LESSON 6: Nov 3 due Nov 10

First required assignment HW6.0
Your team picks one of these programs from teachers Jeff, Ian or Ruth written by kids and writes a one paragraph review/analysis of it on our Collaborative Document. You choose on page 9 of the Collaborative Doc and each person contributes to the review/analysis. Please "be proactive" and choose one and then tell your partners, but please check the Collaborative Doc to make sure it has not been taken yet. Do not wait for your partners to decide. Someone needs to be "be proactive" and take charge! Then you all review and analyze!

JEFF'S STUDIO (from Kinkaid School, Houston TX -- we listened to Jeff on video last week; I have chosen 5 of Jeff's programs from his sixth graders, but if your team wants to choose a different one, that is fine -- the URL for his studio is http://scratch.mit.edu/studios/303333/)

CHOICE 1: BEAUTY SPA
http://scratch.mit.edu/projects/15076145/

CHOICE 2: CATCH THE ORANGE
http://scratch.mit.edu/projects/15067170

CHOICE 3: THE MAZE
http://scratch.mit.edu/projects/14997088

CHOICE 4: BASKETBALL SHOOTDOWN
http://scratch.mit.edu/projects/15020980/

CHOICE 5: GIGA THE HORSE TAMER
http://scratch.mit.edu/projects/14642647/

IAN'S STUDIO (from Milwaukee WI) took this online course last year and is the technology teacher with Milwaukee Montessori School. These are a few examples of storytelling exercises done by his 5th and 6th grade students using Scratch. This was a project in which students had to tell a story about the dangers of multitasking with electronics. They were expected to include certain storytelling and technical requirements.

CHOICE 6: ELECTRONIC MULTITASKING MOVIE PROJECT
http://scratch.mit.edu/projects/2860149/

CHOICE 7: MULTITASKING ASSIGNMENT
http://scratch.mit.edu/projects/2860154/

RUTH'S STUDENT (from Duchesne School Houston TX) is named Mimi and she was a 4th grader when she wrote this program last year. Ruth then helped her win a coding award at the http://codeorg.tumblr.com/post/81593199113/sotw3 website. Ruth took this online course last year.

CHOICE 8: RAINBOX MIX
http://scratch.mit.edu/projects/18209193

Mimi says she had only heard a "teeny" bit about code until her teacher recently introduced computer programming. As Mimi's classmates were still making shapes and letters with **Scratch**, she put in extra hours at home every day to build an entire video game with 10 levels. Now, she's on a roll.
"Coding is fun and useful. You can learn how to fix your computer if something goes wrong. You can create and learn new things."
What would you tell other girls?
Girls should code too because they are just as good as boys!
What's down the line?
When I grow up, I think I'll be able to do lots more on computers and that they will be even smaller. I want to be an artist, programmer or some kind of doctor -- in that order.

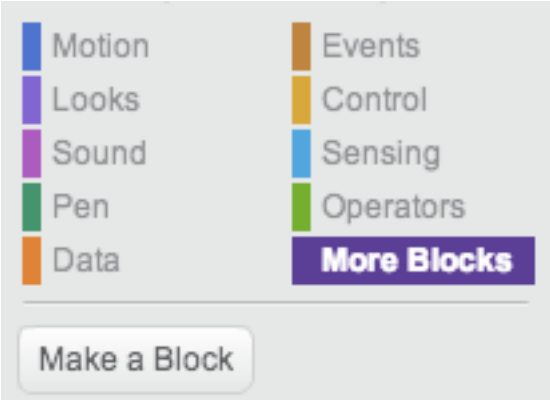
Linda	Technology, grades 2-4 -- La Jolla Country Day School -- CA	scratch.mit.edu/users/torreylin	ca
Cassie	Media Specialist -- Le Jardin Academy -- HI	scratch.mit.edu/users/mscaldarone	hi
Marti	Ed-tech, PreK - 8, HS, parents' groups Georgetown Day School -- DC	scratch.mit.edu/users/MartiW	dc
Loren	K-4 -- Curtis School -- CA	scratch.mit.edu/users/lasboes	ca
Majken	Lower School Principal -- Le Jardin Academy, HI	scratch.mit.edu/users/odatage	hi
Natalie	5th and 6th -- The Hockaday School -- TX	scratch.mit.edu/users/nbravo	tx
Victoria	Chinese for Grades K-5 -- Le Jardin Academy -- HI	scratch.mit.edu/users/vschina2003	hi
Karen	Technology Integration Specialist -- Hockaday -- TX	scratch.mit.edu/users/krob27	tx
Tricia	Elem. Curriculum Specialist -- Academy of the Holy Names -- FL	scratch.mit.edu/users/tdieck	fl
Elizabeth	Librarian for Grades 2-4 -- Rodeph Sholom School -- NY	scratch.mit.edu/users/eatshaw	ny
Gail	5th and 7th grade -- River Oaks Baptist School -- TX	scratch.mit.edu/users/gwatkins7	tx
Marge	Pre-K to 8 Library, Grade 4 Reading -- Dedham Country Day School -- MA	scratch.mit.edu/users/mjf2180	ma
Amanda	Middle School Science teacher, Rodeph Sholom School, NYC	scratch.mit.edu/users/mscarella	ny
Wally	K-12 Innovation Lab -- Columbia Independent School -- MO	scratch.mit.edu/users/Orangepierre	mo
JoAnne	PK-4 Academic Technology -- University School of Milwaukee -- WI	scratch.mit.edu/users/technewbie	wi

if you need the email addresses of partners, please send me a quick request

Next Topic

We are going to learn about BYOB this week.
This acronym stands for Build Your Own Blocks.

If you look at the bottom right of the Scratch color choices, you will see it say MORE BLOCKS in Purple.



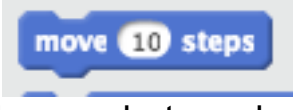
When you make a new block, you are adding a new word to the Scratch language or defining a new procedure where some work is going to happen.

So I can make a block to build a square of any specified size.
In this first required 4 min video at http://youtu.be/P05EMU9sqSk I am building a block called SQUARE and using it to achieve Spinning Squares.

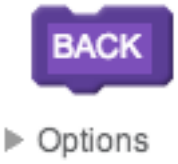
Or I can make a block to create a new command. Or I can make a block that handles the question/answer dialogue with the student in a quiz program.

Once again, the BYOB feature of Scratch makes it into a real computer language.

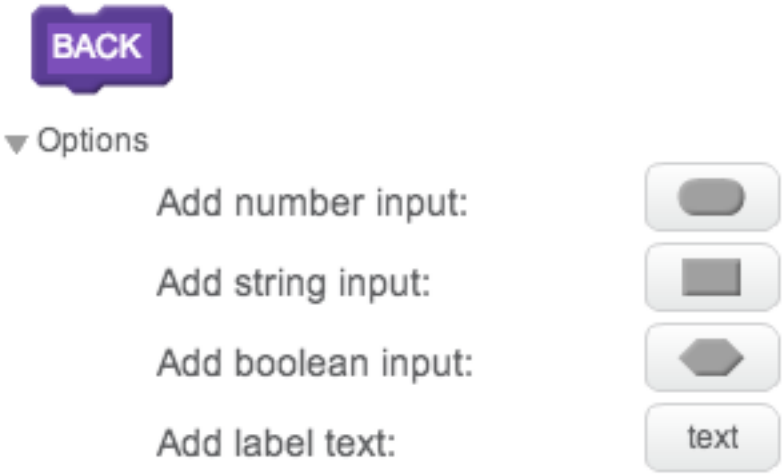
For example, we have the MOTION command



that we have used since our first lesson, but we do not have one that GOES BACKWARD 10 STEPS. So we use MORE BLOCKS to create one, even though we could put a negative number in front of “steps.” When it says MAKE A BLOCK, we choose BACK and then notice there are OPTIONS below.



When we click on OPTIONS, we get several choices, each with a purpose



The first 3 are called INPUTS and they allow us to "pass info" to the new block called BACK. For our purposes now, we want the first type (numeric) so that we can issue commands like BACK 30 or BACK 140. Yes, I know we can MOVE -30 or -140 but I want to pretend we cannot and want to create this NEW command called BACK. This optional 7 minute video at http://youtu.be/4pNpcn2R1Ck takes you through building the new COMMAND called BACK. It also has a section on the BACKPACK feature for those of you whom I have not yet shown via screenshare.

Or we might one day create a block called REVERSE that would take a string and reverse the order when we type the command REVERSE (any word).

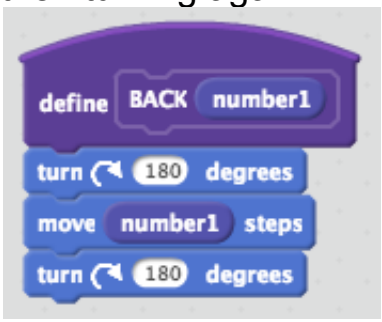
Boolean refers to True or False and that is yet another input, e.g. we could say RESPOND (X>Y) where X>Y is either true or false.

And LABEL TEXT allows you as programmer to put some comments or notes about this block for your future reference or that of someone else if you are on a programming team.

So for our BACK block, we choose NUMERIC and it would look like this:

If you prefer a different variable name to "number1" you can right mouse click on the BACK command under MAKE A BLOCK and change the variable name.

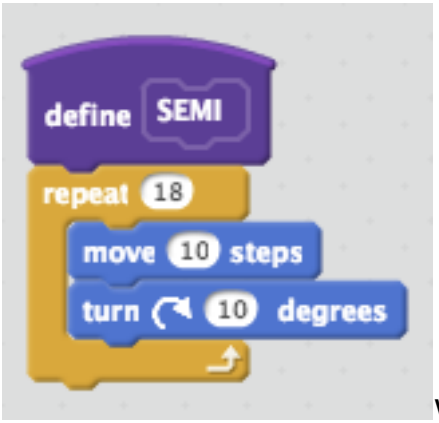
We now put in the script for this command -- turning 180 degrees, moving the specified number of steps and then turning again.



and we now can go back to our main program and issue commands like

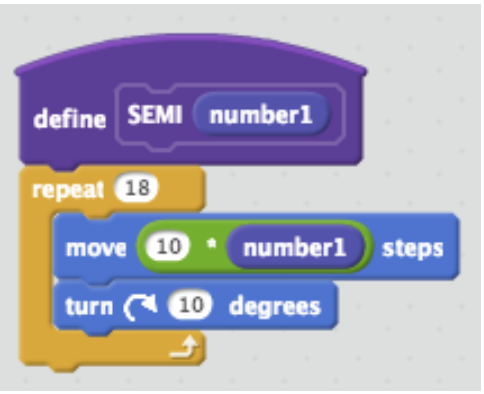
and everything acts as if Scratch has a new command!

How about a block that draws a SEMICIRCLE which can be useful when drawing letters of the alphabet like "S" or "C" or "G"



which results in

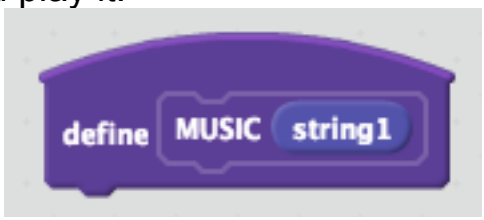
Want to make the SEMI block fancier?
How about a numeric input that specifies whether the semicircle is bigger or smaller than one we just drew? We can EDIT the BLOCK called SEMI to have a numeric input and then use NUMBER1 as a multiplier for the number of steps.



so SEMI .5 is  and SEMI 1.5 is 

The fact that both BACK and SEMI use the variable NUMBER1 which was made by the system is not a problem, since it is a "local variable" used internally when the programmer issues the command.

For another example of a BLOCK with a STRING INPUT, consider how useful it would be to have a BLOCK called MUSIC so that you could type in the first few notes of a song and it would play it!

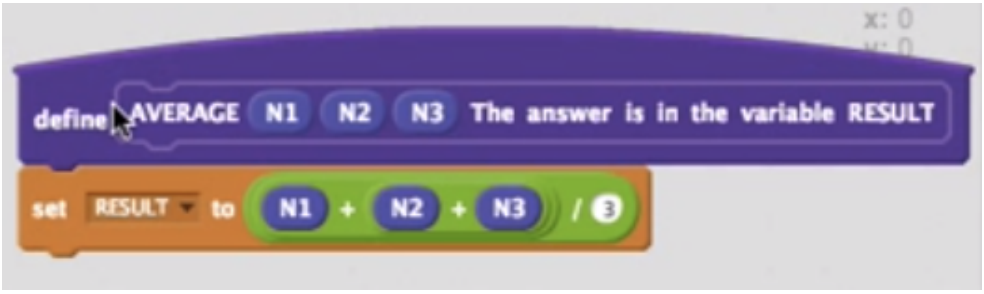


If you had this block working (not impossible to write) then you could put in your program

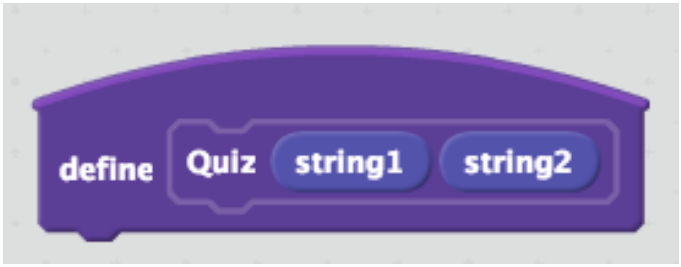
and it would play the first 7 notes of *Doe A Deer*, one of the few songs I remember from my piano playing days as a teenager ;-)

Or you could have a VOWELS block that would count the number of vowels in a string.

Or you could have an AVERAGE BLOCK that automatically finds the average of several numbers. Here is a required 5.5. minute video on building the block called AVERAGE -- http://youtu.be/l4Qzw3j_TqE -- using three numeric parameters. Hopefully this video will solidify your awareness of BYOB.

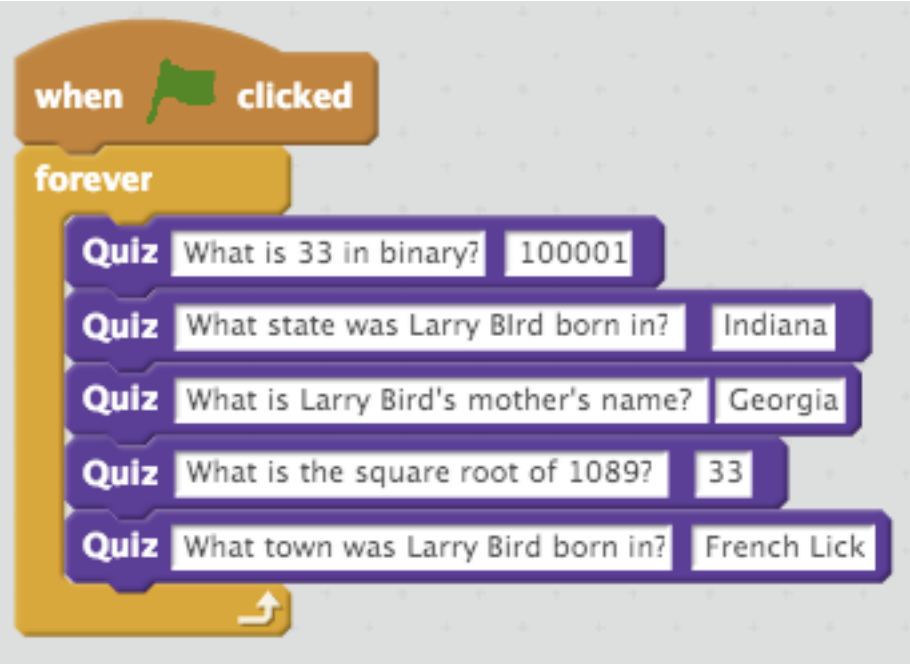


Here is one last example that you will weave into your 6.1 HW so it is the most important example. I am going to use the BYOB feature to create a quiz game that will ask a bunch of questions of the user.



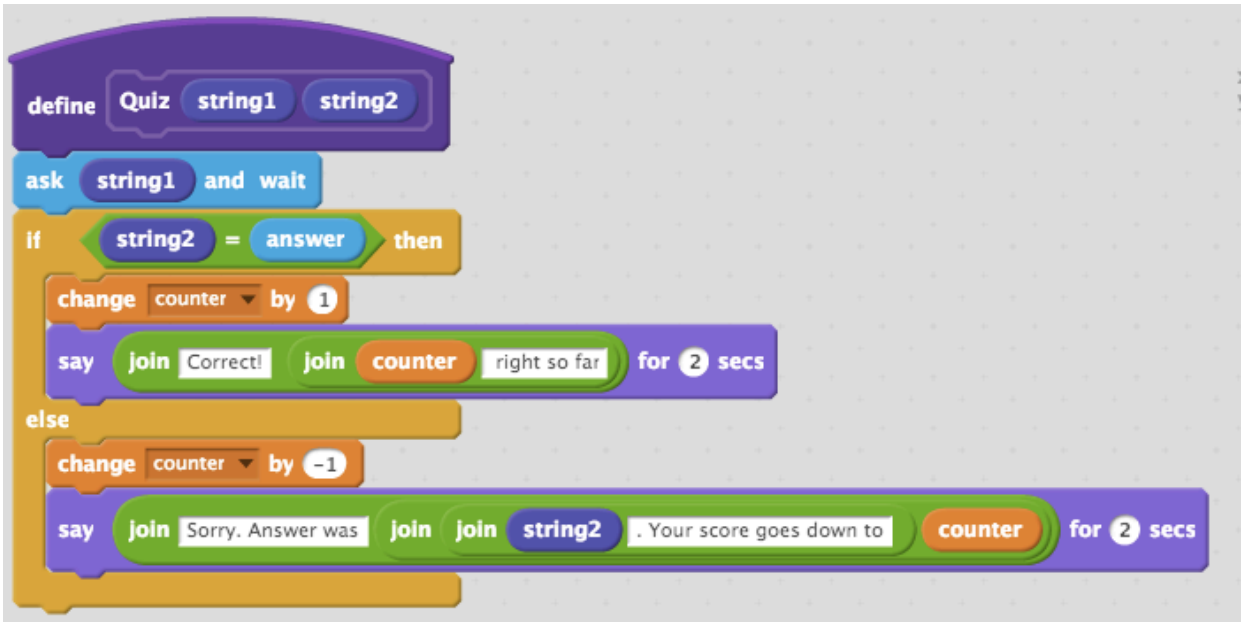
The two variables STRING1 and STRING2 are called PARAMETERS. We are passing these parameters from the main program to the BLOCK and saying “hey Block, please take charge of asking the question called STRING1 to the user and evaluate what he or she responds based on the answer I am giving you in STRING2."

One more point of advocacy regarding BLOCKS. It allows you as the programmer to keep your code shorter and more efficient. The code I have written for my quiz program would have to be replicated 5 times in my main program if I did not have blocks. Just imagine if you were charged $1 per line of code! Efficiency in coding is a plus.



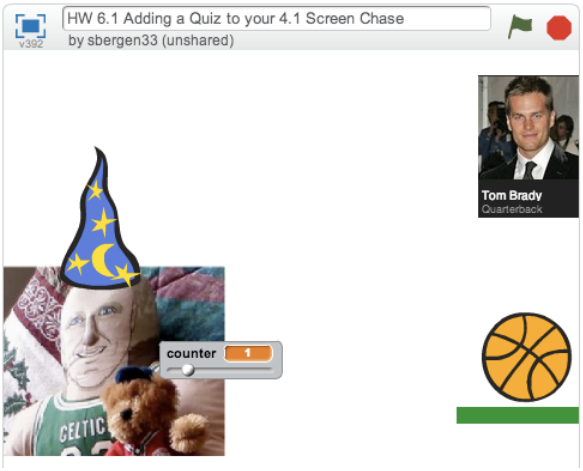
Instead, this is my main program where I have my five questions. The block called QUIZ takes care of all the work. In other computer languages, what we call blocks in Scratch might be called SUBROUTINES or PROCEDURES.

Here are the details of what goes on within the block called QUIZ.



Notice how the computer asks the question called STRING1 of the user and then evaluates whether STRING2 match ANSWER, either adding or subtracting a point from the user's score via the variable COUNTER.

Now using the COUNTER, you can do what you want on your screen. I have chosen to program a basketball to start bouncing and eventually reach Tom Brady on this screen.



The script for the ball is based on the script that one of Jeff's students (from Houston) used. Even though I can't say I understand it 100%, I can now use it effectively and want you to do the same. I have programmed the use of the COUNTER to make the ball bounce a little higher each time you get one quiz question correct. I want you to do something similar in the context of your program, bouncing a fish, a volleyball or an object from Downton Abbey.

Last week, I shared an optional video on the bouncing ball that you may not have watched due to time constraints. This week, it is required since you will be using it in HW 6.1 – **http://youtu.be/Aq8WJGP2wQs** that shows you how Jeff's student created the bouncing ball. He got the script online from another scratcher by searching within the Scratch community. The central idea of the descent of the ball is that it "falls down" a little bit more each nanosecond, perhaps 2 pixels in one nanosecond, then 3 pixels in the next nanosecond, then 4 and so on, creating the illusion of gravity. **Please work at understanding this!**

Next item

Finally, let us learn about BROADCASTING a MESSAGE -- another new topic we have never discussed before but I have shown some of you via screenshare.

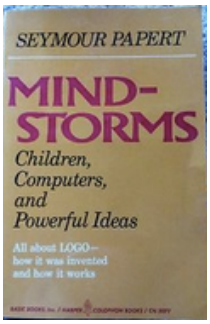
If you look under EVENTS you see 3 commands that involve the word BROADCAST.

This idea is that this command gives us a method for Sprite #1 to interact with Sprite #2. For example, I could take my Tom Brady program and change it so that when Tom goes to one of the corners, he calls one of the players and "broadcasts" a message. This way that player and ONLY that player chases him.

When you click on the triangle for any of the above commands, you can create a NEW MESSAGE of your choice.

The essence of the BROADCAST command is that we have a different way for one of the programs under one of the Sprites to begin. In the old days (e.g. a few weeks ago), every program under every Sprite would begin when the GREEN FLAG was clicked or perhaps when a certain variable or flag changed a certain value. Now a Script can begin when another Sprite "yells at it." So if I had Sprites named Larry, Moe and Curly, I can have the script for Larry begin when we click the green flag, but the scripts for Moe and Curly don't begin until Larry yells "Moe" or yells "Curly." Or you can have Larry broadcast "MoeCurly" and then those two scripts begin simultaneously.

Very, very powerful stuff and fun stuff which makes me think yet again of Seymour Papert's Logo book called *Mindstorms*: *Children, Computers and Powerful Ideas*.



I may have told you this before, but reading this book back in 1982 -- when I was working as a programmer for a company called The Williamson Group in Cambridge MA -- was one of the things that made me quit my job and start the teacher training company first called ***The Teaching Company*** that then became ***Summercore***.

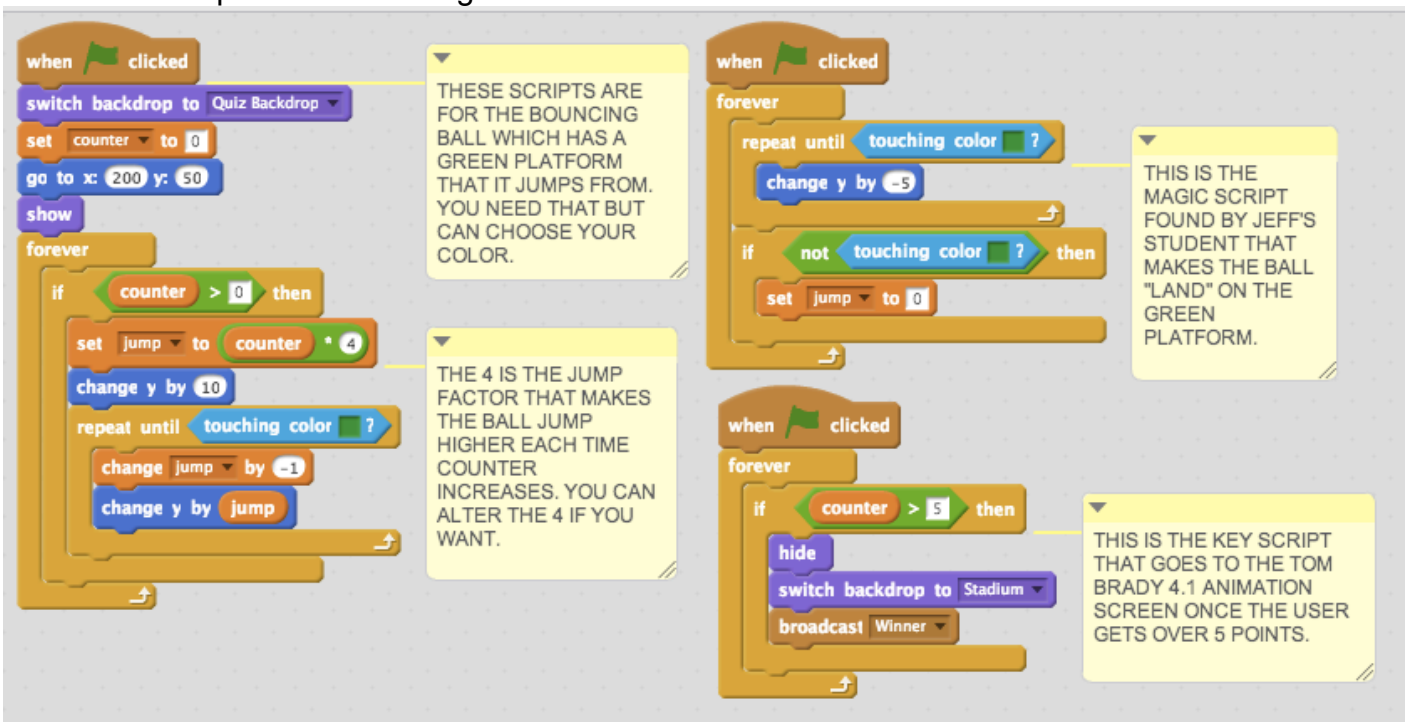
In my program called HW 6.1 Adding a Quiz to your 4.1 Screen Chase, you will see all of these elements. You can remix the program and use your backpack and move any scripts you want into your own 4.1 Screen Chase (actually 5.2 project which enhanced 4.1 with scrolling text) which will now become 6.1.

So your HW 6.1 is an enhancement to your 4.1 project (actually 5.2 project)
When done, I want you to have your 6.1 include
• a bouncing ball or bouncing anything
• a quiz program that keeps track of points using BLOCKS
• the reward of seeing your 4.1 Screen Chase animation happen after a certain number of points are scored using BROADCAST
• a scrolling message using the technique shown in Lesson 5

Please send an email to your partners and me when you are ready for us to see your 6.1 creation.

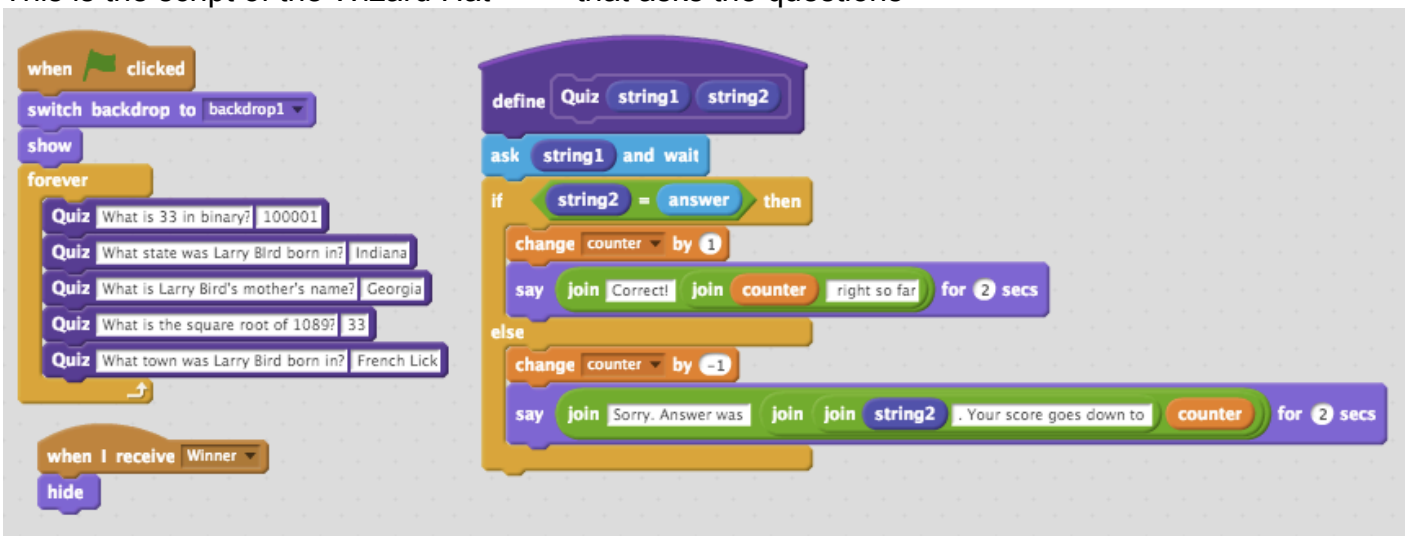
On the next two pages – to help you – I am including the scripts of the bouncing ball and wizards hat from my 6.1. Please make this program your own by doing your own thing with these techniques in your own creative way!

Here is the script of the Bouncing Ball  that animates more and more based on the counter.

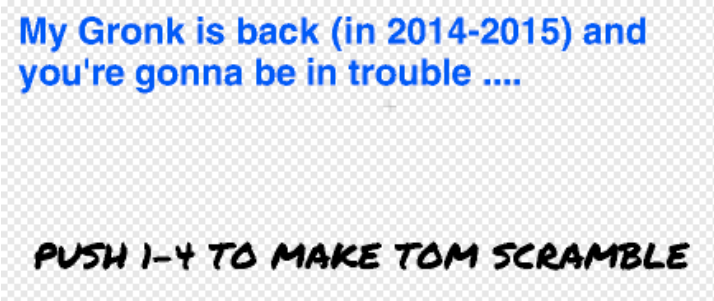


Try your best to understand the script on the left. Pretend that COUNTER = 2. This makes JUMP start out as 10. So in the bottom REPEAT loop, it changes Y by 9, then 8 then 7 until 1 which is why the ball GOES UP. Then JUMP is -1 so it descends 1 pixel in the first nanosecond, then descends 2 pixels in the second nanosecond, then 3, then 4 which means it speeds up until it touches "and lands" on the green. I am in awe of whomever was this clever to first program this!

This is the script of the Wizard Hat  that asks the questions



Here is the script of the SCROLLING TEXT



Have a good week. One more lesson to go everyone after today! Our last lesson will be Monday 11/10 and our course officially ends 11/17

phone = 781-953-9699
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Email = sbergen33@gmail.com

p.s. for any compulsive types, here is an OPTIONAL bonus problem for week 6

HW 6.2: Optional and Truly Challenging

Create a program that has two lists, one for SUIT and one for CARD. The four items of the SUIT list are Spades, Hearts, Diamonds, Clubs. You then create a BLOCK called RANDOMCARD which picks a random card. Now use this block to pick 5 random cards making sure there are no duplicates. That is the toughest part!