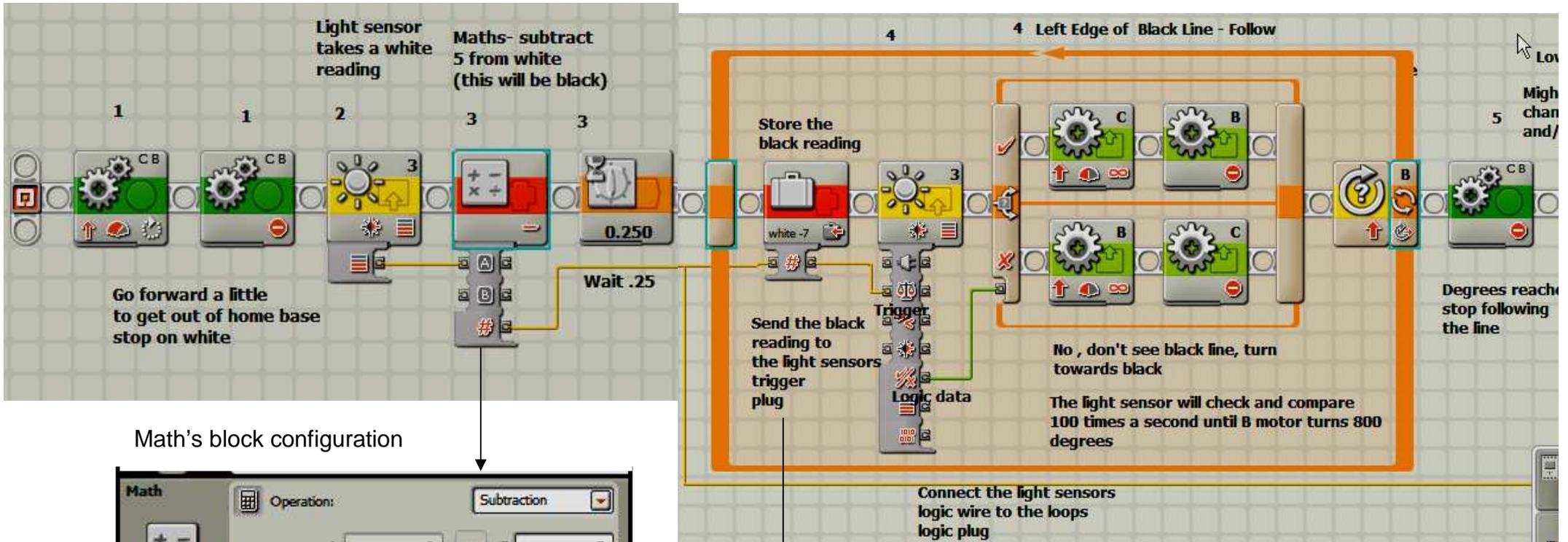


Also see the Using Data Hubs information to explain the wires.



Automatic Line Following Program – Math's block, Data Hubs, Variable block

Go forward a little, stop, take a light reading from the light background, send it to the math's block and subtract 5 from it . Pass this calculation through the loop and connect it to the Variable block you created. Pass this number from the variable block to the light sensor TRIGGER plug. This number (the black reading you calculated) will be used by the light sensor to compare what it is currently seeing with that number. The light sensors LOGIC (yes /No) wire is connected to a LOGIC switch block. If the light sensor sees the black reading (yes) the robot will do the top line behavior, If no then it takes the bottom row. It repeats (loops) until 800 degrees on motor B is reached



Math's block configuration

