Intro Section for Our First Lesson

Hello everyone,
This is our first lesson and I am excited to be teaching you and guiding you on this journey. Here are some important "starter" details that apply to everyone taking one of these courses.

1) I try to highlight in yellow in this PDF each web site, web link or video. This means that on SOME of your computers, you can just click on the yellow but on OTHER computers you may have to COPY the info in yellow and PASTE into a new TAB or new WINDOW to get to the link. In case you did not know it, the www is optional as well as the http:// when you enter a website, but in order to get the yellow links to work on a PDF I need to use the http:// notation.

2) Our weekly 30 minute one on one connections are scheduled to your convenience.
- • Each week on a Monday, I send you a PDF that contains 1 or more videos to watch and the weekly HW assignments.
- • Each week, we have a 30 minute 1 on 1 online meeting (just you and me) in which we use phone or Skype or Google Hangout and screensharing software (Team Viewer) so that we are talking and going over specific details and questions. These 30 minute sessions allow me to customize the content to the level best for you.
- • It usually takes participants 30-45 minutes to work through the PDF and the videos. This can be done any time of course.
- • The online meeting between you and me can be scheduled at any time that you request, seven days a week from 7am to 10pm NYC time. Yes, I am serious -- you can choose any 30 minute time slot during these 105 hours unless someone else has chosen that time. These online one on one meetings can be the same time every week or can vary each week -- your choice!
- • The HW assignment can generally be done in an hour but some people choose to put in more time.

So total time is estimated to be about 2 hours or so per week with much flexibility. Even though I connect you with a partner outside of the class, generally in another state, there are no prescribed sessions where everyone attends at the same time. This is what sometimes kills online classes since teachers have very individual and complicated time schedules.

3) The screenshare software we use is called TeamViewer and you can save a bit of time by going to http://teamviewer.com and choosing to download and install. Or we will do it together in our first or second session.

4) Weekly 30 minute conversations? My favorite algorithm for the weekly conversation is to always start with a phone call and then transition to skype or google hangout (both are free video conferencing) and teamviewer. Each of us is obliged to phone call the other at the exact specified time. This way if we don't talk, it is both our fault! These conversations are recommended but NOT required. No guilt if you miss one or more or choose not to take advantage of them. Different strokes for different folks!

5) Regarding logins and passwords, you will hear me say many times to record them in a notebook or a 3x5 card you keep in your wallet and to "practice redundancy" and put them somewhere else -- perhaps in a document on your computer or in a Google doc called PASSWORDS. Over 30 years and more of teaching teachers via Summercore, I can tell you that hundreds of times, people forget a login/password combination or they forget the email address associated. Please, please change your habits (if necessary) and practice redundancy!

6) The reason for getting a picture from each of you is not profound. I simply want all of you in this course to be connected by name, state and face. So hopefully by lesson 2 or lesson 3, I will be able to include a picture summary of "who's who" in this class. Later in the course, I will match you up with a partner (in a different state hopefully) and ask the two of you to do a team project.

7) There is a webpage called http://teachingcompany.com/f14 that contains ALL of the PDFs and clickable links for all the videos each week. It serves as redundancy to give you another way and possibly easier way to go to any of the PDFs or videos. Each week, I add the PDF and videos to this page and you will have access to this page forever!

8) We will have a Class Shared Doc where you type info and questions and others contribute. This doc also has a "who's who" section and a "homework summary section." Please contribute to our Shared Doc. You can either type some answers or helpful info about a few items or you can ask a question or you can improve the answer of someone else. You will love the fact that others are contributing to this (including me) and that this will be an organized summary at the end of our course! The web link for our Shared Doc will be posted on http://teachingcompany.com/f14 and at the end of this PDF.

9) I will post some of your HW samples on our Shared Doc. This helps connect all of you from different states and schools taking the same course. In addition, the samples from other people in the same course are helpful for you as you gain skills.

10) Regarding watching videos, I encourage you to take Piaget's advice and practice while you are watching, pausing when you need to and rewinding when you need to. Because the computer is more like a violin than a blender, you cannot be passive and just watch. You gotta do! How do you get to Carnegie Hall? Practice, practice, practice.

11) There is definitely a redundancy between the text in the PDF and the information on the videos. That is intentional and serves to reinforce information and to present it in different ways. You as a learner will do the necessary picking and choosing as you figure out the strategies that work for you.

12) You are the boss of our 30 minute conversations. You can and should direct me as to what you want help on. Or if you want to talk about classroom management with technology or a specific curriculum project you are doing, that is fine. As I learned from Bruce Springsteen, you are the boss!

13) Unscheduled phone calls? Fine! I can't always answer, but you have the green light to call me for ANYTHING at 781-953-9699 from 7am to 10pm seven days a week. Sometimes there are tech questions that need an answer right away and that is part of the service I am providing you for these three months!

14) Tech tip that some of you know and some of you do not? When on the web on a PC, you can use CONTROL + or - to magnify or demagnify. On a Mac, the same thing works with the COMMAND (⌘) symbol and + or - keys. But just on the web.

Hope this is all clear and so let us begin the course on the next page,
Steve

To get to Scratch Online you go to http://SCRATCH.MIT.EDU or just type SCRATCH into GOOGLE and do a search. If you are interested in the history of Scratch, it has evolved from 1.4 to 2.0 and now the most popular version which we will be using is the online version. Please do not use any other version but please stick with the online version at the http://SCRATCH.MIT.EDU website.

At the upper right you will see [Join Scratch] [Sign in]

Unless you have done so already, you should JOIN and use a simple username that will contain your library of programs that you will share with me (and eventually your students). So choose a username you are comfortable with, i.e. I might choose SteveBergen or MrBergen depending on what I wanted to give out to kids.

HW 1.0 -- Please put your username on our Shared Doc at tinyurl.com/f14coding

To make a new program you choose CREATE from the main menu then FILE and NEW. At first, you will encounter a tutorial called GETTING STARTED WITH SCRATCH which is excellent but optional.

Getting Started with Scratch
Want to get started with Scratch? Try this!

Watch me dance!
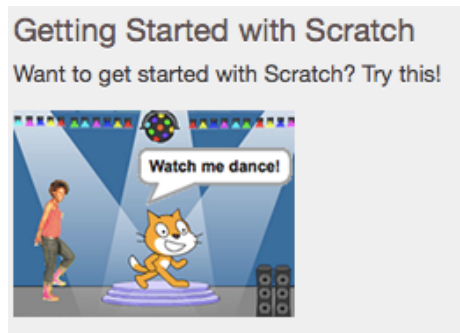
Once you click the X to get rid of the tutorial, you are ready to write your own program. Or you can choose NEW under the FILE menu.

Here are the first two starter videos to watch or rewatch whenever you are ready. You are in charge of your own learning style!
http://tinyurl.com/sc008sc (7 minute video) making a square (or triangle) and learning to use the interface

http://tinyurl.com/sc026sc 2 chunks in Scratch (3 minute video) to show how the ink comes out of the back of Cat's neck

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The left hand side with the cat is where your program will run. It is called the STAGE. The middle area shows the commands in smorgasboard style that you drag onto the right side where you build your program. Notice the 10 categories at the top of the middle area. When you click on each of the 10 categories, you will see the specific programming commands of that type below.
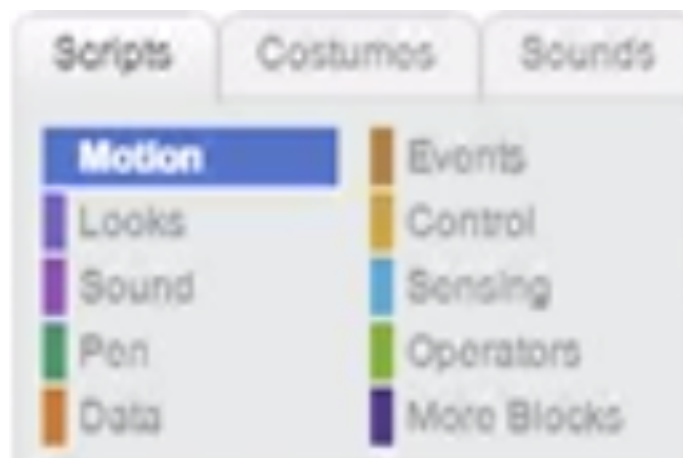
Each type (MOTION, LOOKS, SOUND, PEN, etc) has a different color and in a few weeks, you will get used to finding what you are looking for. Please observe for now

the 3 TABs above called SCRIPTS, COSTUMES and SOUNDS. We will use COSTUMES later in this lesson.

You take blocks out of the middle area and drop them into your programming area on the right. You can snap the blocks together or keep them separate for a while when thinking and planning. If you snap them together, then clicking any one (usually the top) will execute the program. You can separate them after they are snapped together. Our first challenge is to draw a square.

To run the program after you build the script, click on the first line of the script. To delete the entire program or any individual commands, drag from the programming area into the middle area.

To clear the screen, Use the CLEAR command ![clear] at the start of your program. Clear is in the PEN category which is green. To separate a stack, grab any block from the middle and the ones below it will come with you.

The CLEAR command "erases the stage" but does not move the CAT back to its

starter location. To do that, you need the ![go to x: 0 y: 0] command.

Also, you might want the CAT to reorient and face the same angle as when it

started. To do that, you need the ![point in direction 90▾] command.

Finally, if your cat is moving but not leaving ink, you might need to fix this with the

![pen down] command.

HW Exercise 1.1 -- Draw a small square and a larger square

Feel free to create a square first before watching my video or looking at the next page. Programming is like playing with clay or building a sand castle at the beach. It is great to try things and fine to make mistakes. Each mistake you make will lead to some good realization that will get you better. I promise you that one little mistake can cause the program to not succeed and when that happens, it is normal to be frustrated. But the joy of programming is that when you see the light -- whether you

figure it out yourself or because someone helps you, the logic is so wonderful! That is why programming is good for kids! It is a playspace of logic and precision.

Here are the dimensions of the Stage (480 x 360 pixels with 0,0 in the middle). You may not think it important now to know these numbers of 480 x 360 but trust me that it will be relevant later in the course and you can always come back to Lesson 1 to see these important numbers.
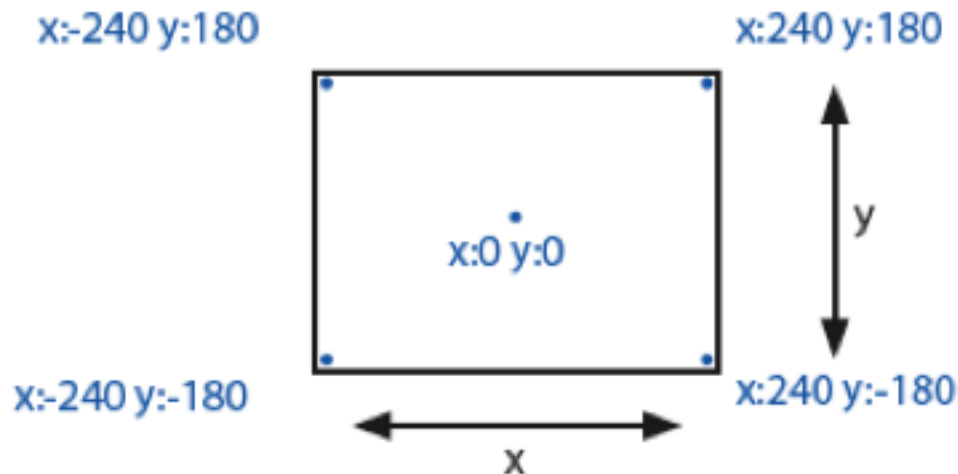
In this first week, I want you to gain comfortable skill with writing, modifying and preserving our first few programs on Scratch. I am going to use polygons as the focus since it adds a nice element of meaningful curriculum integration. Scratch does not work on an iPad so I am hoping you are all working on a laptop or desktop. Later in the course, we will look at Scratch Jr. or Hopscotch and/or SNAP (from Berkeley) that all run on an iPad. Most of the concepts we are learning in Scratch will transfer over!

You all know that a square has 4 equal sides and 4 equal angles of 90 degrees. So this program should make sense. You will find the brown REPEAT command in the BROWN section called CONTROL. You will find the blue MOVE command and the blue TURN command in the BLUE section called MOTION.

Observe that at the bottom right of the screen you will see [−] [=] [+] which magnifies or demagnifies the programming commands.

Also observe that to the bottom right of the STAGE you will see   x: 82   y: -104   which shows the coordinates of the CAT using the back of its neck as the coordinate point. To the right of the coordinates, you see the little triangle ◀ that gives you a larger programming area and makes the stage area smaller.
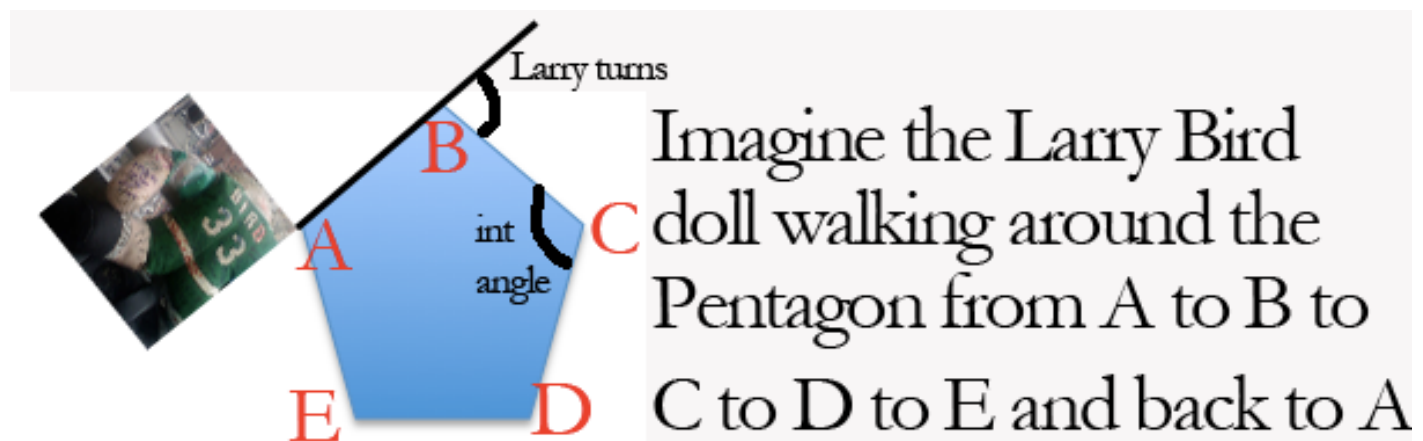
Hope you are doing well and practicing. Let us move on to a pentagon with 5 sides.

HW Exercise 1.2 -- Draw a small pentagon and a larger pentagon

You may not instantly know that a regular pentagon has 5 equal sides of 108 degrees but here's the trick that you will one day pass on to your students. If you draw a pentagon by walking it with your body, you need to make 5 turns that add up to 360 degrees since you return to where you started. Since 5 goes into 360 exactly 72 times then the angle you turn each time is 72 degrees. This is called the exterior angle as you see below where it says ⟨Larry turns⟩ and this means the interior angle is 180-72 or 108 degrees.

Imagine the Larry Bird doll walking around the Pentagon from A to B to C to D to E and back to A

Let me try with an example to make this clear, since many of you as teachers will have to explain this to your students one day! As Larry walks to each of the 5 corners of the pentagon and turns, the angle his body turns at each corner is called the exterior angle. You can see it marked at point B. Larry does this 5 times and gets back to his starting point, having turned his body 5 times on his walk. Since he ends us where he started, the total trip was 360 degrees. Since he made 5 equal turns,

then each one is 360 ÷ 5 or 72. Since the exterior angle was 72 that means the interior angle must be 108. Got it?

One more example, just in case or just to reinforce. If you walk thru a regular octagon ("regular means equilateral and equiangular") you are turning 8 times. Since the total is still 360 degrees, then each turn of your body is 360/8 or 45 degrees. So each exterior angle is 45 degrees, which makes each internal angle of the regular octagon into 135 degrees.

So let's set this as our focus for lesson 1, not because this is a math course, but because it is powerful, relatively easy and can be used to connect Scratch with math for your kids.

HW Exercise 1.3 -- Draw a small triangle and a larger triangle.

Now I will show you an enhanced program for doing the square. A common mistake is to not put the pen down or sometimes not have a color that is viewable. I love the way the REPEAT command snaps around other commands or you can just drop it and move a block of commands into its "mouth."

The purple SAY command and purple THINK command are in the LOOKS section. The green PEN DOWN and SET PEN COLOR commands are in the PEN section. The SET PEN COLOR command can be quirky so beware. As you will read later, that is why many people prefer the SET PEN COLOR to a NUMBER command.
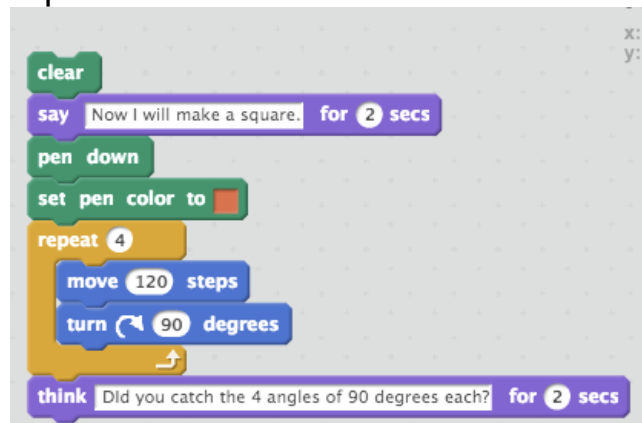

Now let us modify a few things to get a triangle. Why make your students use the SAY and THINK commands? The rationale is to get them to write and explain well, using proper English. That is the only reason that I have added these two commands, to model for you requiring your students to use quality English to enhance their programs.

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Below you will see the solution for a triangle so feel free to try it first before you look. Remember from before that when your body walks a triangle, you are making 3 equal angles that add up to 360, so each exterior angle must be 120 degrees.
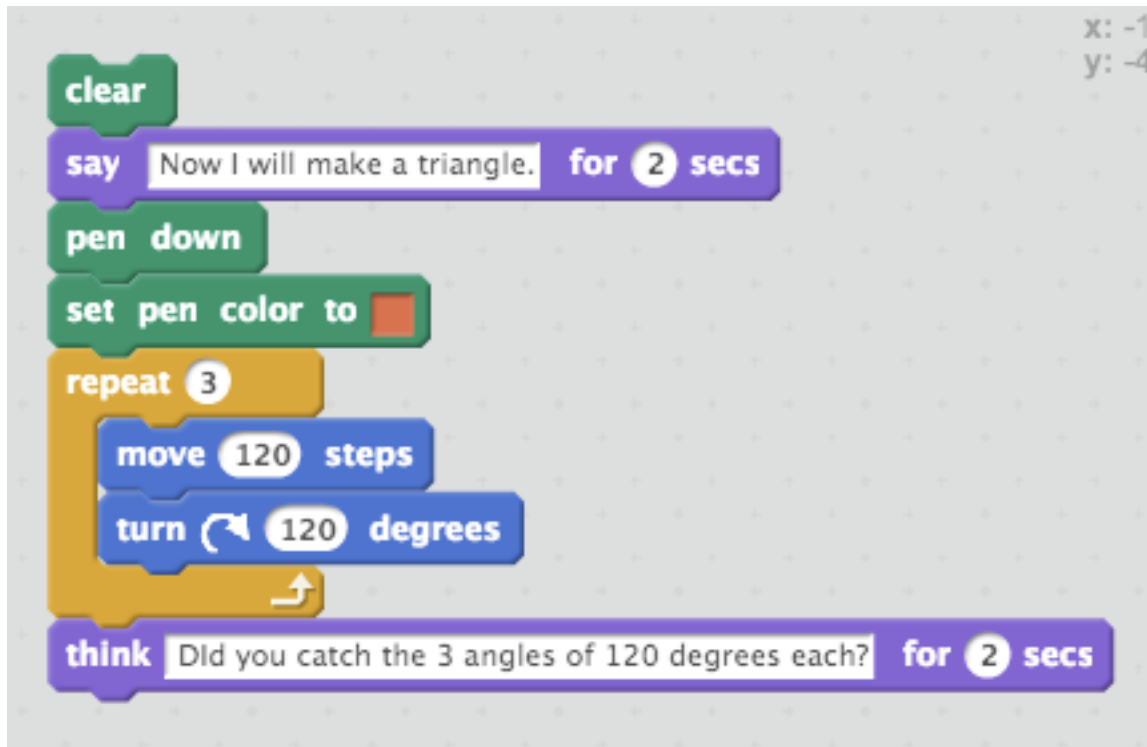

Here is what the THINK command does. Notice the "think" bubble that appears for a designated number of seconds if you like. You gotta love the cute bubble!
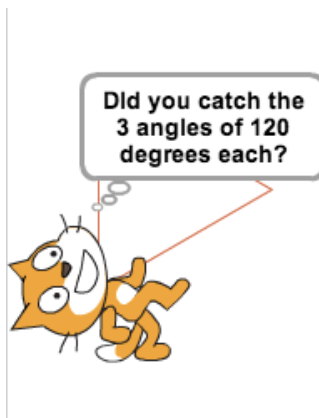
Okay, let us write one more program that illustrates where the ink comes out of the cat. The GO TO command is new but reasonably intuitive, sending the cat back to the origin of the x-y coordinate grid. My rationale for the two WAIT commands involves the fact that I want the user to see each step slowly instead of it happening magically.
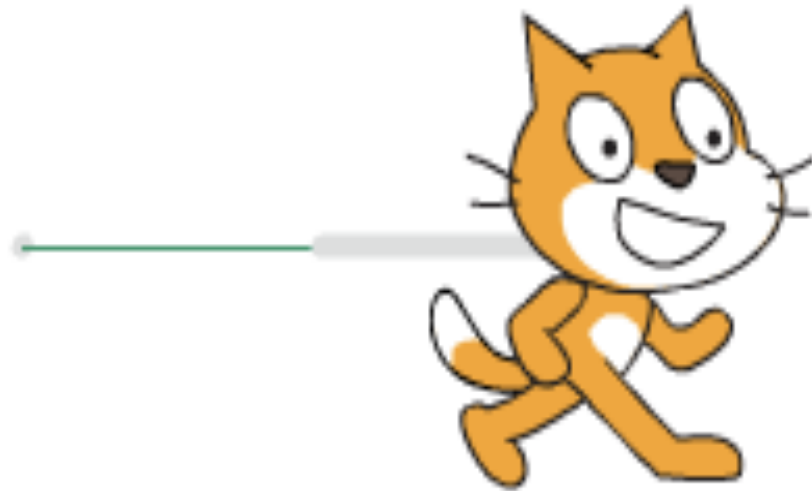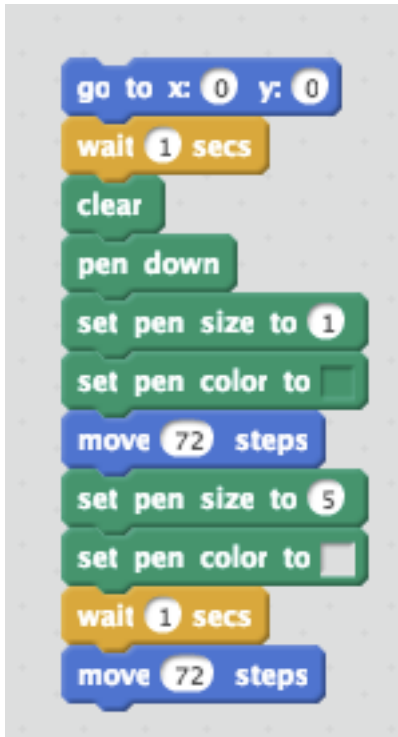
On the right above you see the result of the program with the ink coming out of the back of the cat's neck. The cat used thin green ink (pen size 1) for the first 72 steps (one inch) and thick gray ink in (pen size 5) for the next 72 steps.

HW Exercise 1.4 -- Draw a decagon (10 sides).

Once you create your SCRATCH login, you can SAVE your program under the FILE MENU using a name such as Exercise 1.4 Decagon or Exercise 1.5 Polygon with 36 sides.

HW Exercise 1.5 -- Draw a polygon with 36 sides. You will need to keep the length of each side small.

HW Exercise 1.6 -- Pick an uppercase letter of the alphabet and write a Scratch program to create the letter so that it is 100 pixels tall and 50 pixels wide. Send me a screen snapshot via email of the code when done. If you need help with screen

snapshots for your Mac or PC, I have info at http://summercore33.com/tips but I am also happy to help you via our weekly 30 minutes conversation.
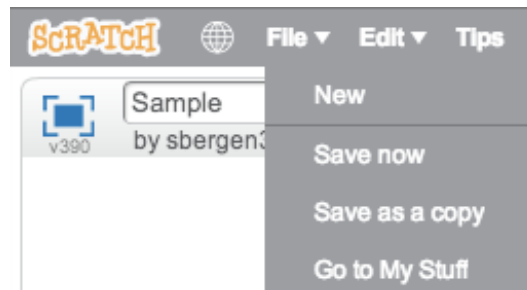
Your program lives in MY STUFF which corresponds to this icon the next time you come back to SCRATCH and your account. Even cooler is the fact that when you look at any program in your MY STUFF library, you can declare it "accessible to the world" by choosing the Share icon. This will give us a way later in the course to see each others' programs.

OPTIONAL -- instead of sending me a screen snapshot for Exercise 1.6, you can make your program PUBLIC by choosing SHARE and then send me an email. I will then see if I can access your UPPERCASE letter.

Here is a tough challenge that stumps most people, but believe or not you know enough programming to do it!

OPTIONAL CHALLENGE (not an assignment and not required): Write the program for this design that appears to be 36 squares.
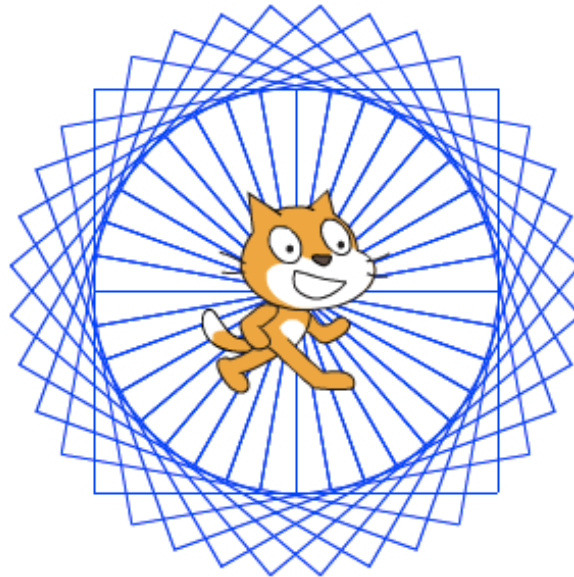
If you get frustrated and want to see the solution, it is in my library and is called Lesson 1 Challenge with 36 Squares. My Scratch name is SBergen33 so you can go to the URL of http://scratch.mit.edu/users/sbergen33/ and see my programs.
Also, I have a link to my library at the top of http://teachingcompany.com/f14

Each time you access a program from someone else, you can either RUN it or you can REMIX it. If you REMIX it, you can save it in your library and modify it.

By the way, when you look at someone's library, you are seeing only the programs that the user has chosen to SHARE. The owner of the account chooses to SHARE or UNSHARE any program.

Okay, I hope you are doing fine. We are now marching forward with one new concept, a few more commands and one more challenge.

A variable is an important part of programming. It is also an important part of pre-algebra, algebra and math in general. Math people like to call variables X, Y, Z, T, and C or use a letter that stands for a word, e.g. T for Total or C for counter. Computer people like to use actual short words for variables such as COUNTER or TOTAL or HOWMANY. Different strokes for different folks; we all have our preferences!

Below is the first sample program that uses a variable to draw a square of variable size.

Here are the new ORANGE commands under DATA:
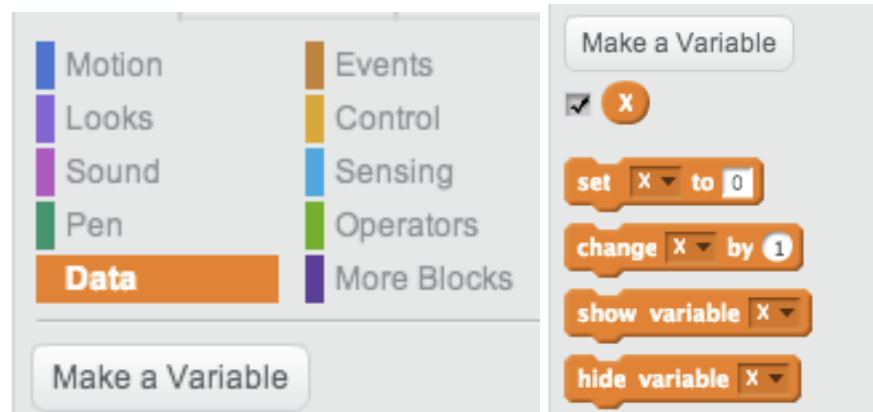
When you make a variable, you get this new set of 4 commands that you see on the right. The important ones are the SET command and the CHANGE command.

Below you can see that I am adding the starter command with the green flag

 so that my program runs when you click the green flag. The first and only use of a variable in this program occurs when you see the ORANGE DATA command called SET SIZE TO ANSWER. Using the DATA option, I created a variable called SIZE. This automatically displays at the top left of the screen where your program is executed.

Now here is the important thing. When you use the BLUE ASK command, the result always goes into the BLUE temporary variable called . This is not a user choice. The variable is a special location in Scratch and always corresponds to what was entered via the last ASK.

So as a programmer, the standard thing to do is to use the SET command to move ANSWER into a more permanent variable, in this case SIZE. Got it? I hope so, but like anything else, you need to do it yourself from scratch and then repeat it a few times to practice. Think BLUE and ORANGE. The blue command called ASK allows the human to interact with the program and puts the result into the ANSWER
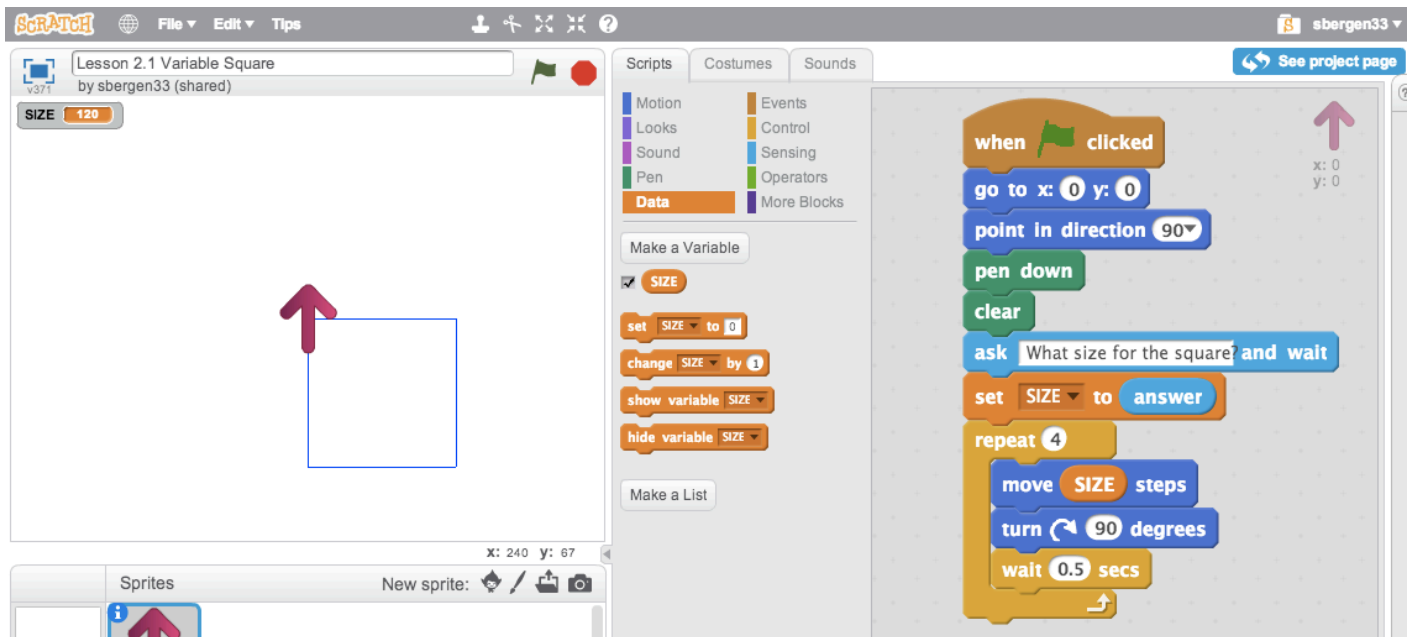
variable which you will see right in the blue SENSING set of commands. Meanwhile the ORANGE DATA section is where you make or rename your variables.

• Arrow and Variable • 9 minutes
http://youtu.be/YhzaZrO84oo

• Change Cat to Arrow • 6 minutes
http://youtu.be/JT2qnciGVJc

Please notice that I have changed the CAT to a RED arrow pointer which I find much more useful in terms of the themes of directionality. I will show you below and also on video how to do this using COSTUMES. Also notice my personal preference of using WAIT to slow down the action a bit so you can see each side being drawn. And yes, you can use decimals like .5 to wait half of a second.

This program below is the exact same program using the variable X instead of the variable SIZE. The ability to rename the variable in DATA is wonderful. I want you to see both styles (math teacher and computer teacher) so you can decide what your own personal preference is when using variables. It is great that you can RENAME a variable and it renames it everywhere!
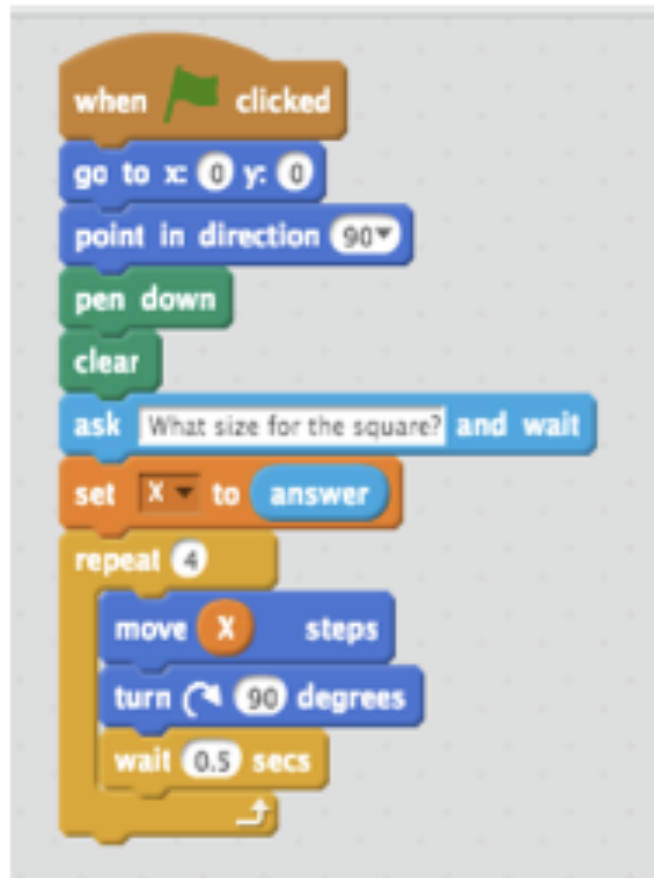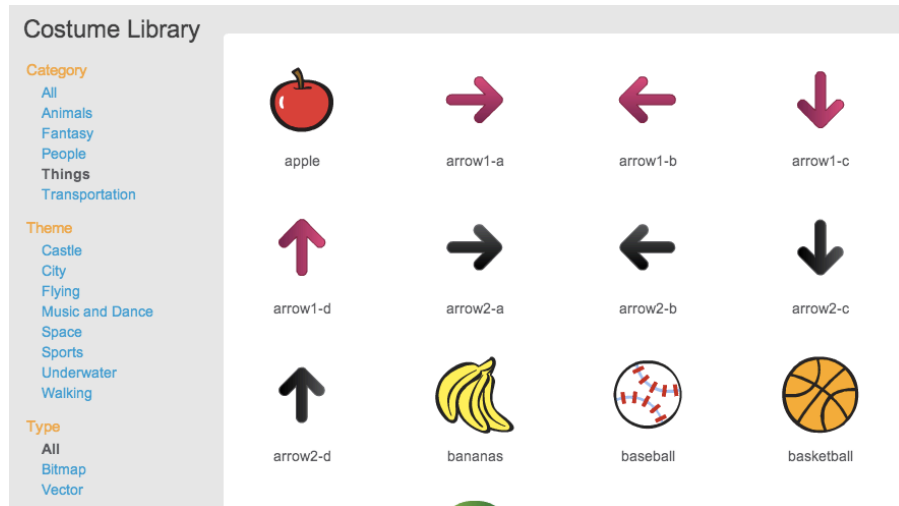
Let's talk about changing the CAT to my favorite icon, the arrow.
If you click on the blue icon below called CHOOSE COSTUME FROM LIBRARY
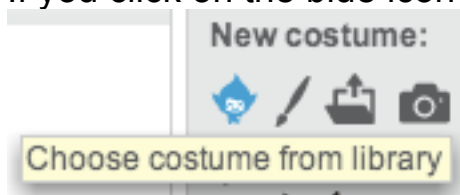
you get access to dozens of replacements for the CAT. They are organized by category on the left and my favorite category is THINGS.

The arrow pointing to the RIGHT is the one I like, either arrow1-a or 2-a. This is the arrow for which the ink that comes out matches your intuition.

HW Exercise 1.7 -- Draw a variable sized triangle where the user can specify the size of each side.

Vocabulary words used in this lesson that you will find in our Shared Doc

ask [ ] and wait, answer, Blocks, CLEAR command, Costume, Interior Angle, Exterior Angle, GO TO X: Y: command, make a variable, MOVE command, PEN DOWN command, PEN SIZE command, Polygon, Scratch, REPEAT command and MOUTH of the Repeat Command, SAY command, Script, SET PEN SIZE command, SET PEN COLOR command, set [variable] to answer, Stage, Sprites, Stack, THINK command, TURN command, WAIT command, when GREEN FLAG clicked

Have a good week. Sorry this lesson is longer than intended but I have been looking forward for a while to beginning our course and would love to get off to a fast start!

Steve

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