

LESSON 3

Vocabulary: random, if _____ then _____, switch costume

Before we start, let me ask you to make public and SHARE the programs each week for your completed homework (or any others you want) so I can see them, along with any of your colleagues who might be looking for hints or help.

Bridgid: AHNJaguars (upper vs lowercase does NOT matter with scratch libraries)

Bryan: MrSark

Jessica: JLANCas2

Matt: MrMel

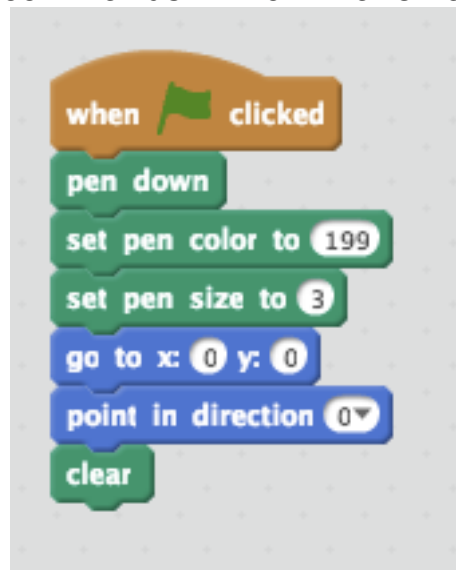
Maureen: MacTechWitch

Ruth: TechnoTeachRuth

Steve: SBergen33

Zhanna: ZhannaCannon

Before we begin the lesson on random numbers, let me share with you a program that contains all the "starter commands" which I have named Lesson 3.0 Template.



It also contains my replacement to the cat facing up.



Every new program from now on, I load this template and then choose SAVE AS A COPY. Feel free to grab this program from my library and REMIX so you can save it as your own.

The video that explains this is at

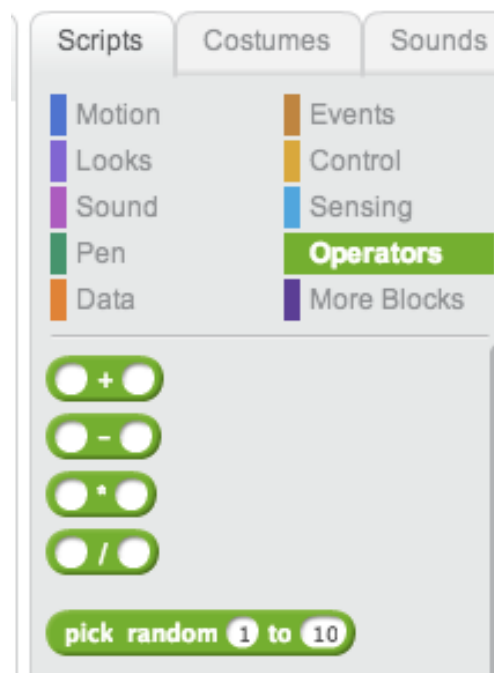
<http://www.youtube.com/watch?v=HRxh2yLNm8Y&feature=youtu.be>

This week, we introduce the RANDOM command and build on all the ways we can use it with graphics and variables. You will find the random command as the fifth command in the light green section called OPERATORS.



pick random 1 to 10

Please note that this OPERATORS section contains options for adding, subtracting, multiplying and dividing two things. This is the key for making one variable be based on another as you will see in the video(s).



All of these commands in green can be put into the "white circle" of the orange SET command where it says 0 as some of you have discovered already.




This is a powerful concept and the key to more involved programming.

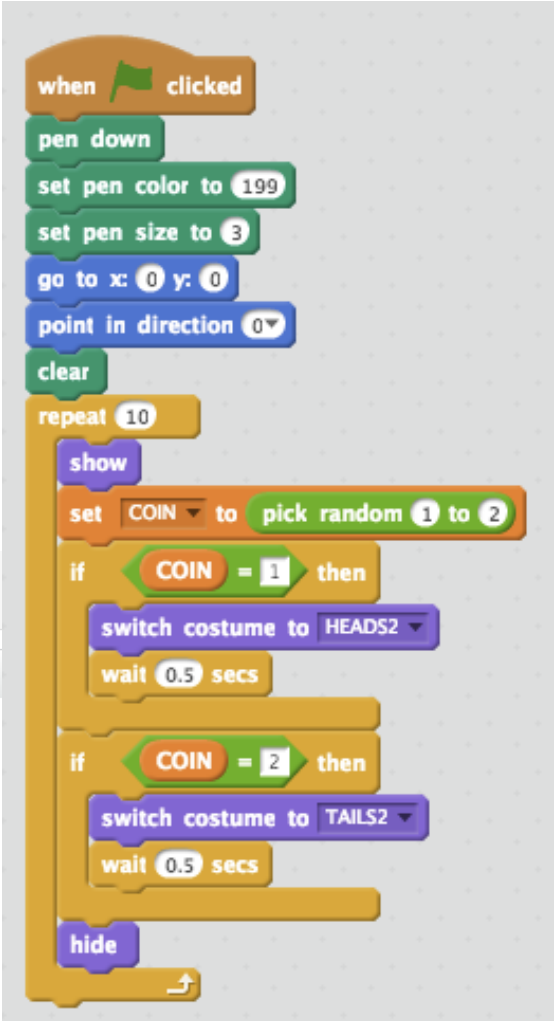
The first random program is one that flips a coin and shows HEADS or TAILS. It is called Lesson 3.1 Flip a Coin and you will also encounter a few COSTUME commands. To see this program work, you can either go to the video or get it from my library. On the video, I show you how I took the pictures of a coin from the web and added them as files into the COSTUME section of my library.

Lesson 3.1 Flip a Coin
by sbergen33

v371

COIN 2






```

when clicked clicked
  pen down
  set pen color to 199
  set pen size to 3
  go to x: 0 y: 0
  point in direction 0
  clear
  repeat 10
    show
    set COIN to pick random 1 to 2
    if COIN = 1 then
      switch costume to HEADS2
      wait 0.5 secs
    if COIN = 2 then
      switch costume to TAILS2
      wait 0.5 secs
    hide
          
```

Lesson 3.1 Flip a Coin
by sbergen33

v371

COIN 1



Notice the use of the IF ____ THEN ____ section and the new command SWITCH COSTUME.

One of your assignments for this week is to modify this exact 3.1 program so that it flips 100 times and counts how many heads and how many tails out of 100.

Yes, when you grab it from my library, you get the benefit of my coins for free!



The next program uses random numbers to simulate rolling dice. This program is marked Lesson 3.2 and you will also need to get it from my library. A segment is drawn by the arrow each time it rolls a 7 just to give you a visual. Not sure if you know this but when you roll two dice, the most likely outcome is "7" and it comes out a "7" approximately 1/6th or 16.67% of the time.

The screenshot shows a Scratch project titled "Lesson 3.2 Roll Two Dice" by sbergen33. The project has three variables: "Red Die" (value 4), "White Die" (value 2), and "Total" (value 6). The code block is as follows:

```

when green flag clicked
  pen down
  set pen color to 199
  set pen size to 3
  go to x: 0 y: 0
  point in direction 0
  clear
  repeat 100
    set Red Die to pick random 1 to 6
    set White Die to pick random 1 to 6
    set Total to Red Die + White Die
    wait .5 secs
    if Total = 7 then
      move 30 steps
      turn 30 degrees
  
```

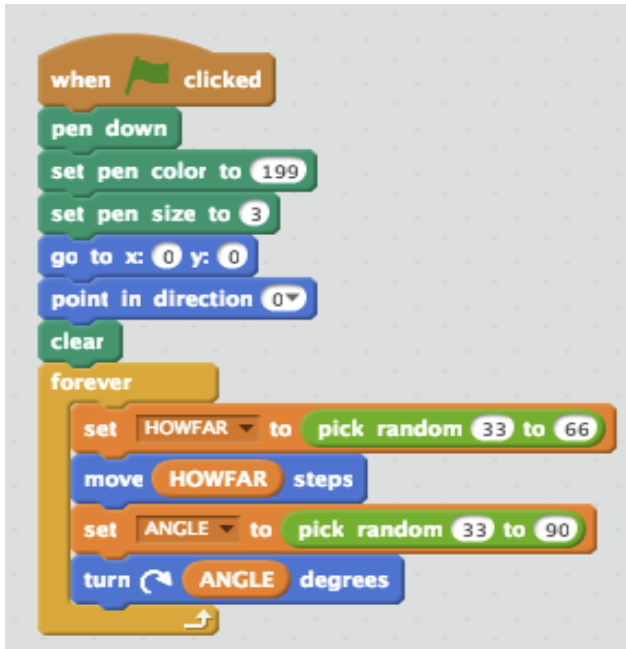
The visual shows a red arrow starting at the origin (0,0) and pointing downwards and to the right, indicating a roll of 7. The arrow is drawn with a red line and a purple arrowhead.

One of your assignments for this week is to modify this program 3.2 so that it counts how many 7's are rolled out of 100 times and how many 2's are rolled out of 100 times and then to report these two facts to the user. In order to get a "2" you have to be super-lucky and get a "1" and a "1" called "snake eyes."

Bonus/Extra Credit -- add costumes for pictures of dice and modify the dice program so that you see the dice. To simplify, just do ONE DIE with 1 to 6.



The next random program (Lesson 3.3 Random Scribbling) is one that randomly scribbles on the screen.

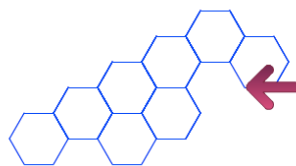


What is cool about this program is that eventually (about 15 min) the screen is solid red. I find it interesting to watch (like a fire place) in a side window while I am working on other things. Total randomness. Total chaos.

This is your third assigned program 3.3 to change. Can you modify this program so that it scribbles with a random color and with a random pen size?

Now can we turn chaos into something orderly? What about a program that draws a small hexagon of a variable size but instead of going around the hexagon 6 times, it goes around a random number from 6 to 11. Then it turns 240 degrees and then draws another hexagon

This is your an extra credit challenge program (let us call it 3.4) and one you will find immensely gratifying when you succeed, creating a tessellation of hexagons that are random and eventually cover the screen -- making order out of chaos (like a fractal). Below is a screen shot as this program works.



By the way, because of the anomaly with hitting edges, you need to keep the side of each hexagon small. And of course I am here for you with hints and help! I am

frustrated myself regarding the behavior of the Scratch language when it hits the edges. That is why you should keep your hexagons small.

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



Assignment 1A: Read this handout

Assignment 1B: Watch these videos (also posted on summercore.com/videos for redundancy)

Lesson 3 Template (3 min)

<http://www.youtube.com/watch?v=HRxh2yLNm8Y&feature=youtu.be>

Lesson 3 Random Numbers (6 min)

<http://www.youtube.com/watch?v=j4qNlyQW76Q&feature=youtu.be>

Lesson 3.5 Challenge

<http://youtu.be/NCUcEcZxxeM>

Assignment 1C: Schedule a 30 minute phone call or skype with me

~~Assignment 1D: Please continue to contribute several entries to our WIKI which is located at the tinyurl.com/sconlinec webpage (nothing of significance this week)~~

Assignment 1E: You need to modify 3.1 and 3.2 and 3.3.

I have marked the HW **with this color in the reading** to make it easier to go back and find. Don't forget to take 3.1 and 3.2 and 3.3 from my library, then remix and modify. Don't forget to make the programs public and shared that you want me to see.

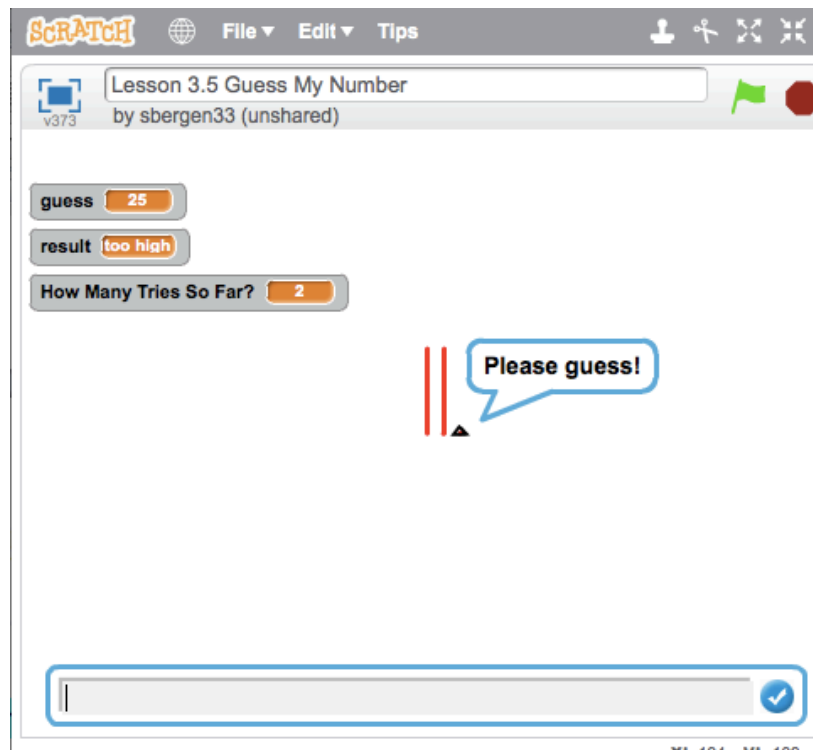
Extra Credit Challenge: You need to create a program called 3.4 Hexagons

One more bonus/extra credit challenge program which we will call 3.5. Again, I am mindful of you not spending more than 2 hours per week, so I give you this challenge with that caveat about time. I love programming and love creating these programs but I find myself having to discipline myself to get my necessary work of the day done and not allow writing programs take away from critical things I need to do.

3.5 Challenge.

Write a program that has the computer pick a number from 1 to 100 but not tell you.

Please watch the video at <http://youtu.be/NCUcEcZxxeM> if this interests you. Sample screen snapshot below. I am not sharing 3.5 with you.



Have a good week,

Steve

