LEGO® WeDo (III)

Programming in Scratch

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This time we will try to continue dominating the universe one brick at a time, the LEGO® universe! WeDo is a challenging platform that forces our imagination to generate designs with very few pieces. While Diego Galvez delights us with detailed explanations of the WeDo software, we will continue with Scratch: The free platform for those tempted to wear an eye patch!

In the last issue, we briefly described how Scratch works. We also discussed some differences with the WeDo software, and where you can get it. From now on, we will be working with Scratch. Why not, it is free after all.

Boy, you have been talking about Scratch since the last issue, and still I haven't seen one program!

Don't be impatient my dear friend. As with good food, you need to know some little things before facing the challenge of delivering a gourmet dish.

In case English is not your native language, it is a good thing to know that you can change it. By default, Scratch will be installed in English, but if you look carefully, you will find the option to modify this. Next to the floppy disk image (the save option), you will see a round icon shaped as a globe. If you click it, there will be a long menu with a list of languages Scratch is available in.

Since a picture is worth a thousand words, you can check the next image for your own reference. There are more choices than in the WeDo software. This is really a good thing.
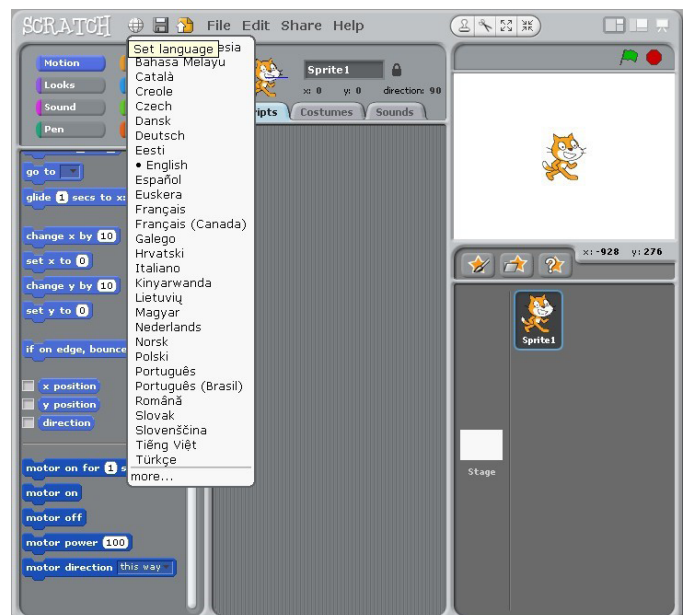
In the image, you can observe that when you have the WeDo connected to the computer, there will be 5 new options for controlling the motor. You need to remember that if the WeDo is disconnected, they will not be displayed.

So, let's start programming with Scratch, and what could be better than beginning with the motor. You can make a thousand little wonders if you learn to use it. Imagine the number of combinations with all the bricks, plates, axles, wheels, belts, pulleys, cams and gears available. You can motorize cars, construction machines, move a crane or even a robot arm, you can simulate the motion of animals or make them fly, imagine the number of helicopters and airplanes, animals, automatic doors, rockets, spaceships, robots and many, many models you can dream up. Now, the power to control your LEGO® creations in your LEGO® universe will be at your fingertips. Star Wars™ will be closer to domination!

Boy, please stop talking and show us how you do it!

Well, for those who cannot wait; let's make an analogy with the WeDo software. If you want to move the motor one way, this is the combination used

In Scratch, this is what a similar code will look like

Using the WeDo software, clicking the square red button will stop the program. In Scratch, you will accomplish the same when clicking the round red button. In order to increase the complexity a bit, let's set the power level of the motor. Using

the WeDo software, you can choose a level from 1 to 10 (where 10 is the maximum).

In Scratch this is done in a similar fashion. The power level here goes from 1 to 100

So, let's keep increasing the complexity in our programs. Rather than using the mouse to click icons on the screen, why not use the keyboard to perform the same functions? Let's say that when pressing the letter R the engine will run, and when pressing the letter S, it will stop. In the WeDo software this part is a bit confusing: after dragging and dropping the computer key icon, you need you hit the key you want on the keyboard. It can be a letter, a number or even the arrow keys. In Scratch you will find a drop down menu to choose from letters, numbers, arrows or the space bar. Below you will see the codes in both programs.

In Scratch you can also use the command when Object 1 clicked (the Scratch Cat or the figure you have on the white canvas) to turn the motor on, and you can turn it off with the space bar (this command is found under the control menu). Nice trick, Isn't it?

You can program the time the motor is turned on in the WeDo software. You also have the same functionality in Scratch.

Just knowing how to program the motor to turn it on and off is enough to motorize a large number of creations. You can turn the motor in both directions. You can program the motor to wait a few seconds while on or to wait a few seconds to turn it off. You may activate the motor with the mouse or the keyboard. You can also program cycles that repeat several times. Now you know how to do a number of tricks with the motor alone. There is still more to come since we haven't talked about the sensors (tilt and proximity). Those will be covered in a future issue. Stay tuned.

A good meal is not complete without a good dessert. What's better that using Sprites in Scratch as a neat treat. Sprites are programmable animations. Imagine you can interact with sensors and control what the Scratch Cat does on screen with your WeDo creation. You can control the virtual creation with your real one made of bricks. You can use your WeDo robot as a remote control. What a nice treat!

You know that in LEGO®, the sky is the limit. Now that you have learned how to program your creations you can start making plans about conquering the universe, the LEGO® universe. You may try controlling robotic insects, or why not with the Mars Rover from your very own room.

You can find more information, and building and programming instructions for the designs presented here and many more at:
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