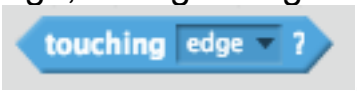
Monday 2/2/15

• **LESSON 3 -- Costumes, Sprites, Scripts and more use of Random**

First for those of you who did or tried the tessellation: beware of borders. When you get to the border of the stage, strange things happen! The way to compensate is with the SENSING command 

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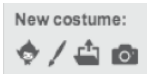
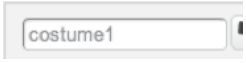
Secondly, if you were put off by the math in lesson 2, you are not alone! Several others in our class had the same reaction. I will try my hardest to minimize math references this week or at least make them optional!

Let's begin by talking about one Sprite with multiple costumes.

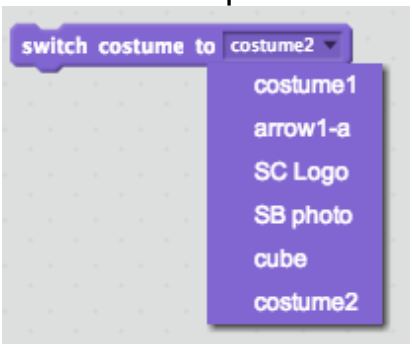
When you click on the COSTUMES folder tab right next to SCRIPTS, you see

with a rich collection of features. At the upper left, the NEW COSTUME button 

lets you add a costume from the library, paint/modify your own, from your hard drive or from a new camera photo. I have done a few samples. Please note the very faint hard to read + sign in the editor which is where the ink comes out from the back of the cat's neck (or whatever costume you are using). Every tiny button reveals its identity if you hover over it. Having one Sprite with multiple costumes is not the same as later when we have multiple Sprites. You can rename a costume by typing in the 

box after you click on the costume you wish to rename. The Paint Editor is extraordinary with both Bitmap Mode and Vector Mode -- the former lets you easily fill regions e.g. my cube while the latter lets you easily resize an object. You can switch from Bitmap to Vector mode seamlessly.

You can DELETE or DUPLICATE a costume by right mouse clicking on it (PC) or ctrl clicking (Mac). There are two programming commands that deal with COSTUMES. They are located in the purple LOOKS section. The SWITCH COSTUME tells your Sprite to put on a specific costume with the pull down arrow specify which costume:



The NEXT COSTUME command just goes to the next one and after it reaches the last costume it goes to the first. Notice that I have a variable called INTERVAL which is initialized to be 1 so that it is WAITING 1 second after each costume.

My reason for having a VARIABLE for the WAIT is to affect the speed as you will see on the next page.

Required HW 3.1 Write a program modeled after the one above where you have multiple costumes and you are basically having a slideshow of your costumes. Try to

have at least one costume of each type (the Scratch library, a file on your hard drive that perhaps you got from the Web, a graphic you drew, possibly a picture you took with your camera). Use the WAIT command so that there is a bit of a delay each time it changes costumes.

Optional: add features like this so while the slideshow is happening, you can move the sprite left/right or up/down or both. My code below also slows down or speeds up the slideshow by making the variable called INTERVAL to be bigger or smaller.

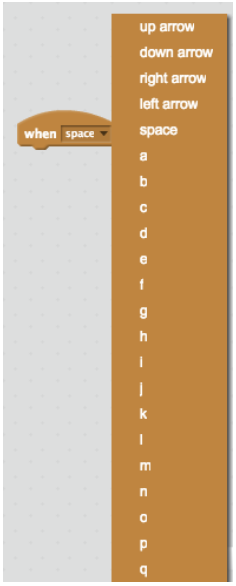
Note that I am using the BROWN command from the EVENT category that says "when up arrow is pressed" do these things:

thing 1 (change the value of INTERVAL so that it is either double or half of what it used to be)

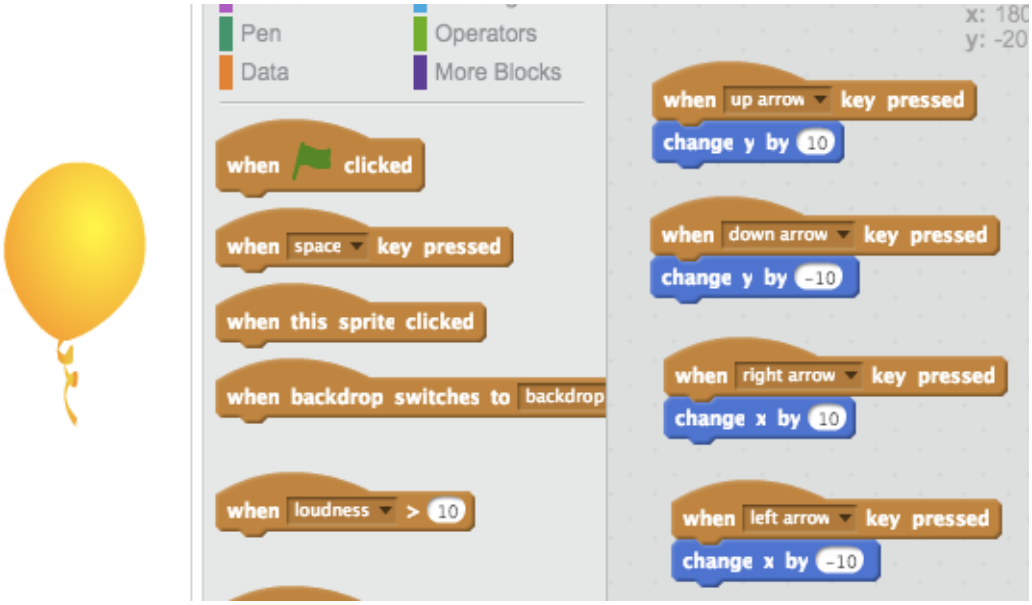
thing 2 (move forward or back 50 steps)

Having this EVENT command

that has so many choices under the TRIANGLE



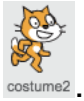
leads to wonderful uses in creating games. To give you a glimpse of where we are going, try changing the CAT to a BALLOON or a BALL and now write this kind of program.

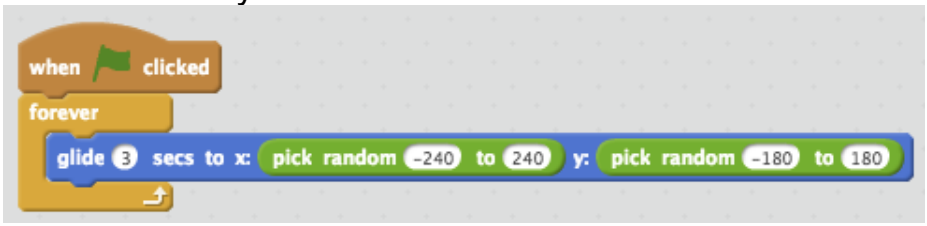


With just these four commands, you can navigate your balloon around the screen. Now imagine a maze in which the walls are green. Pretty soon, you will be able to program the balloon to pop if and when it hits one of the green walls. Got it?

HW 3.15 Write a program that makes a balloon (or ball or other costume) move in all four directions based on the user pushing one of the four arrows.

Another use of the NEXT COSTUME command is to achieve animation.

If you look at the standard CAT that you get with every new program, you will see that they give you two cats named costume1 and costume2  . If you use the forever loop below you can make animation happen via this very simple program (on the left) that shows the cat is walking. Add a glide command on the right and you can watch the cat walk randomly on the screen.



The URL for this sample program is http://scratch.mit.edu/projects/45463540/ and is named Lesson 3 Cat Animation

HW 3.16 Get this program from my library, remix so that it is now yours. Change the named to HW 3.16. Alter the speeds to see if you can improve it.

Now let's talk about multiple Sprites with one costume.

Consider this program with my standard header and one Sprite, the standard cat:

HW 3.17 Hopefully, you can figure out what it does, but this required 9 minute video at http://youtu.be/oGwmUBQMy3o should help you. I use the above script with three Sprites and one costume. The video is titled

3 Cats Race Up the Screen

and shows a race that leads us to exercise 3.2. Note the use of Y POSITION above.

HW 3.2 Write a program similar to the one above with 3 cats all facing right and racing from left to right horizontally across the screen with different speeds based on different use of random numbers and the WAIT command. Include a sound that each cat makes going across the finish line.

HW 3.21 Optional Challenge Bonus: use the technique described on the previous page with next costume and make one or more of the cats animate while travelling.

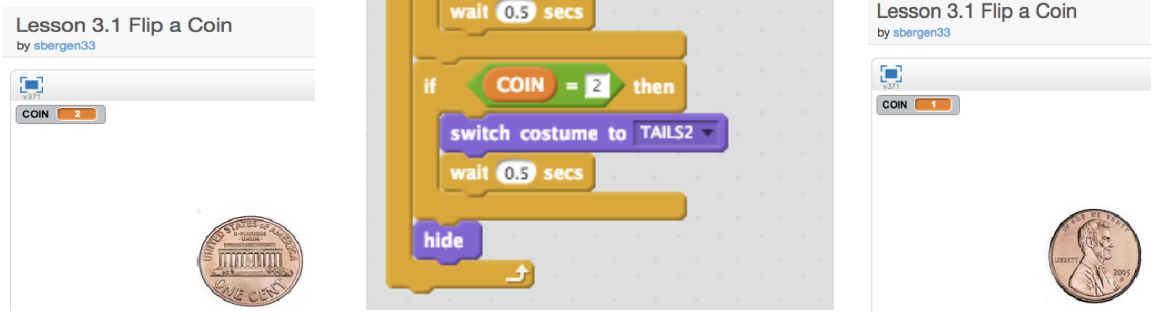
Hint: you will be using X POSITION since you are making the cats go left to right.

Next, back to coins

Last week, we discussed the program on page 11 to flip a coin.

Now -- with our costume know-how, we want to modify it so that you see a HEAD or a TAIL when you flip. Part of the work you need to do involves getting the two pictures from the web or using your camera. In my library/studio, you can find the program called **2014 Lesson 3 Flip a Coin (with coins showing)** at http://scratch.mit.edu/projects/12635059/

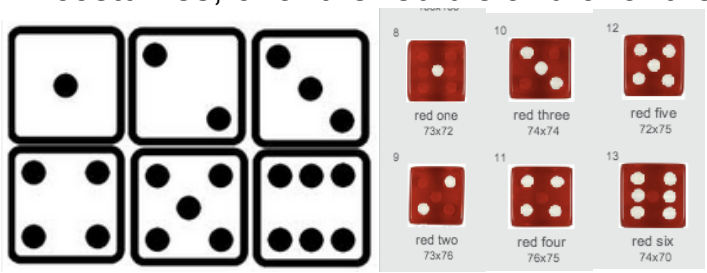
HW3.22 This week in lesson 3, please watch the follow-up 22 minute video at http://youtu.be/YTIt69KrzYA on Flipping Real Coins. On this video, I show you how I took the pictures of a coin from the web and added them as files into the COSTUME section of my library. Notice the use of the IF ____ THEN ____ section and the new command SWITCH COSTUME. I also have a section on BROADCASTING MESSAGES in Scratch, something I have shared with a few of you during our weekly conversations. This will be formally introduced in the next few weeks.



HW 3.3 Modify your coin program from last week so that it displays COINs. Or if you did not do it last week, please do it this week.

Next let us deal with dice

The next program uses random numbers to simulate rolling dice. We want to use two dice so we need 12 costumes, 6 for the red die and 6 for the white die.

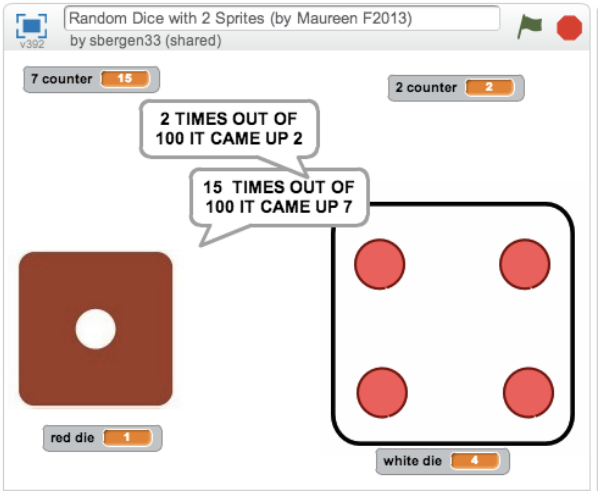


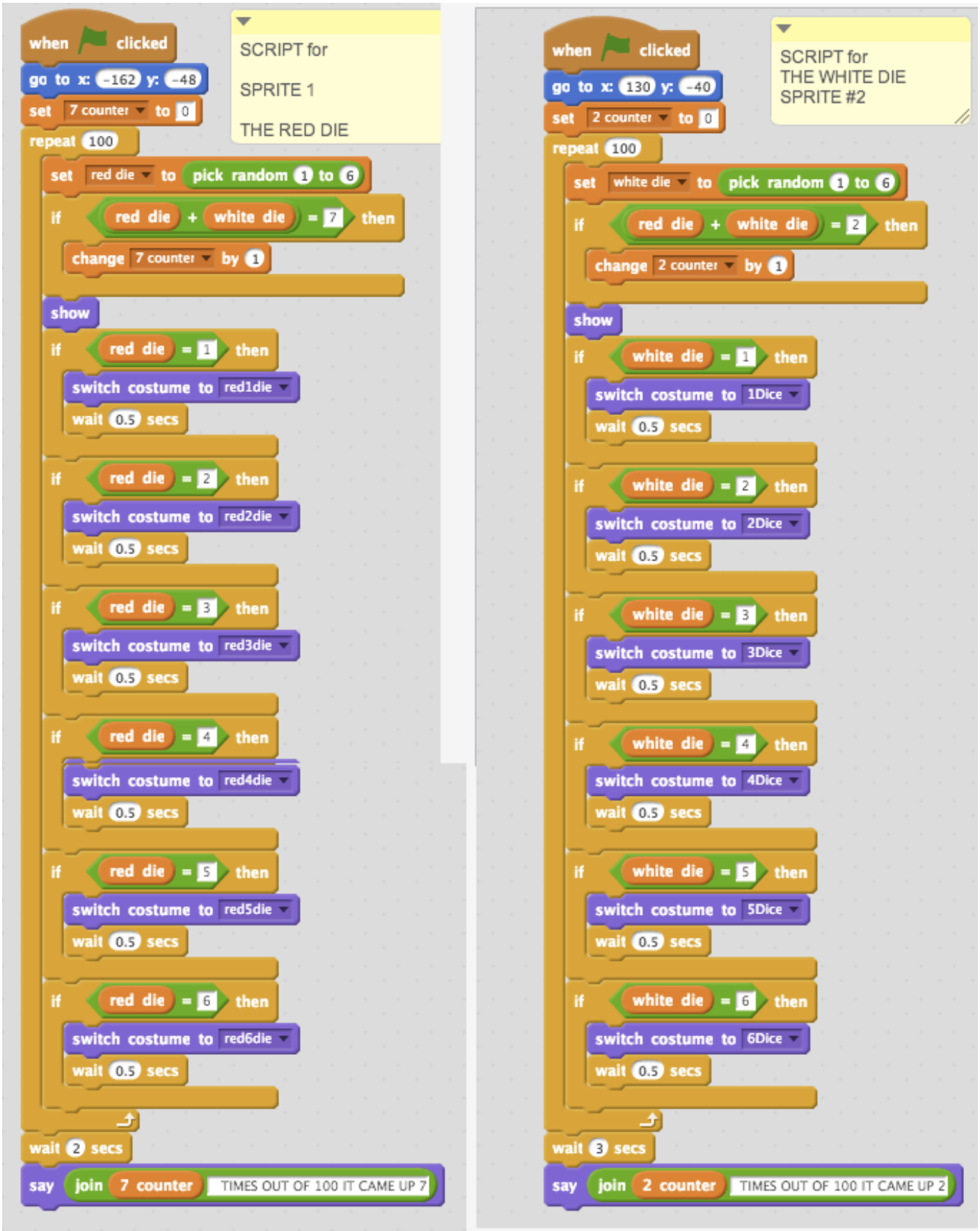
I have done the work for you so that you can focus on the programming. This program is marked **Lesson 3 Dice Template (graphics no script)** and you can get it from my library/studio.

Sources for my dice graphics: http://t1.ftcdn.net/jpg/00/34/26/52/400_F_34265213_6dfUzSQPOP5LjMlqmk9gDvZwqBJYImRF.jpg and http://image.shutterstock.com/display_pic_with_logo/65880/65880,1176077587,1/stock-photo-white-dice-in-a-row-from-to-3038623.jpg

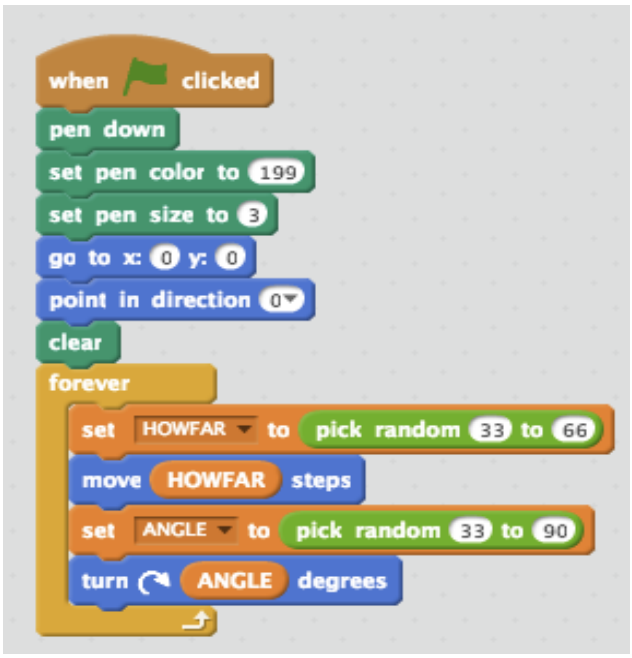
OPTIONAL HW 3.4 Use the 12 dice I have given you in the template above to create a program with two Sprites that will roll a pair of dice 100 times, showing the dice on the screen. Count the # of times it comes up "2" which some people call "snakeeyes" and count the # of times it comes up "7" -- the most likely outcome with two dice.

On the next page is a completed program by one of the people in the Fall 2013 course. Please use it if you get stuck and want to see a sample.




when clicked
go to x: -162 y: -48
set 7 counter to 0
repeat 100
set red die to pick random 1 to 6
if red die + white die = 7 then
change 7 counter by 1
show
if red die = 1 then
switch costume to red1die
wait 0.5 secs
if red die = 2 then
switch costume to red2die
wait 0.5 secs
if red die = 3 then
switch costume to red3die
wait 0.5 secs
if red die = 4 then
switch costume to red4die
wait 0.5 secs
if red die = 5 then
switch costume to red5die
wait 0.5 secs
if red die = 6 then
switch costume to red6die
wait 0.5 secs
wait 2 secs
say join 7 counter TIMES OUT OF 100 IT CAME UP 7
SCRIPT for
SPRITE 1
THE RED DIE
when clicked
go to x: 130 y: -40
set 2 counter to 0
repeat 100
set white die to pick random 1 to 6
if red die + white die = 2 then
change 2 counter by 1
show
if white die = 1 then
switch costume to 1Dice
wait 0.5 secs
if white die = 2 then
switch costume to 2Dice
wait 0.5 secs
if white die = 3 then
switch costume to 3Dice
wait 0.5 secs
if white die = 4 then
switch costume to 4Dice
wait 0.5 secs
if white die = 5 then
switch costume to 5Dice
wait 0.5 secs
if white die = 6 then
switch costume to 6Dice
wait 0.5 secs
wait 3 secs
say join 2 counter TIMES OUT OF 100 IT CAME UP 2
SCRIPT for
THE WHITE DIE
SPRITE #2

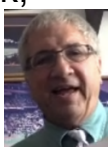
HW 3.5 The program called Lesson 3 Random Scribbling is one that randomly scribbles on the screen. Modify it so that it scribbles with a random color and with a random pen thickness.



What is cool about this program is that eventually (about 15 min) the screen is solid red. I find it interesting to watch (like a fire place) in a side window while I am working on other things. Total randomness. Total chaos.

By the way, here is my random chaos 20 minutes later -- solid red!

Have a good week,

Steve 

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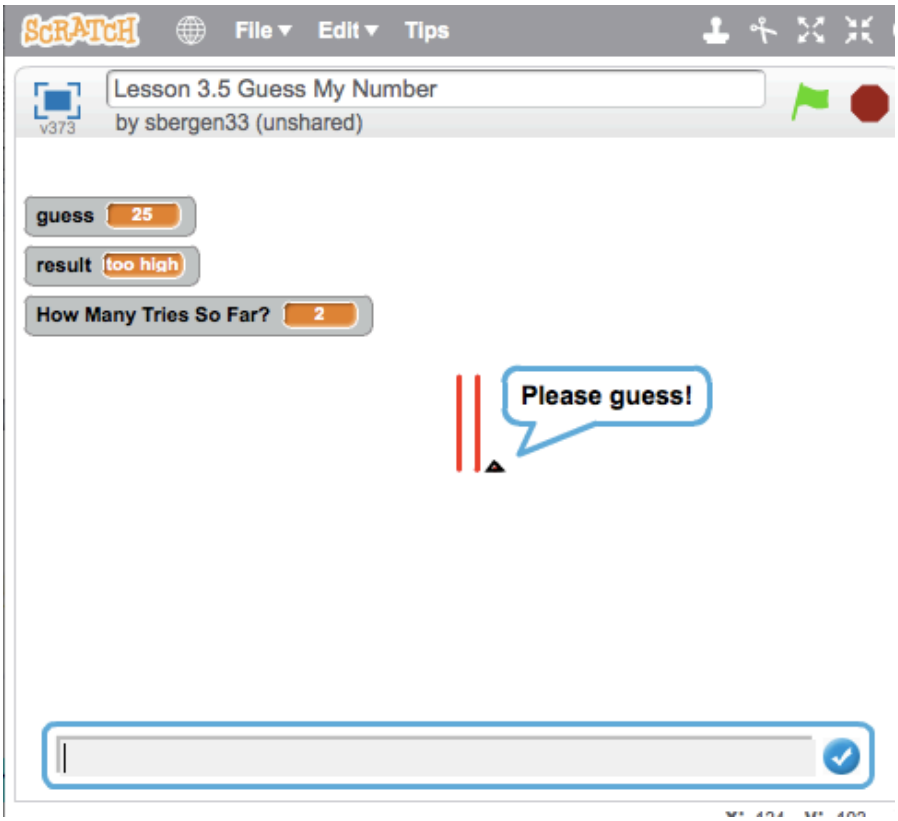
OPTIONAL 3.6 Challenge:

Write a program that has the computer pick a number from 1 to 100 but not tell you. The computer then lets you guess and tells you each time "too high" or "too low" until you guess the number.

If this interests you and you choose to work on this one, please watch the optional video at http://youtu.be/NCUcEcZxxeM that explains it all.
Lesson 3 -- Guess the Number (2 min)
Sample screen snapshot below. I am not sharing the code with you, however.



INDEX of HIGHLIGHTS can be found on the last page

☑ HW 3.1 Write a program modeled after the one above where you have multiple costumes and you are basically having a slideshow of your costumes. (pages 2-3)

☑ Optional: add features like this so while the slideshow is happening, you can move the sprite left/right or up/down or both. (page 3)

☑ HW 3.15 Write a program that makes a balloon (or ball or other costume) move in all four directions based on the user pushing one of the four arrows. (page 4)

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☑ HW 3.17 Watch the 9 minute video called 3 Cats Race Up the Screen (page 5)

☑ HW 3.2 Write a program with 3 cats all facing right and racing from left to right horizontally across the screen (page 5)

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