Monday 10/6/14
• **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!

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!
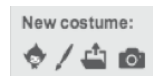
Let's begin by talking about one Sprite with multiple costumes.
When you click on the COSTUMES folder tab right next to SCRIPTS, you see

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Shared doc at http://tinyurl.com/coding

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

New costume:

◆ / ⬆ 📷 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 costume1 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:

switch costume to costume2 ▼
- costume1
- arrow1-a
- SC Logo
- SB photo
- cube
- costume2
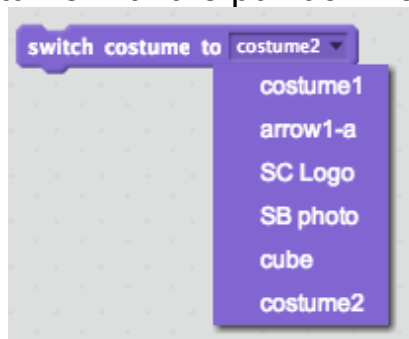
The NEXT COSTUME command just goes to the next one and after it reaches the last costume it goes to the first. Notice that I have a variable called INTERVAL which is initialized to be 1 so that it is WAITING 1 second after each costume.

when 🚩 clicked
set Interval ▼ to 1
show
forever
    next costume
    wait Interval secs

when space ▼ key pressed
stop all ▼

My reason for having a VARIABLE for the WAIT is to effect the speed 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.==
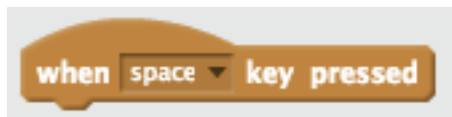
Optional: add features like this so while the slideshow is happening, you can move the object left/right or up/down or both. My code below also slows down or speeds up the slideshow by making the variable called INTERVAL to be bigger or smaller.

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
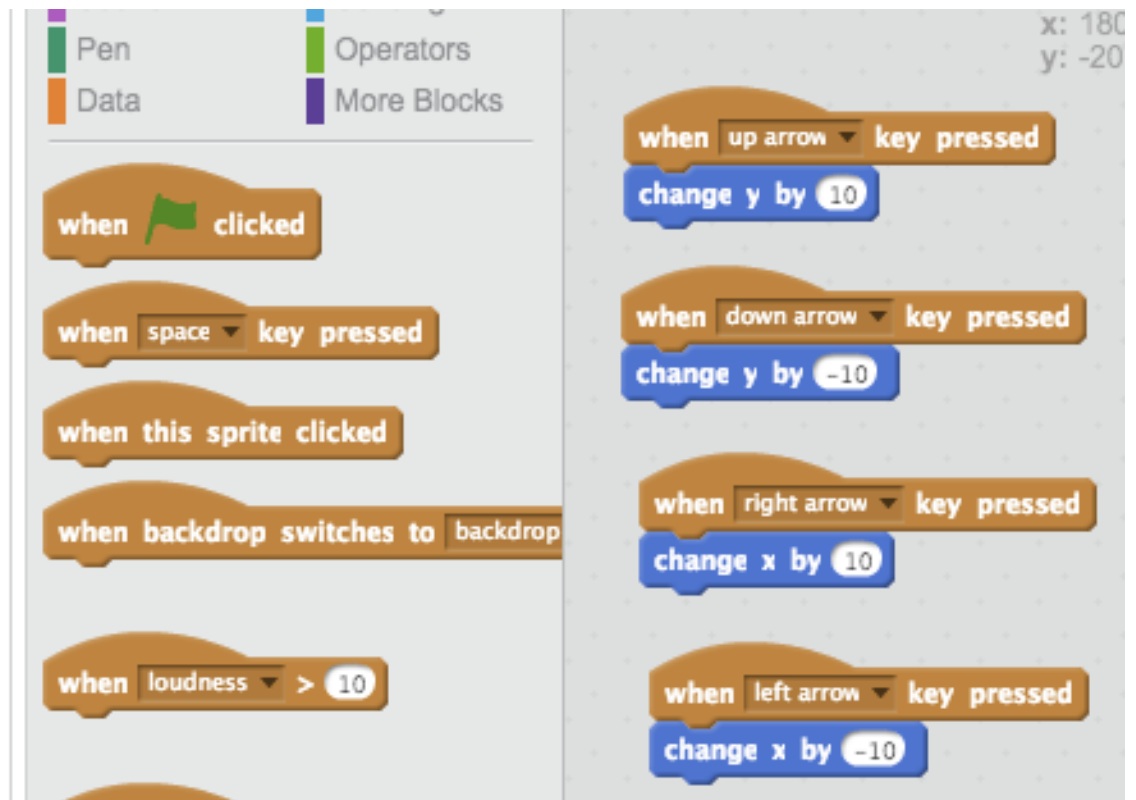which has so many choices under the TRIANGLE

when space ▼

up arrow
down arrow
right arrow
left arrow
space
a
b
c
d
e
f
g
h
i
j
k
l
m
n
o
p
q

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.

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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?

Required 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.

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

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

Hopefully, you can figure out what it does, but this required video will help you. The 9 minute video is at http://youtu.be/oGwmUBQMy3o and 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.

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. This program was at http://scratch.mit.edu/projects/16773175 in my library the video last week was at the http://youtu.be/fsc9A19kavs webpage.

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/

This week in lesson 3, I have a followup video at http://youtu.be/YTlt69KrzYA webpage. 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.
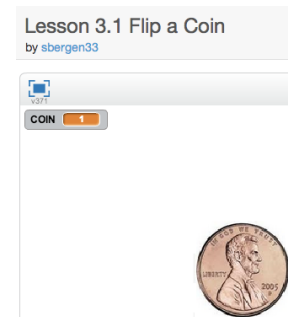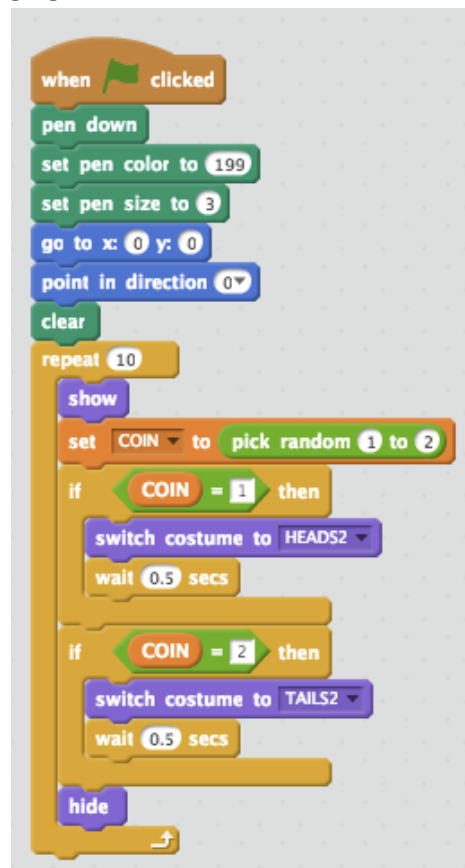
HW 3.3 Modify your coin program from last week so that it displays COINs. Or if you did not do it last week, please do it this week. I have two coins you can use in a Scratch template called **Coins in a Template you can use**. Or you can get your own coins from the web.

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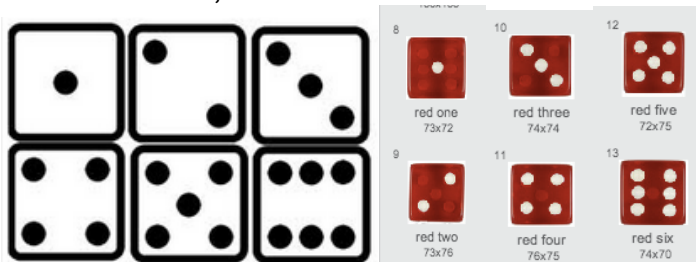
I have done the work for you so that you can focus on the programming. This program is marked **Lesson 3 Dice Template (graphics no script)** and you can get it from my library/studio.

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

OPTONAL 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.
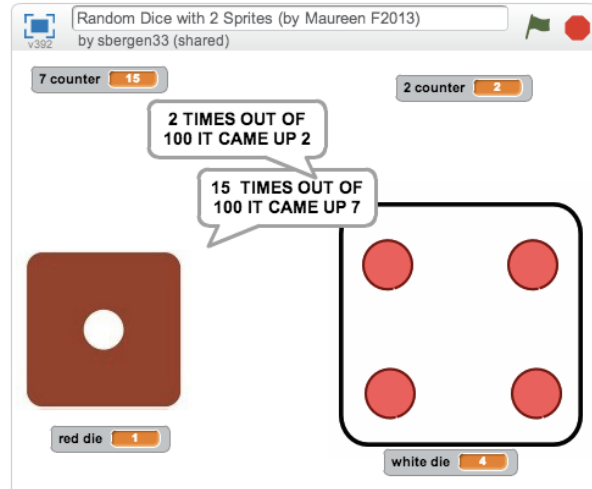
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SCRIPT for SPRITE 1 THE RED DIE

```
when [flag] 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 THE WHITE DIE SPRITE #2

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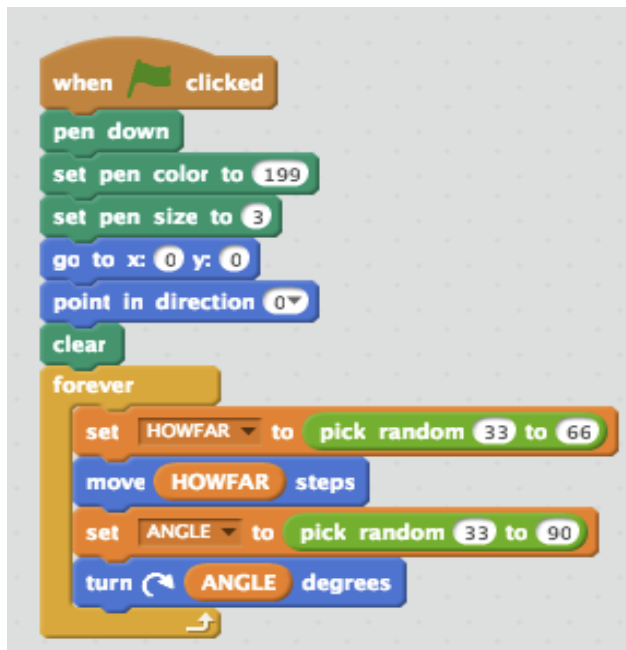
HW 3.5 The program called Lesson 3 Random Scribbling is one that randomly scribbles on the screen. Modify it so that it scribbles with a random color and with a random pen thickness.

Lesson 3.3 Random Behavior
by sbergen33

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!

Lesson 3.3 Random Behavior
by sbergen33

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.