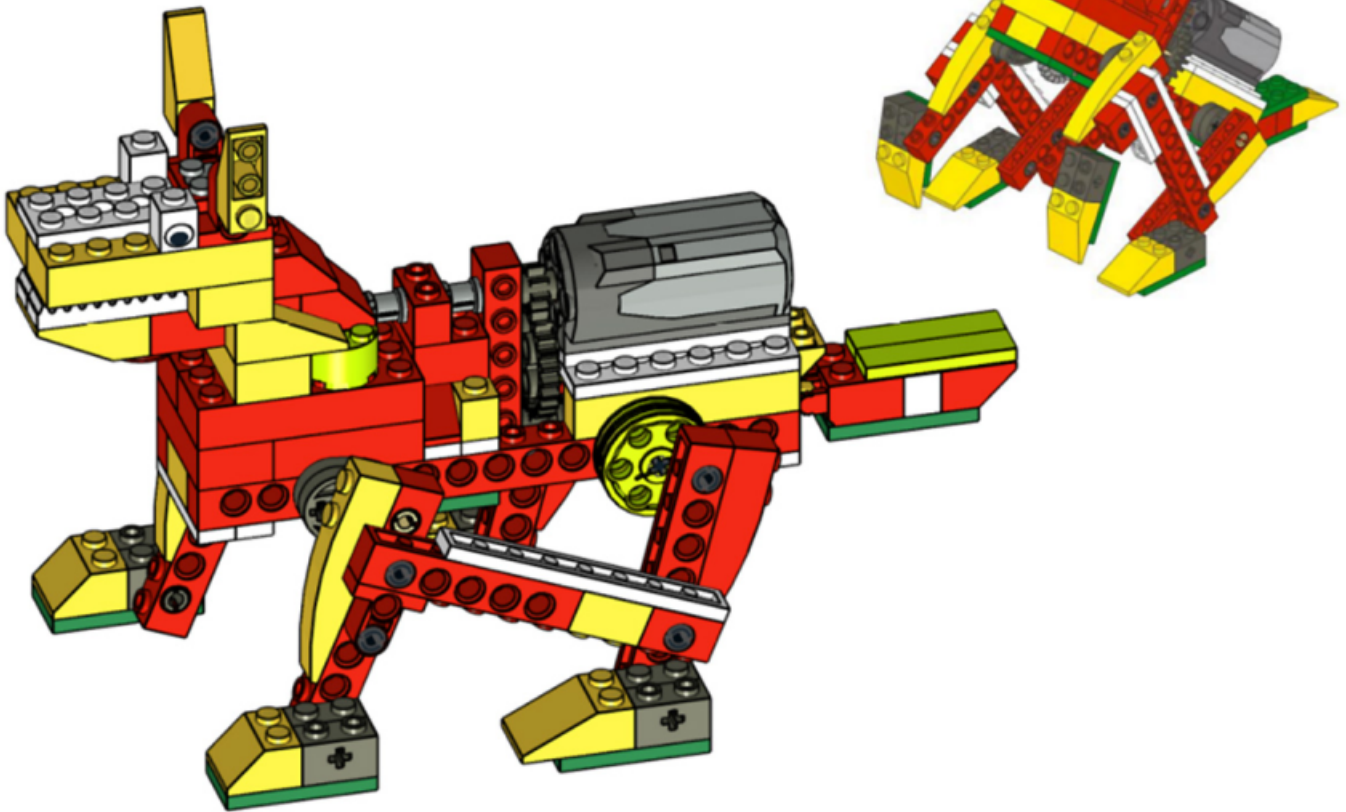


Robotics with LEGO® WeDo (IX)



Labeling LEGO® Devices WeDo, 9th Edition

by Diego Galvéz

In this current edition we will explain in detail how to configure and program more than one device connected to the same computer.

For certain projects we may find it necessary to use more than one motor or more than one sensor. For such cases, the WeDo software comes with a tool called "Labeling".

This tool allows you to work using multiple electronic devices. Before getting into detail about "labeling", you should have clear the maximum number of electronic devices that can be connected to computer.

Hub

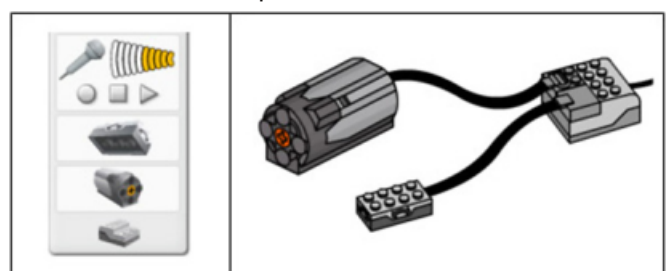
The Hub allows for the connection of motors and sensors to the computer.

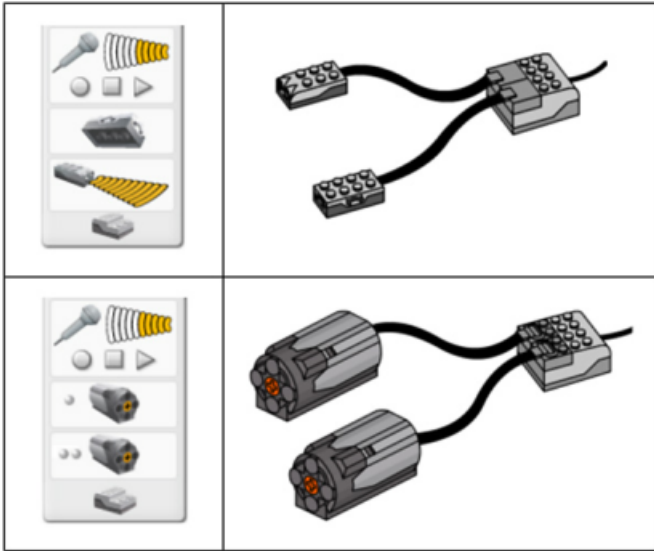
The software will recognize a maximum of 3 Hubs connected at once.



Using the Hub, you can create many different motor and sensor combinations.

Here are some examples:





One Hub can recognize a maximum of two connected motors.

Using what is shown above, we see that the WeDo software will recognize a maximum of 6 motors (2 motors per Hub and 3 Hubs connected). The same maximum number applies for sensors that you wish to connect to the Hub.

Labeling the motor

To label a motor using WeDo software, the following is done:

While holding down the **SHIFT** key, click on the **Motor Block** to which you would like to assign a label.

For example, the **Motor This Way Block**:



Following the procedure described above, you will notice an empty circle appears above the **Motor This Way Block**. This tells us that the action has been "labeled" to be carried out by motor number "1".



If we wish to label a second motor, what we do is repeat the previous action twice.

We can label up to 6 motors (given that there are three Hubs connected).

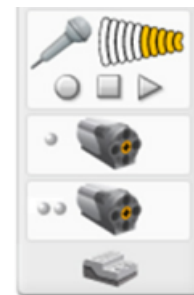


Example

A program to make two motors turn in opposite directions simultaneously.



Upon observing the upper left part of the screen (**Connection Tab**), you will note that the software automatically detects the two motors connected to the Hub:



First, create the following program:



When you run it, you will notice that:

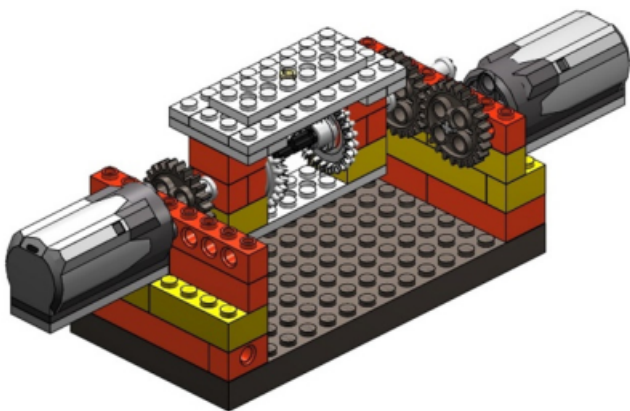
- Both motors turn counter clockwise for a short period of time.
- Later they turn counterclockwise for 3 seconds before coming to a stop.

Since there are two motors (motor 1 and motor 2) you can assign a direction to each one of them.



This way, when you run the program, both motors will run in opposite directions simultaneously for 3 seconds. Note that after 3 seconds both motors stop. This happens because the **Motor on for** block (⌚), hasn't been labelled and so the action affects both motors. In this case both motors will be stopped after 3 seconds.

Adder Subtractor



This mechanism used in this build is called a differential and it allows the operation of the adder subtractor. So where does the name come from?

The turning of the differential is the addition (or subtraction) of the turning of both motors. When **both motors turn in the same direction**, the differential is the sum of their powers. Try the following examples:



The differential turns at a power level of 20.



The differential turns at a power level of 5.

However, if the **motors turn in opposite directions**, the differential subtracts the power of one motor from the other. Try the following examples:



The differential will not turn.



The differential will turn with a power level of 5.

Take a look at the following programs. What is the power level that results from each of them?



The first one is a simple addition and the result is 5. The second is a subtraction and the result is -5. What does the negative number mean? It means if 5 is a clockwise turn with power level 5, -5 is a counter clockwise turn with power level 5.

In the next edition we will discuss "labeling" sensors.

You can find building instructions for the differential on my blog [notjustbricks](http://notjustbricks.com)[1].

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[1] At notjustbricks.blogspot.com you will find multimedia materials (images and videos) of the author's creations, some of which come with building instructions.