



LEGO® WeDo (VII)

Programming in Scratch

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Cover Image by Osvaldo Romero

LEGO® world domination plan: 1) Find world domination music that will inspire us and make our enemies tremble. 2) Bring the bricks to your favorite secret hiding place. 3) Start planning the strategy for world domination using our LEGO bricks. 4) Remember this task becomes a lot easier if the bricks are programmable, like those from the WeDo™ set. 5) Learn to program with Scratch so that the bricks will follow only our orders as we please.

In previous issues of HispaBrick Magazine we have made the comparison between the basic commands of the WeDo program and the equivalent coding instructions found in Scratch. We have also discussed the Amazing Mechanisms (Dancing Birds, Smart Spinner and Drumming Monkey), Wild Animals (Hungry Alligator, Roaring Lion and Flying Bird) and the Play Soccer (Goal Kicker, Goal Keeper and Cheerful Fans). We are getting close to finishing the basics of the first 12 WeDo robotics constructions.

This time is Adventure Stories: Airplane Rescue, Giant Escape, and Sailboat Storm.

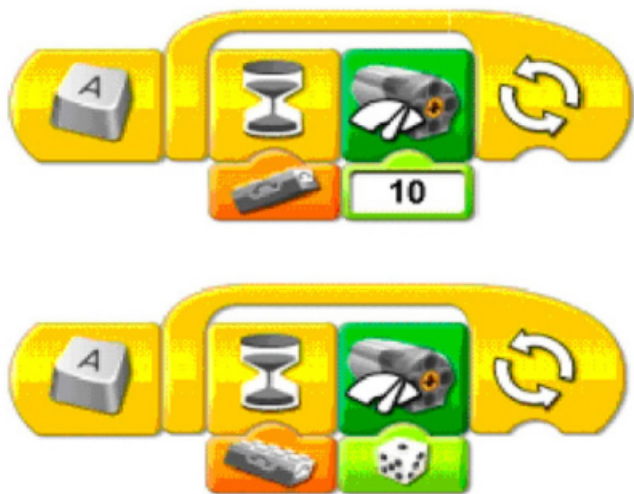
Those are the last 3 robotic creations shown in the image below.



Let us begin with the first story, the Airplane Rescue. The WeDo software programming is shown on the next page.

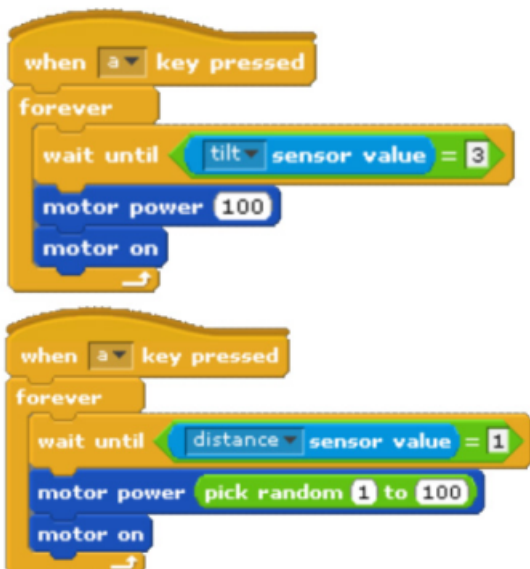


When the letter “A” on the keyboard is pressed, the program starts. If the tilt sensor is pointing up, the motor will show all the power it is capable of; however, if the tilt sensor is pointing down, the motor will experience power difficulties that are quite random. Everything is programmed in a loop to keep the code running forever.



The Scratch programming becomes a bit challenging this time because there is no image showing the tilt sensor’s direction. The tilt sensor has 5 different values (from 0 to 4). A leveled sensor is 0, pointing down is 1, pointing to the right is 2, pointing up is 3, and pointing to the left is 4.

For our code we need to remember only that up is 3 and down is 1. So, the programming must be similar to the one shown below. The start and loop blocks are found under the Control menu. The commands to turn the motor on and off are under the Motion menu (if not visible, go to Edit, Show Motor Blocks). The tilt sensor is under the Sensor’s menu. The equal block (the one with the “_=_” sign) is found under the Operators menu.



With these two programs we can have hours of fun creating a story about a damaged airplane in need of rescue.

The next robotic creation to program is the story of the Giant’s Escape. This is a giant that wakes up very angry when disturbed from his dream.



The programming code from the WeDo software is shown below.



The basic WeDo code uses the arrows in the keyboard to make the giant go up (when it wakes up) or to go down (when the giant goes to sleep). Both programs help us to test the times for waking up and the time for going to sleep in order to check that everything goes in the right direction (so basically, to check nothing breaks!).

The version of the code for Scratch for this giant is shown below. You need to remember that a time of 10 in WeDo is equal to 1 second in Scratch.



The following code is the version with the sound of the giant's angry roar for having been woken up. You can program the time and the best angry sound for the giant.



In Scratch you need to import the sound you like the most under the Sounds menu. For this example (see image below), if you look under the Human folder, you will be able to find the Scream-male1 sound. You can also record your best impersonation of an upset giant.



Last but not least, we need to recreate the Sailboat Storm story. You will be able to program overseas journeys where relentless storms will test the best of your nautical skills.



The WeDo code is shown in the following image. It uses a loop or repetition cycle. You also need to add a waiting time with random numbers (the dice icon) to simulate the ocean waves with variable motor power in order to make the sea trip more realistic.



The programming code in Scratch is presented in the next image. The blocks required for this one can be found under the Motion menu (motor power), the Control menu (the repetition loops and wait blocks) and the Operators menu (pick random number).



Do not forget the 5 steps for world domination using LEGO® bricks. However you need to be careful, the temptation to test our building skills to the maximum can detract us of our objective. We could spend hours and hours on end making new creations and forget what the original plan was! But for now, rest assured you can make programmable robotic stories with your new creations!

That's all for now this time folks, keep tuned for the advanced programming of these creations in the next issues of HispaBrick Magazine. You can find more information, and building and programming instructions for the designs presented here and many more at:

--> www.wedobots.com

--> www.facebook.com/wedorobots

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The unofficial blog for LEGO® WeDo designs