SUMMIT
ACADEMY
NEXT LEVEL
CODING CLUB

Lesson Plans

STARTER PROJECTS

Introduction to Scratch

These first 3 projects will be done in Scratch. But what is Scratch? It is a block-based programing language created by MIT. It can be run in a web browser or a desktop app, with the web browser version storing the projects on the cloud.

Thought Scratch may at first appear limited, it is just as capable as any other programing languages. If you want to do something with scratch, you probably can. That's why I am choosing Scratch, it is simple to understand at first, but doesn't hold you back later.

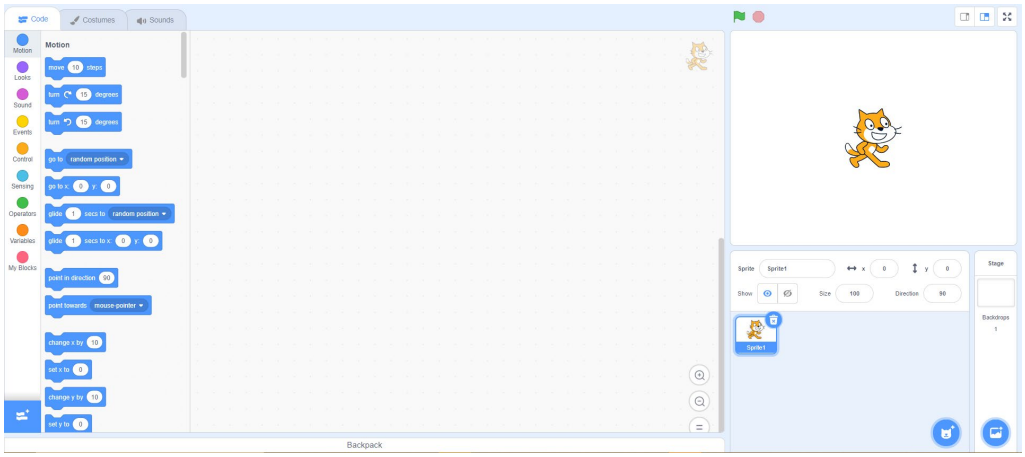
To create and save projects, we need a Scratch account. Head to scratch.mit.edu and in the top right corner there should be a join Scratch Button, click it and proceed through the account set up, use your school email (Or not if those emails wouldn't work). Once the account has been created, we can start our first project.

First Project – Chase Game

The Goal of this project is to teach students the essentials to creating a game. The objectives of this project are:

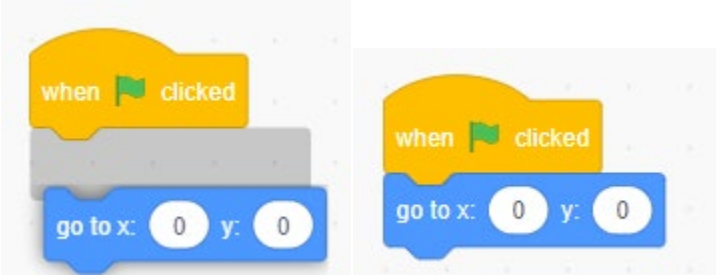
- Player control
- Creating an Objective for the player
- Introduction to variables

1 The game we will be making is a simple chase game. Start off by creating a new project with the create button in the top left. You should arrive to a screen like this:



2| On the left, we have a bank of blocks we can use, in the middle is the area where our code goes, and on the right is the stage, which is where the sprites, the images that we see, are.

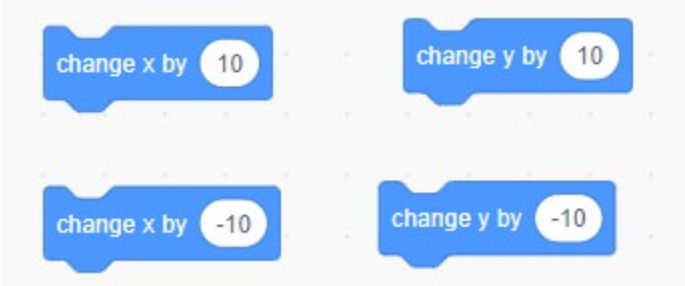
3| Let's get that cat moving. Go to the Events tab and find the "when key pressed block", get 4 of them. Also grab a "when green flag clicked" block as well. Then go to the motion tab on the left, grab a "go to X: Y: " block and drag it close to the "When green flag clicked" block. You should see a grey shadow appear, let go of the block and it should snap into place like this:



4| This is now a complete script, whenever the condition at the top is met, Scratch will run through all the blocks attached to the script, either until the script stops or the project stops.

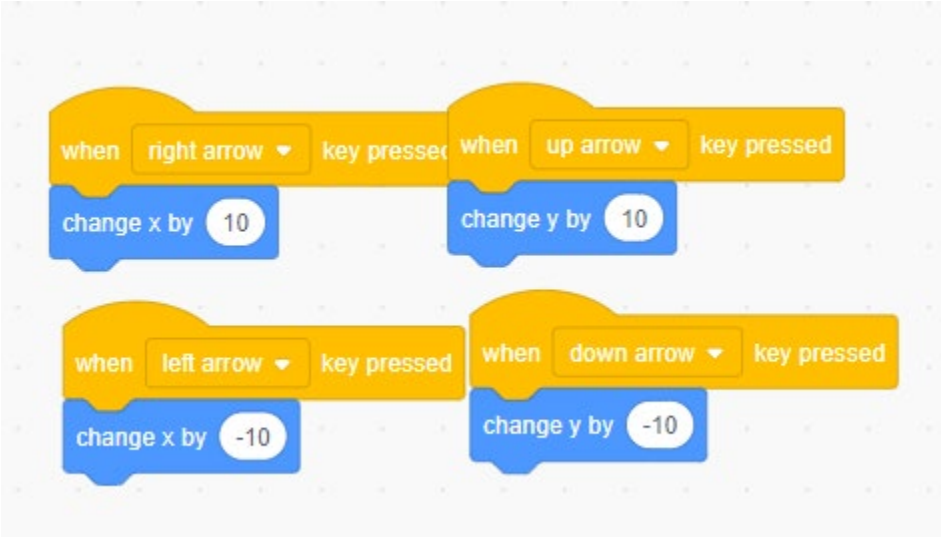
5| Now grab 2 "change X by" and "2 change Y" by blocks. These blocks can effect the position of the sprite (in this case the cat). Think of it as X being left and right and Y being up and down.

6| They start off with 10 filled in by default, so we only need to change one of the "change X" blocks to -10 and one of the "change Y" blocks to -10. Like this



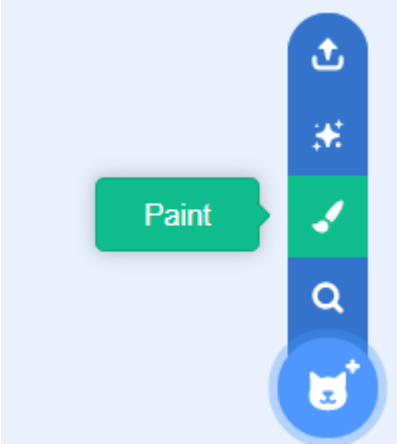
7| Now attach each one of these blocks to a different “when key pressed” block like this:

8| Now we can change what key these blocks are looking for: for the x+10 set it to “Right arrow”; for the x-10 set it to “Left arrow”; for the y+10 set it to “Up arrow”; for the y-10 set it to “Down arrow”. It should look something like this

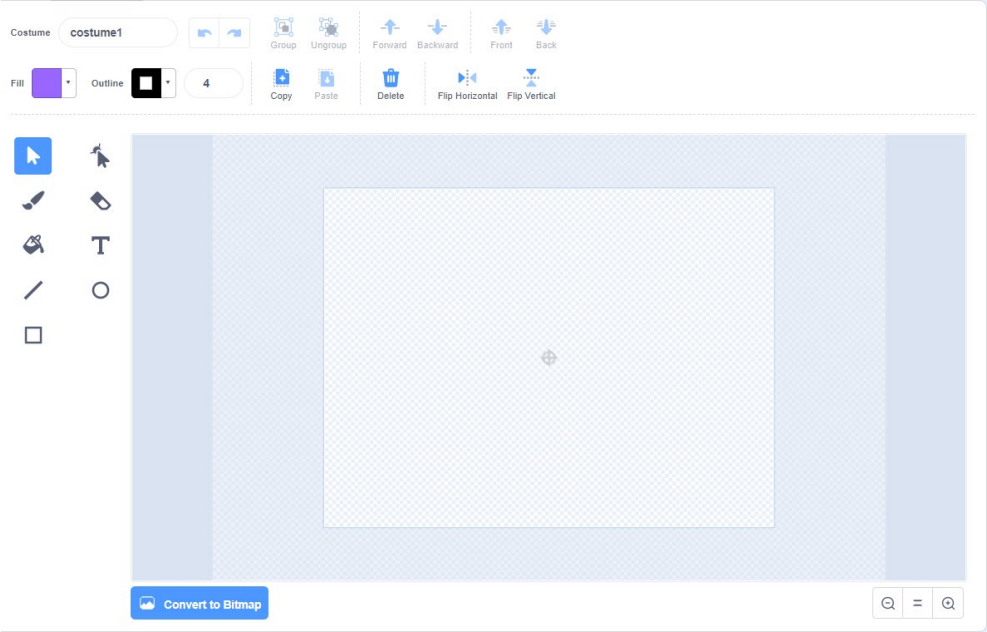


9| Press the arrow keys to confirm that the cat can move around.

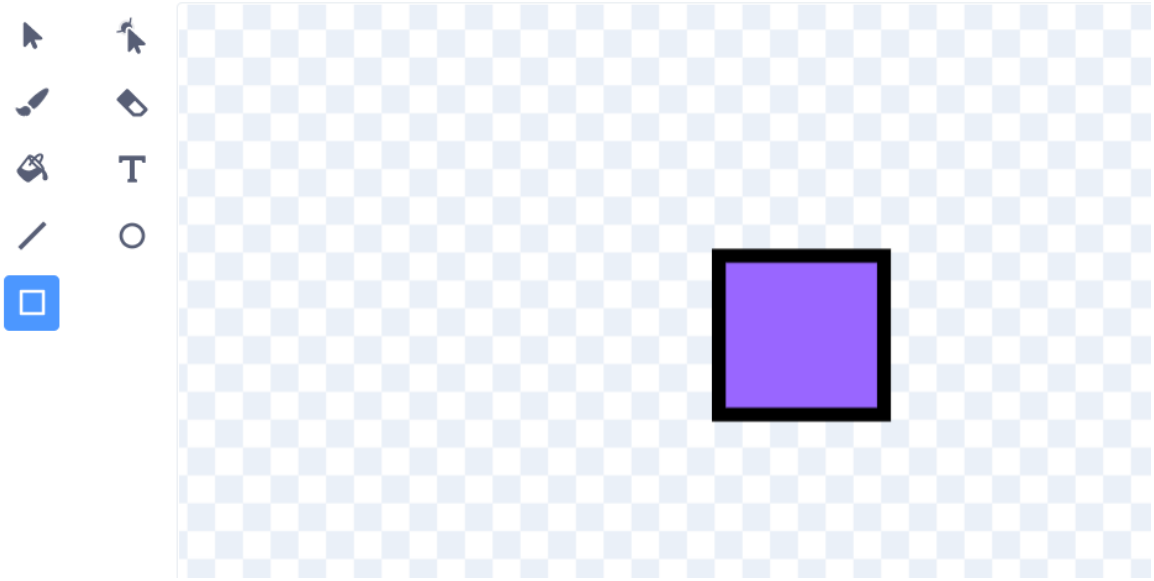
10 | Now, let's create something for the cat to chase: Go to the Bottom right and hover your mouse over the Cat icon. You should see a list appear above it, click on the paint brush icon.



10 | You should now be brought to the costume editor which looks like this:

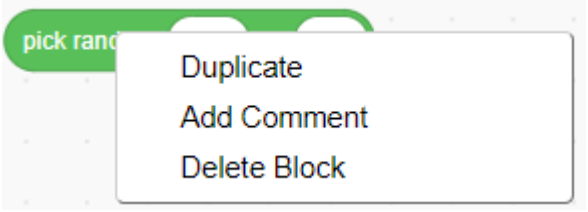


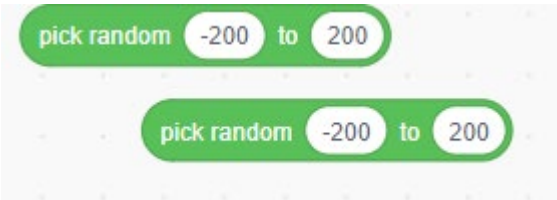
10 There are a bunch tools here, but the two we care about right now are zoom in and square tool The zoom buttons are in the bottom right, click the zoom in button 4 times. Then select the square tool from the right and make a square in the center of the costume. Like this.



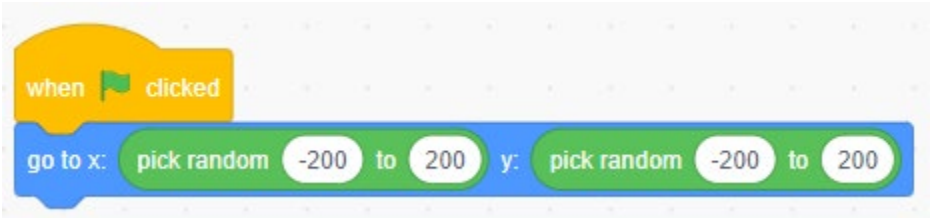
11 Let's make this thing jump around so we can chase it. Go to the top left and click on the Code tab, then grab a "when green flag clicked" block and a "go to" block and stick them together. Next, go to the operators tab (The green one) and grab one "pick random number" block, into this block type -200 and 200 into the number slots like this:

12 Now right click on the block, a little menu should pop up, with one of the options begin to duplicate, click it.





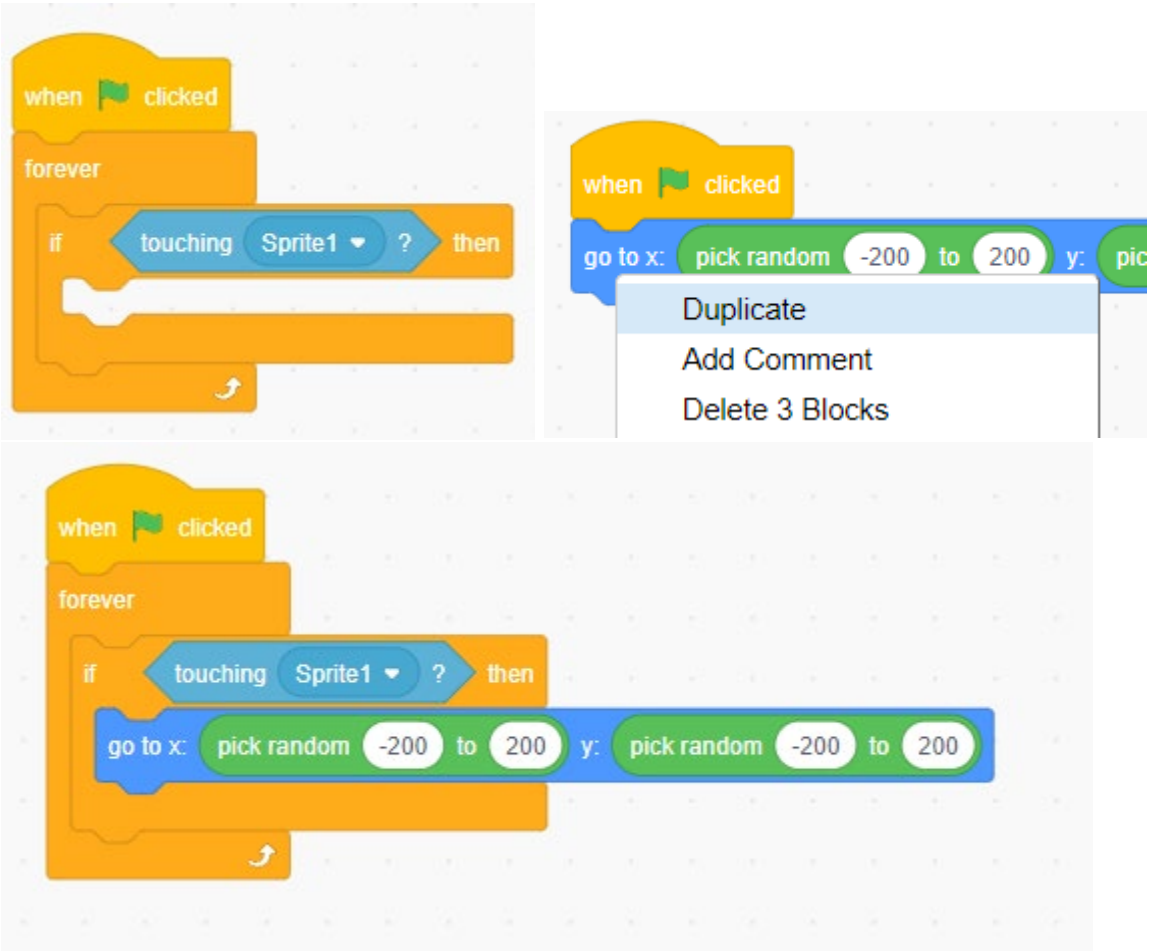
13| Now, take these two blocks and drag them into the numbers on the “go to” block that we got earlier.



14| Now, every time we click the Green flag to start, the square should jump to a random spot on the screen.

15| Now, we need to make it so that the square moves every time the player touches it. Grab a “when green flag clicked” block, a “forever loop”, and an “if then loop”. (the loops are in the control tab). Then put the “forever loop” on the “when green flag clicked”, and then put the “if then” *inside* the “forever loop”.

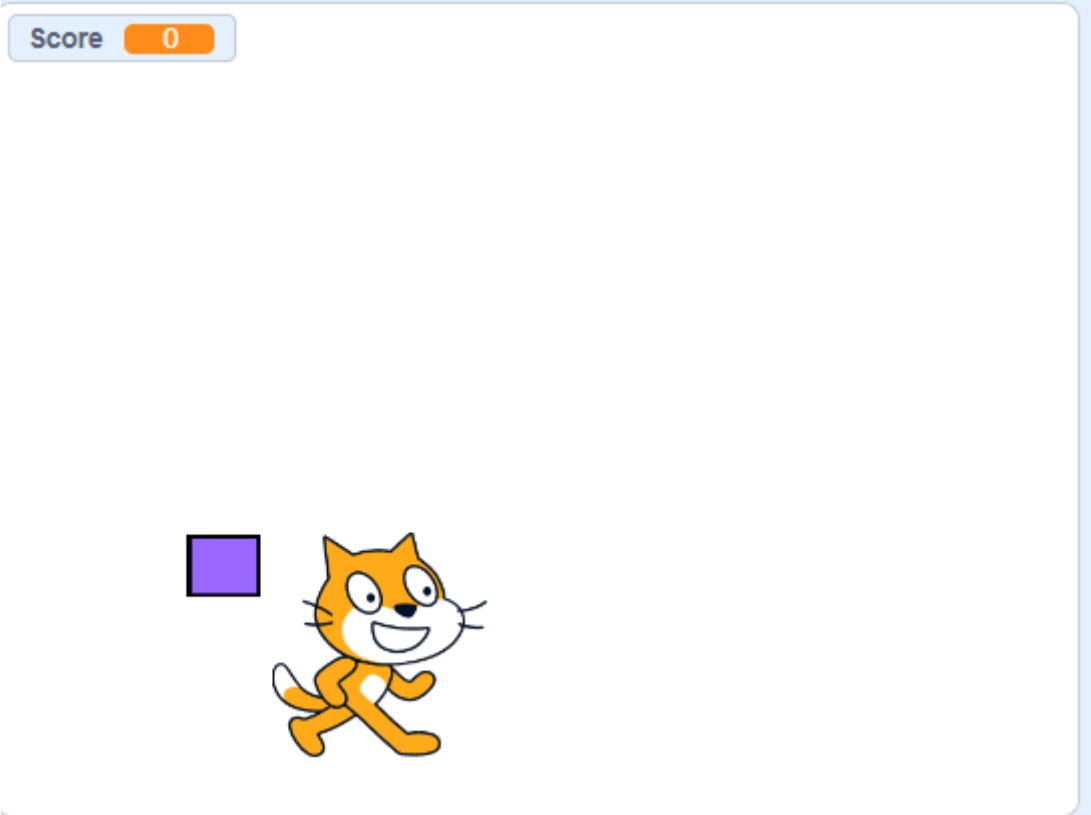
16| This script will constantly check for a condition (If) to be met, in this case, if we're touching the cat (sprite 1), We will *then* do a certain action. In this case go to a random part of the screen. The touching block can be found in sensing and goes into the hexagon shaped hole in the if then block. We can copy the go to block under the "when green flag clicked block" and put it *inside* the "if then loop".



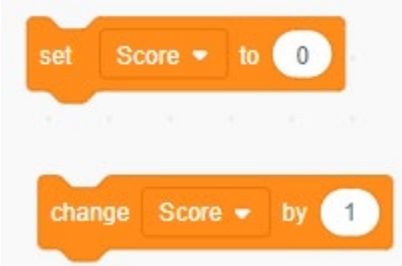
16| Now when we click the green flag, if we move the cat into the square, it should jump to another part of the screen.

17.1| But, what if we want to keep track of how many squares we have collected? Well we can do that with a variable. What is a variable? It is a way for a computer to keep track of a number, it can be added or subtracted from or set to a certain number.

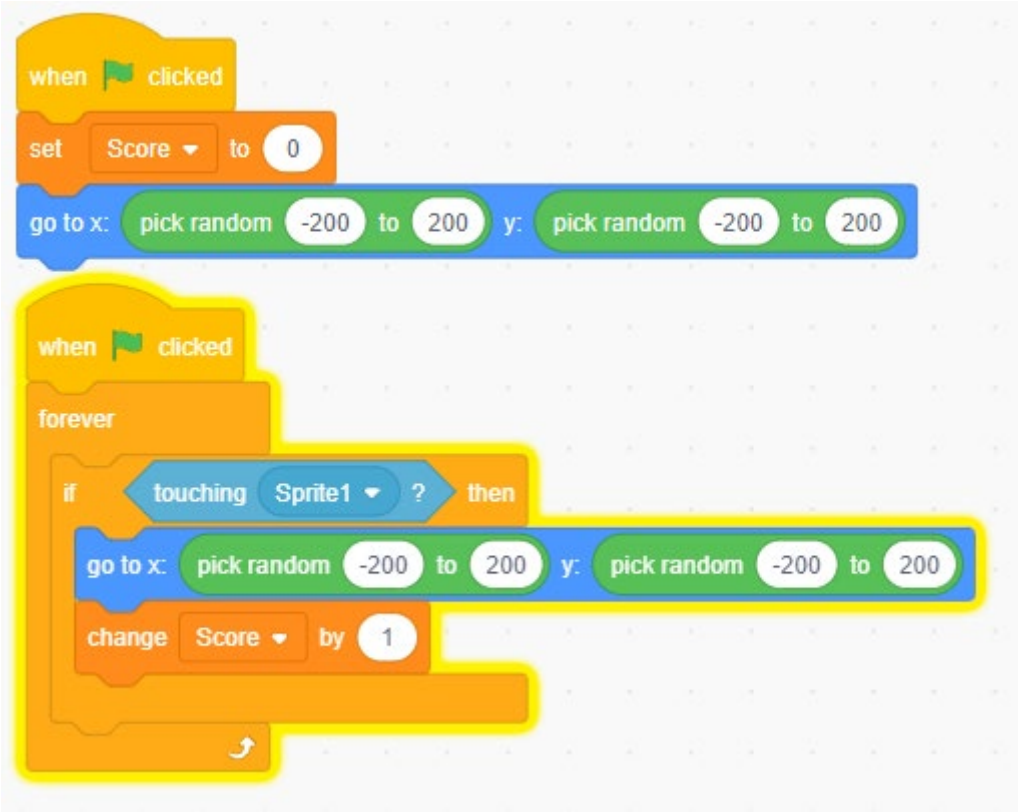
17.2| Go to the variable setion on the left, then near the top click on new variable and call it Score, click ok and you should see it pop up on the stage



18| Grab a "set variable" block and change variable block, set them both to our new variable score.



19| Next, put the "set to" block under the when green flag clilcked and the change by block *inside* the "*if then* loop".



20 When everything is put together correctly, it should look like this:

Congratulations! You now have a simple chase game, enjoy!