



LEGO® WeDo (IX)

Programming in Scratch

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Cover Image by Osvaldo Romero

The world domination plan is a lot of work, more like a full time job. This makes me realize that after all of this hard work we need a really long vacation. How about vacationos in our newly conquered territories? That would be a nice option. Before we vacation anywhere, we need to concentrate on the advanced instructions in Scratch to see if we can actually conquer a nearby place. The beach would be the ideal place to start this plan! If only we could create some robotic allies to scare away those curious minds that wander too close to our resting spot, it would be a dream come true!

Wouldn't it be nice to have the hungry alligator help us with this task? Or what about having the roaring lion help us as well, or even having the giant flapping bird to scare away those intruders that have not yet seen our biting robot's teeth!

In previous issues of this magazine we have made the comparison between the basic commands of the WeDo program and the equivalent coding instructions in Scratch. We have presented the Amazing Mechanisms (Dancing Birds, Smart Spinner and Drumming Monkey), the Wild Animals (Hungry Alligator, Roaring Lion and Flying Bird), Play Soccer (Goal Kicker, Goal Keeper and Cheerful Fans), and the Adventure Stories (Airplane Rescue, Giant Escape and Sailboat Storm). Let's continue with more advanced instructions for the next designs. Today, the Wild Animals return: Hungry Alligator, Roaring Lion and Flying Bird.



Let's start with the hungry alligator: this time it wants to bite, bite and bite.



The advanced version of the alligator in the WeDo program is presented below. Compared with the initial version presented in HispaBrick, it contains a loop that makes the program repeat forever, working together with the distance sensor. That is, anything that gets close enough will make our alligator start to salivate and be willing to bite without stopping.



Try to develop the Scratch code without looking at our implementation.

In Scratch, this code is not much different. Below is displayed one of the possible options. You need the "forever if" loop, the option that waits until the distance sensor detects motion nearby, the motor direction, the timing for the motor to open the jaws (0.5 seconds in the example), play an interesting sound (we used the Dog1 to confuse the enemy), change the motor direction to close the alligator jaws and a suitable time for it (0.7 seconds in the example).

```

when clicked
  forever if distance sensor value < 30
    motor direction that way
    motor on for 0.5 secs
    play sound Dog1
    motor direction that way
    motor on for 0.7 secs
  
```

The command to start when clicked and the “forever if” loop can be found under the Control menu. The commands for the motors can be found under the Motion menu. If the WeDo is connected to the computer you will see the options, otherwise you need to activate it under the Edit menu. You need to look under the Operators menu for the ‘less than’ command option (“_ < _”) before inserting the distance sensor in the “forever if” loop. Once this is done, you can place the distance sensor found under the Sensing menu. The sound option is found on the Sound tab. The sound was chosen from the Scratch library. You choose the sound using the Sounds tab next to the Script tab where you write your code. You can import the best sound you find or you can record your own terrifying audio. In the example, we have chosen the one called Dog1 under the Animal folder, so you will hear a fierce alligator!

We are going to make an even more advanced version of the Hungry Alligator in Scratch. In addition to opening and closing the jaws, we will use a virtual PC companion: the Sprites (we will finally use it!). The sprite will do the same action as our brick alligator but on the computer screen! You have seen the Scratch cat many times before; this is a sprite we can program to move with our bricks, cool isn't it? The sprite for this programming task uses the shark costume. So, you will have control of the Roaring Lion and at the same time you can control a Hungry Shark on the computer.

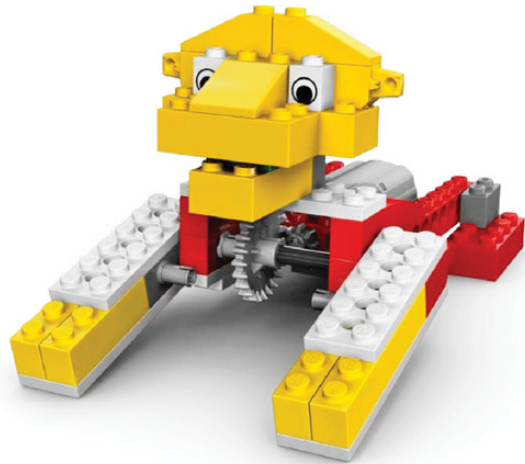


Try to develop your code without looking at ours. The main difference with the first code is the use of costumes. This command is found under the Looks menu. You must import first the shark's images for this task. They are found under the Costumes tab, next to the Scripts tab (where we do the programming). Two costumes were imported from the Animals folder (shark1-a and shark1-b). You can choose any costume, paint your own or use the Camera for the angriest face you have! We also changed the sound to be like a hungry shark under the sea. Since there are not many to choose from, we selected the Plunge sound from the Effects folder.

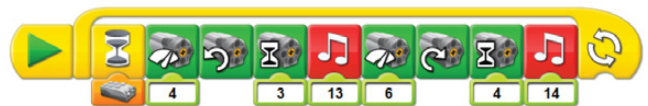
```

when clicked
  switch to costume shark1-a
  forever if distance sensor value < 30
    switch to costume shark1-b
    motor direction that way
    motor on for 0.5 secs
    play sound Plunge
    motor direction that way
    motor on for 0.7 secs
    switch to costume shark1-a
  
```

We will continue the programming with the Roaring Lion. We can do this using the tilt sensor on a robotic bone as in the WeDo software, or use the distance sensor to activate the roars. This version uses the distance sensor to awaken the sleeping lion. That way it can help us as a guardian to keep intruders away from our new territories!



The WeDo code is as shown below. The distance sensor can be placed near the lion or on the shoulder.



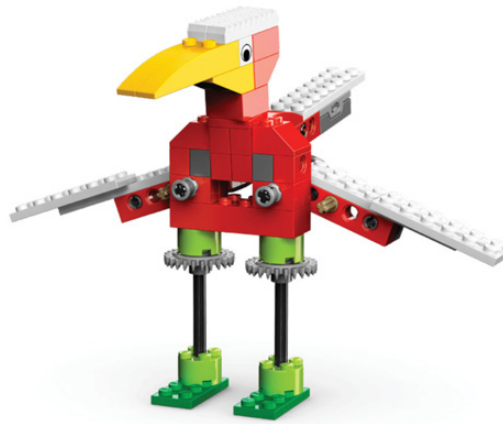
It's a good challenge to try to recreate the code without looking at our version. The code will look similar to what we have done before. You may need to change the times for others that fit better with the lion's motions. From the Scratch library we tried to choose the best sounds. We selected the Gong sound from the Percussion folder and the Peculiar sound from the Electronic folder. You can also record your own sounds; something recommended because there are not many sounds that come across like a fiery lion. Since you already know how to change the costumes, you can try a different version from the one shown below for the roaring lion.

```

when clicked
  switch to costume lion1-a
  forever if distance sensor value < 50
    motor direction this way
    motor power 40
    switch to costume lion1-b
    play sound Gong
    motor on for 0.5 secs
    motor power 60
    motor on for 0.5 secs
    play sound Peculiar
    switch to costume lion1-a
  
```



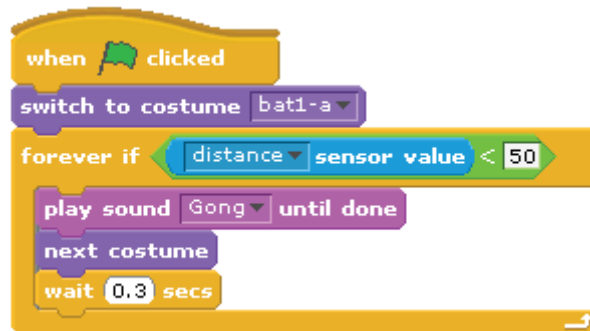
We have to code the Flapping Bird to finish our work. With this huge bird we can scare away any clueless person who has not yet seen our alligator or the lion. That way we can enjoy our vacation on our private beach!



The WeDo programming can use the tilt on the tail or the distance sensor close to the bird's feet as shown in the image below.



In Scratch we can use and program both sensors in a similar fashion. Let's use what we have learned so far. We will have a virtual companion as well for this task. What about a terrifying bat, wouldn't that be cool? You need to import the costumes you prefer from the library. The code below will change them automatically. Below you can find a version of this code in Scratch with the chilling images of the bat moving its wings.

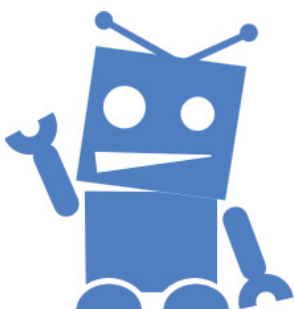


That's all for now, programming will continue in the next issue. You can find more information, and building and programming instructions for the designs presented here and many more at:

<http://www.wedobots.com>

<http://www.facebook.com/wedorobots>

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The unofficial blog for LEGO® WeDo designs