Scratch Programming Part 3

In the previous lesson, we created our very first Scratch animation by first creating a story line, then creating sprites, finally adding very simple scripts. In this lesson, we will introduce more interactions to make the animation more interesting. While adding interactions, you will learn about how sprites communicate with each other.

Step 1: Revisit Our Story Line

Let's revisit our story line and lay it down step by step for each sprite.

Sprite	Story Line Step by Step from the Start
	1) Mr. Meow shows up first at his house 2) He waits for the donut from Donut Man. 3) When Donut shows up, Mr. Meow eats it quickly. Then he says "mmmm…." and smiles happily. 4) Mr. Meow goes back home.
	1) Donut Man shows up at his house 2) He "sends" Mr. Meow a donut. 3) He said "I hope you like it" when Mr. Meow is done with Donut.
	1) Donut hides 2) Donut appears on the plate when Donut Man delivers it. 3) It hides when Mr. Meow is done with it.

Step 2: Adding Extra Costumes

Based on the story line above, we need to add at least two new costumes: one for Mr. Meow when he is *happy* and another for the Donut Man when he is *throw*ing.

Make a copy of the costume "costume2" costume; rename it to "happy" and edit it to have a big, toothy smile.
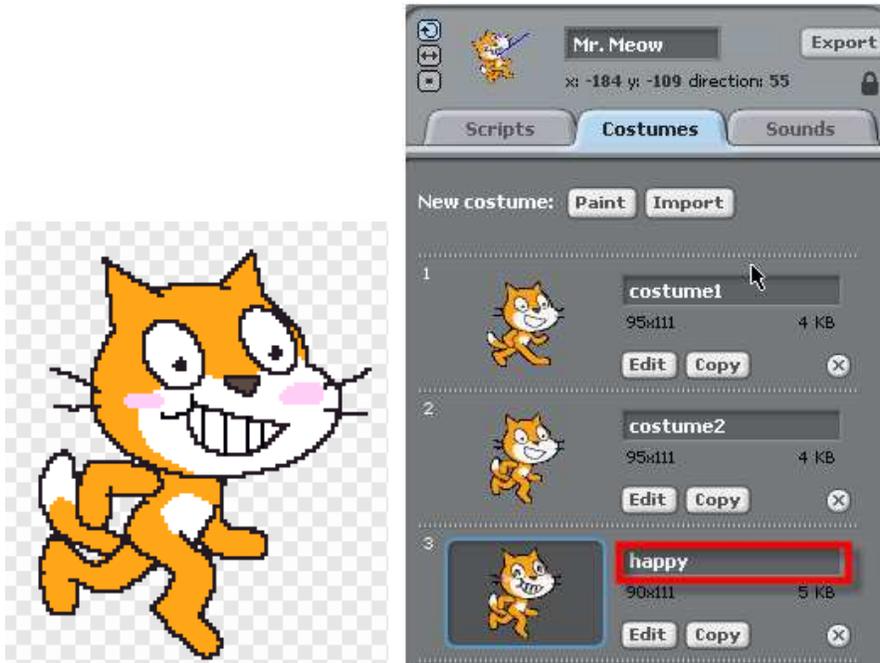
For Donut Man, make a copy of the "regular" costume and change it to have throw lines. Then name the new costume to "throw".
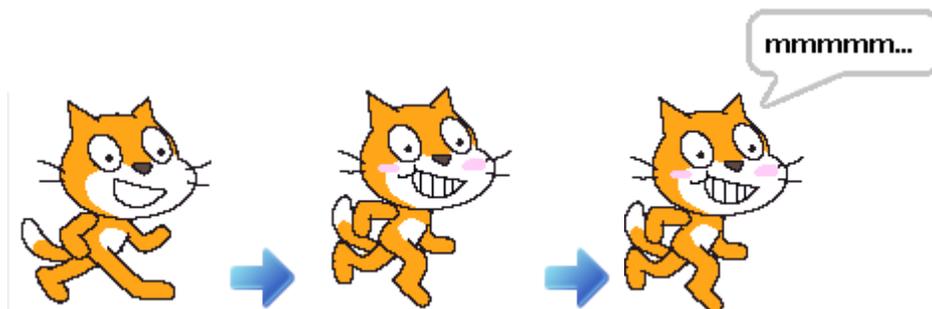
Step 2: Throw and Catch

With new costumes in place, let's use them to create scripts that make Donut Man throw and Mr. Meow catch. First let's make scripts so Donut Man does as shown below:
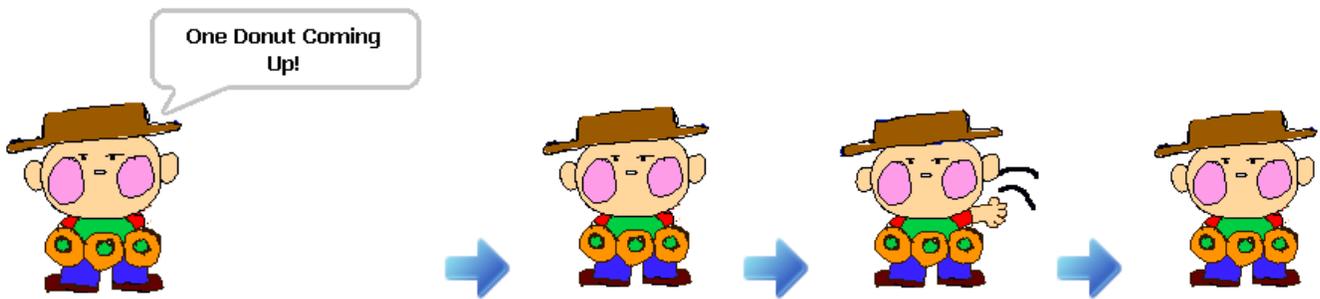
Mr. Meow's sequence of actions and corresponding scripts are illustrated as below:

3

 TEST: Click the Start Flag to see Donut Man throw and Mr. Meow go "mmmmmm".

Note that both Donut Man and Mr. Meow are acting on their own, independent of each other. Next, we will make them communicate with each other, so that Mr. Meow knows when Donut is thrown.

Step 3: Understanding and Create Broadcast Messages

Sprites can communicate with each other by three methods:

1. By Broadcast Messages

2. By Sense

3. By Synchronized Information

We will demonstrate how to use Broadcast Messages now and discuss sense and information method later in the series.

A *Broadcast Message* is a message sent by a Sprite or a Stage, and can be received by all Sprites. To send a Broadcast Message, use the "broadcast" block. Click the little down arrow and select a message or create a new message.

To create a new message, click the "new…" from the popped up bubble to open the Message Name Editor. Enter "throw donut" for message name and click "OK" to save this new Broadcast Message.

You should now see the "throw donut" Broadcast Message added to the "broadcast" Script Block.

Create another broadcast message called "got donut" to be used to notify everyone that the Donut has been eaten.

To receive a Broadcast Message, use the block called "when I receive".


Step 4: Sending and Receiving Broadcast Messages

Change Donut Man's scripts so that he sends out a "throw donut" message.

Change Mr. Meow's scripts so that he waits for a "throw donut" message to go "mmmm". Then he sends out a "got donut" message.

5

We also want Donut to hide first upon start, to show up only when it receives a "throw donut" message, and then to hide again when it receives a "got donut" message.
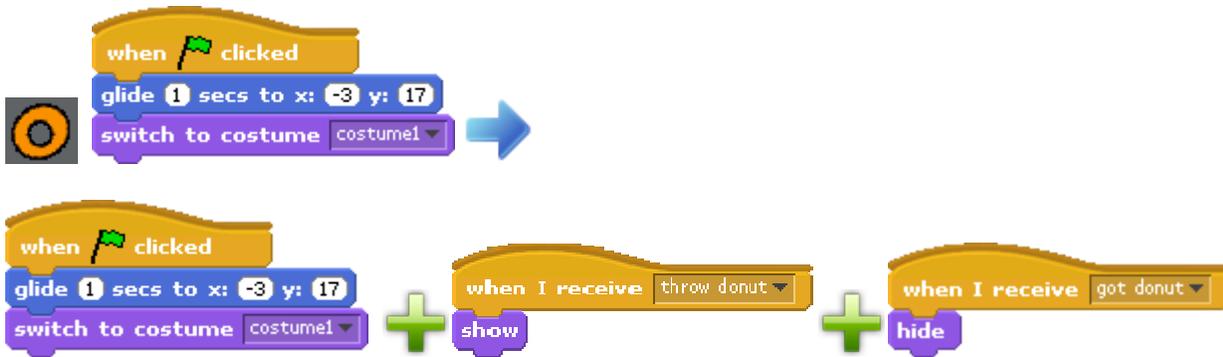
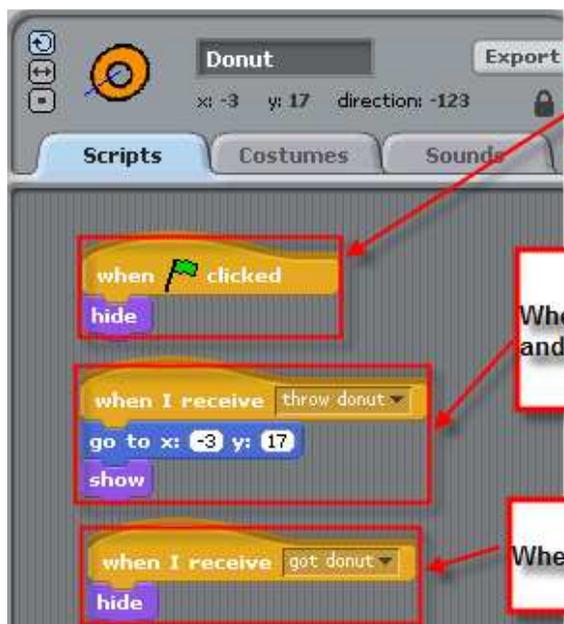Donut Man's scripts now should look like the snapshot below.

When animation starts, go back home to (-172,114)

Serve one donut: say "One Donut Coming Up!", change costume to "throw", pause for half a second, then change costume back to "regular".

When done throwing a donut, send out a "throw donut" broadcast message.

When someone(a happy costumer) sends a "got donut" message, say "Come Back Again".

6

Donut's scripts should look like the snapshot below.

Donut
x: -3   y: 17   direction: -123

Scripts | Costumes | Sounds

when [flag] clicked
hide

When animation starts, hide.

when I receive [throw donut]
go to x: -3 y: 17
show

When I receive a "throw donut" message, go to (-1,17) and show

when I receive [got donut]
hide

When I receive a "got donut" message, hide.

Mr. Meow's scripts should now look like the snapshot below.

Mr. Meow
x: -183 y: -109 direction: 5

Scripts | Costumes | S

when [flag] clicked
glide 1 secs to x: -184 y: -110
switch to costume costume1

When animation starts, glide to (-184, -110) and change to costume "costume1".

when I receive [throw donut]
switch to costume happy
say mmmmm for 1 secs
switch to costume costume1
broadcast got donut
glide 1 secs to x: -184 y: -110

When receive the "throw donut" message, change costume to "happy", say "mmmm". and change costume back to "costume1". Send out a "got donut" broadcast and glide back to (-184,-110)

TEST: The animation should play like this diagram, which is called a Time-Space diagram in Computer Science term.

Time

Say "Come Again!"

"throw donut"

"got donut!"

Eat donut   Send "got donut"

"throw donut"   "got donut"

Show   Hide