

**LESSON 4: Assigned 2/3 and due 2/10**

Vocabulary: background, character, bitmapped graphic, forever loop, key pressed command, new costume procedure, point toward command, play sound command, switch costume, vector graphic

First, a new twist to our course. I am matching you up with a partner and there will be various team requests over the next 5 weeks of the course. I have worked hard with a lot of research to match you up with the nicest person in the course.

NAME	SCHOOL and GRADES	SCRATCH LIBRARY	PARTNER
Andy	Phoenix Country Day AZ * PK-4	scratch.mit.edu/users/ndbro1	Marc
Angela	Village School CA *TK-6	scratch.mit.edu/users/AMackenzie	Terri
Anita	Canterbury School IN *5-8	scratch.mit.edu/users/anitabates22	Ien
Betsy	Lincoln School RI *K-6	scratch.mit.edu/users/lincoln	Jayme
Brian	Canton Country Day School OH *PK-8	scratch.mit.edu/users/MrBortz	Jennifer
Ian	Milwaukee Montessori Sch WI * PK-8	scratch.mit.edu/users/ianastas	Jeff U
Jayme	Village School CA *PK-6	scratch.mit.edu/users/JaymeJ/	Betsy
Jeff U	Rumson Country Day School NJ *5-8	scratch.mit.edu/users/mvhdad2014/	Ian
Ien	Berkeley Carroll NY * MS Sci 5 & 8	scratch.mit.edu/users/LucyLucyLucyLucy	Anita
Jennifer	Brimmer and May MA * K-12	scratch.mit.edu/users/jakunkel	Brian
Marc	JVL Wildcat Academy Charter Sch NY	scratch.mit.edu/users/magicmarc	Andy
Terri	Ensworth School Nashville TN * 1-5	scratch.mit.edu/users/schulzt06	Angela

I will connect you with your partner via email.

**HW 4.0** First HW assignment is to BROWSE or CHECKOUT the Scratch Library of your partner and send her or him an email about something that caught your eye or you found intriguing. No need to cc me. Yes you should FOLLOW your partner.



Each week, there will be another partner assignment. We will keep the same above color code partners for the rest of the course and you will be happy since I did such a good job of matching you up with the nicest person in our course ;-)

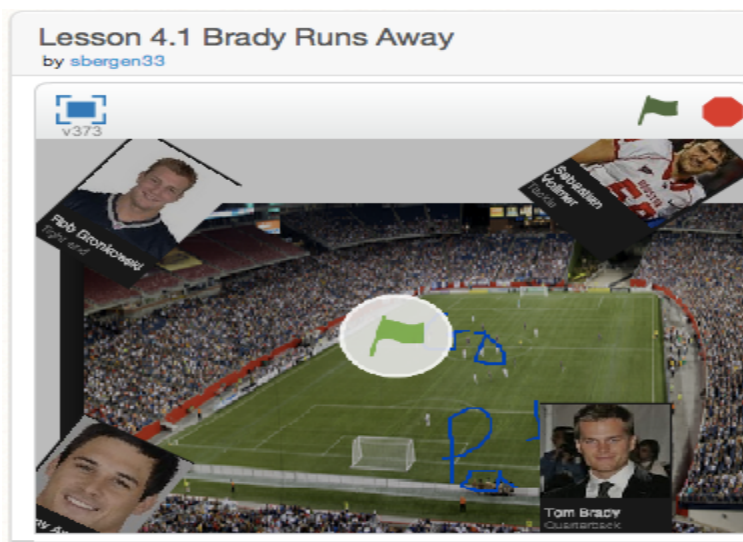
## Okay, now for Lesson 4.

We are ready to pull our skills together and create something that involves multiple Sprites. I want you to start by watching this video before you continue doing any more reading -- two minutes of what I call **Brady Moves No Coding**.

<http://youtu.be/muFZBu6i6J8>

Because I am a bit of a crazed Patriots fan and so sad about my team not playing in the Superbowl yesterday, I have used pictures of 4 football players, but when you do this, you can use any 3 or 4 objects you want. What you should observe from the video above is that

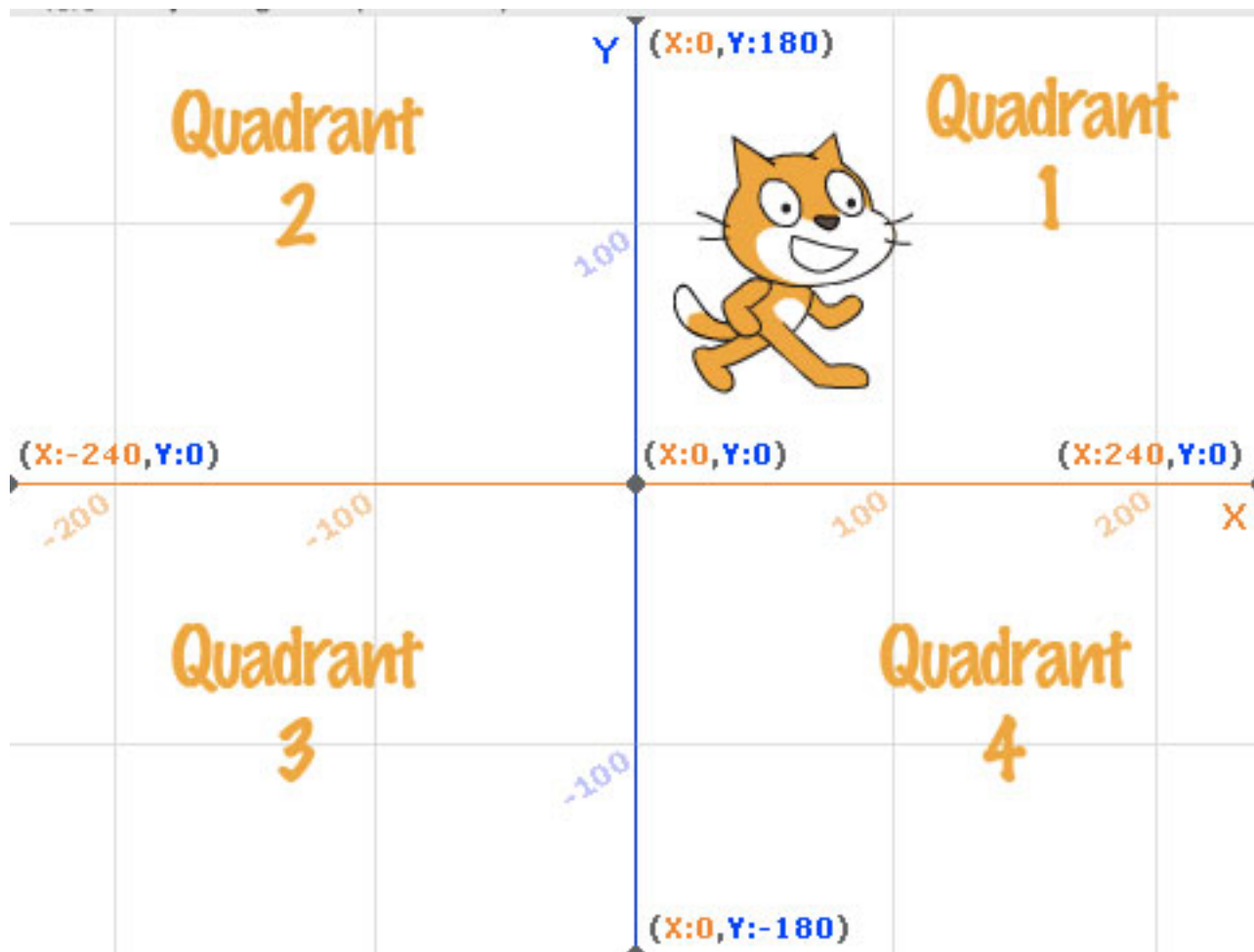
- a) all the Sprites are moving simultaneously
- b) the leader object (Tom Brady) moves when the operator presses a key (1,2,3,4 for the 4 quadrants of the screen)
- c) there is a sound (my dumb voice) you hear each time Tom moves
- d) the other 3 Sprites are constantly heading towards Tom no matter where he goes on the screen



Here is a short 3 minute video called SCRATCH SIZE OF GRAPHIC showing the difference between vector graphics and bitmapped graphics.

<http://youtu.be/THtXxl93zGY>

Reminder of the dimensions of the screen with the 4 quadrants labeled.



Okay, so here are the new commands and procedures for the week.

**Adding characters or a background from a file on your computer.**

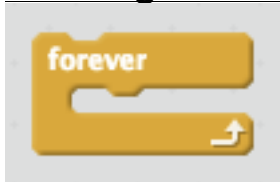
You will need to be able to make screen snapshots on your PC or Mac.

See the bottom of [summercore.com/tips](http://summercore.com/tips) for step by step help if this is not in your skill set. Or I will help you one on one whenever you arrange for us to talk.

This 18 minute video called Brady Runs Away takes you through the Lesson 4 content. You can watch it before or after you read through this PDF, whatever you prefer. This video is the essence of lesson 4, working with multiple Sprites.

<http://youtu.be/7rVWA-P1Cyw>

### **Creating a FOREVER loop:**



Why this command? Because in creating this game, you need the program to constantly be checking to see if the human has pressed 1,2,3 or 4 to move Tom Brady into quadrants 1,2,3 or 4.

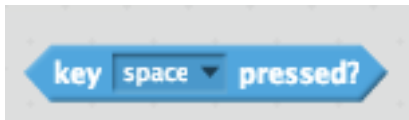
We have used this before



Why this command? Because in creating this game, we need to check to see IF the human presses "1" and if so, we need to have Tom Brady with pen up move into quadrant 1. And of course we will need a total of four of these IF commands, one for each quadrant.

### **New SENSOR command to detect if a key has been pressed.**

This is a new one and is essential. Notice the shape is a hexagon (6 sides) and notice that it will "fit" into the IF statement above.



So this is why Scratch is a "powerful computer language" since it is allowing us as programmers to detect if the human has pressed a certain key. Under the triangle where it says SPACE you will see all the keys anyone might press.



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**New MOTION command to make one Sprite point towards another Sprite**

The next one is also new and will be put into the script for the other 3 Patriots.



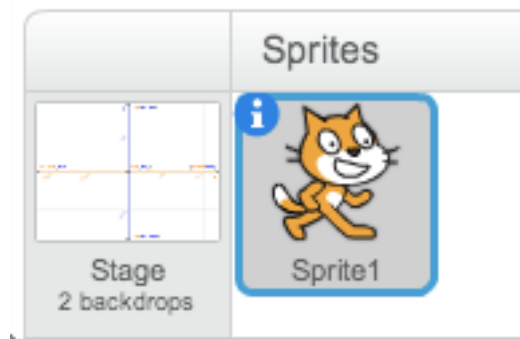
When you click under the triangle, you will see each of the other Sprites you have made.

The next procedure is at the bottom left of the screen.

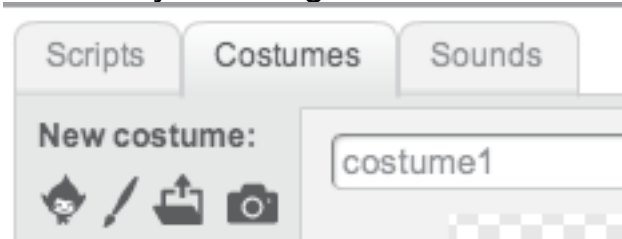


This is where you will see all of the SPRITES in your program. The section that says NEW SPRITE allows you to add a Sprite from the library or from a file. It is my hope that you will pick characters of your choice as I have done, but if you get frustrated by screen snapshots, feel free to use the Sprites in the library.

When you look at the bottom left of your scratch screen, you will see



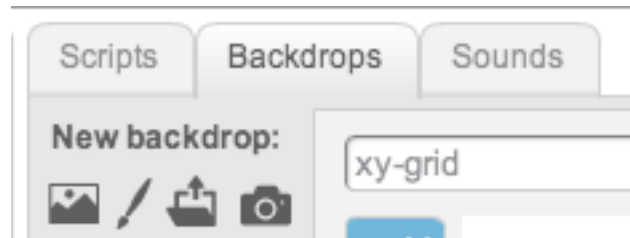
and the top of the screen will let you change costumes.





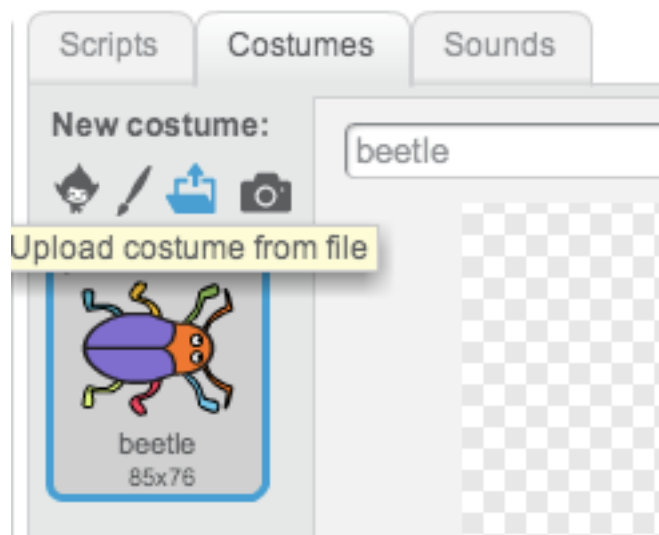
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But when you click on STAGE at the bottom left, the top of the screen changes to



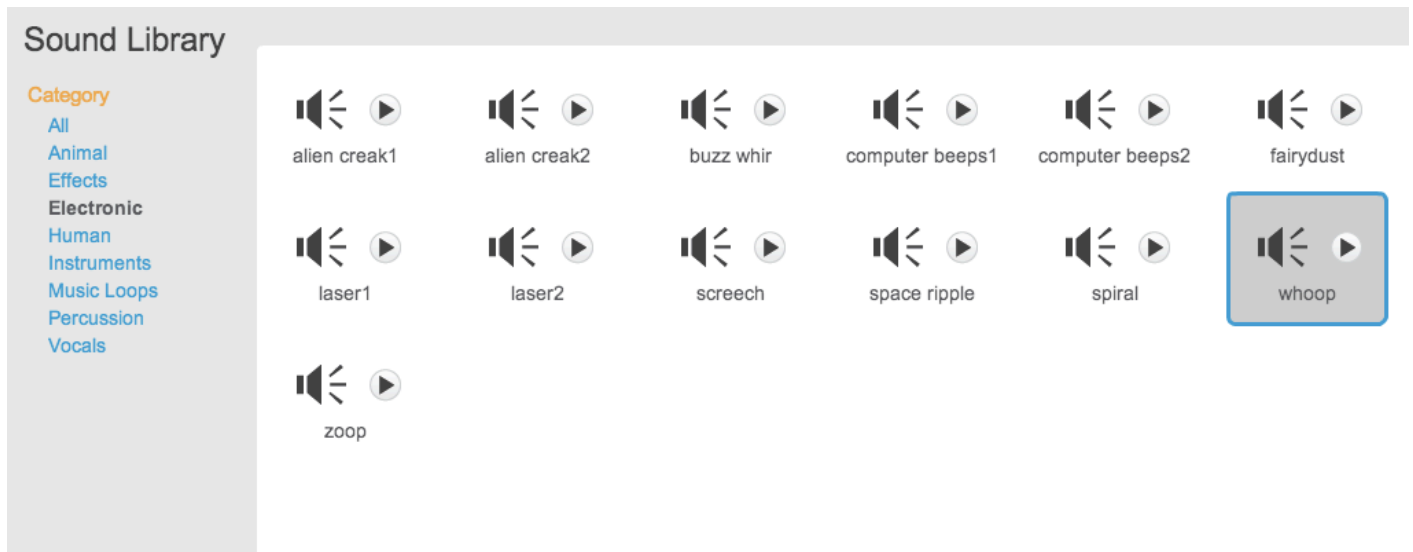
and you can add a backdrop from the library or from a file on your computer.

So the bottom left icon controls whether you are in COSTUME mode or BACKDROP mode. When in costume mode, you can change the costume, choosing from a file or from your library.

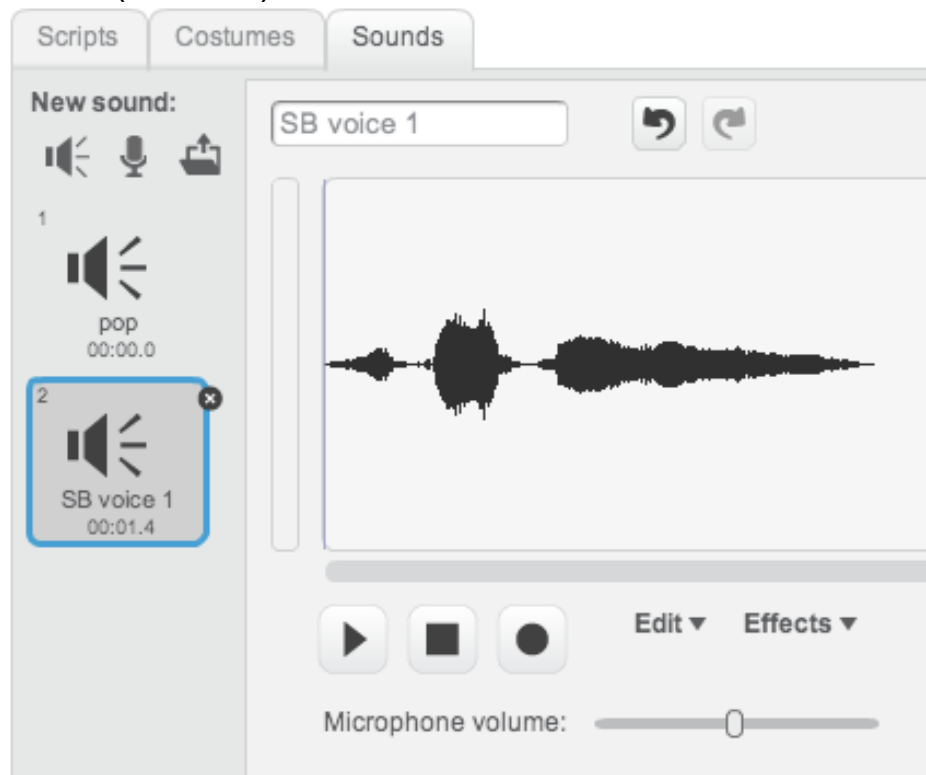


Notice that the THIRD TAB above says SOUNDS.

When you choose it, you can add a sound from the SOUND LIBRARY as you see on the next page.

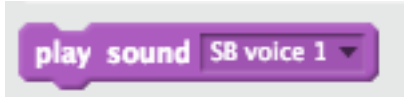


Or if you have a microphone on your computer, you can add a sound from your own voice and can name (and edit) the sound file.

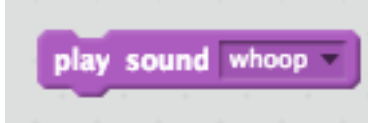


If you have never edited a sound file, it is one of the most empowering things to do on a computer, using CUT or COPY after highlighting a section of your recorded voice. So you use the mouse to highlight part of the sound file, then you CUT or COPY. Then you click within the sound file somewhere if desired and PASTE.

Here is the new command you will use in your TOM BRADY script, either with your voice such as



Or with a sound from the library



Okay. Got it? You pick the theme. You want to use US Presidents who are chasing George Washington? You want to use famous female mathematicians who are chasing Hypatia? You want to use famous computer people who are chasing Grace Murray Hopper (creator of the word "bug" in the 1940s). Your choice, but I want you to have fun and build this program on your own. This is why I will not make my Tom Brady program be shared.

I would like you to be creative and take the techniques of this lesson and do something interesting.

Maybe you can have several cars race across the screen.  
Maybe you can have several balloons drop to the ground.  
Maybe you can have several cats run away from a dog.

This lesson allows you to have several Sprites moving in different directions. Since you know about the RANDOM command, you can make your Sprites move at random speeds which I did not choose to do.

### **Other Ideas for making your program better than mine:**

- use GLIDE instead of MOVE
- have Tom move to a random spot in each quadrant instead of a fixed place
- have Tom (or whomever is your leader) have a different sound depending on whether in quadrant 1,2,3 or 4
- have the followers head towards Tom at different speeds'
- have a SPIN button that makes Tom (or whomever is your leader) spin
- use the faces of the 7 people in our class

Required specs: sound, motion, multiple Sprites, allowing the user to push keys during the program that results in something interesting happening on the screen.





Here are screen shots of the key components which you should understand now.

Tom Brady (or the leader of your group) has this script



Each of the followers has this script



### Another tip?

When you have a Sprite, the script belongs to the sprite. So when you duplicate the Sprite by right-mousing on it, you get the script to come with it. Then you can change the costume of the duplicated script. You cannot COPY a SCRIPT from one Sprite to another, but this duplicate trip might be useful.

**HW 4.1 Create your own innovative version of Lesson 4.1 and make it be SHARED. Send me and your partner an email when done so we can play it!**

Samples from people in this course from the past. The actual code and programs are posted in my studio/library with file names that begin with HW 4.1

Animals chase the apple in the upper left corner.



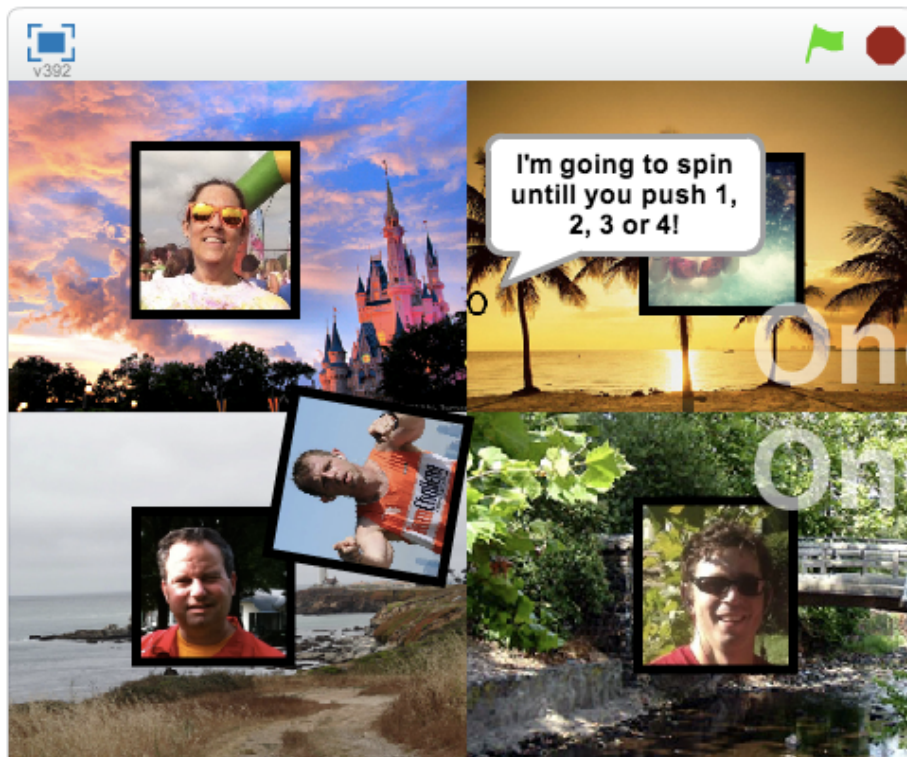


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Swimmers chase one swimmer but must beware of the shark.



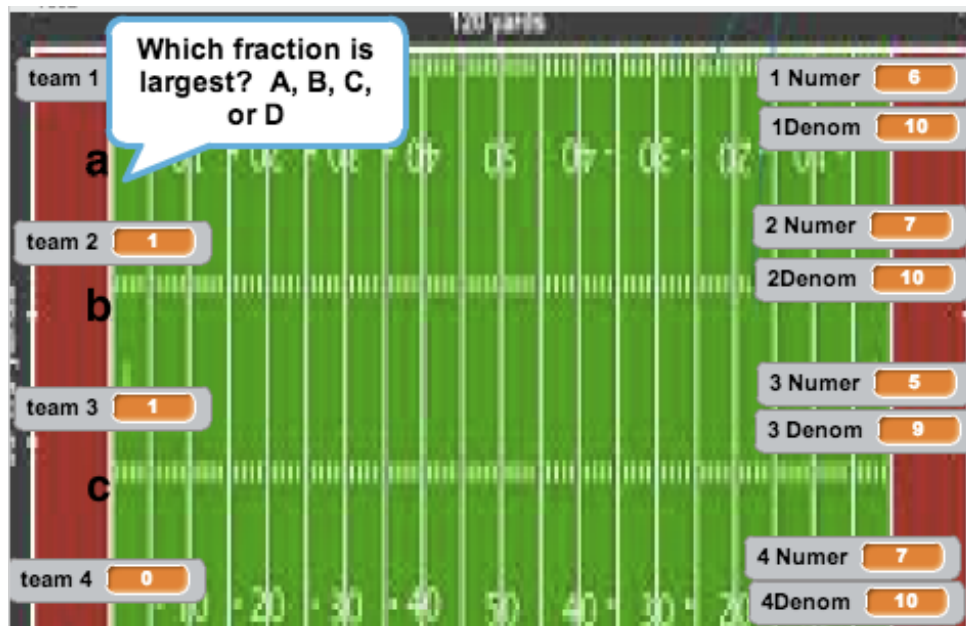
The spinning runner travels to the 4 quadrants upon the request of the user who pushes 1-4 to make the runner head in that direction.



Weather changes in the midwest.



Football Fractions race across the screen.



Please note that many of these samples use an additional technique called SCROLLING TEXT. We will get to in another week, but you are welcome to look at the code from any of these projects.

Steve 

Have a good week,  
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