MIT Scratch 101

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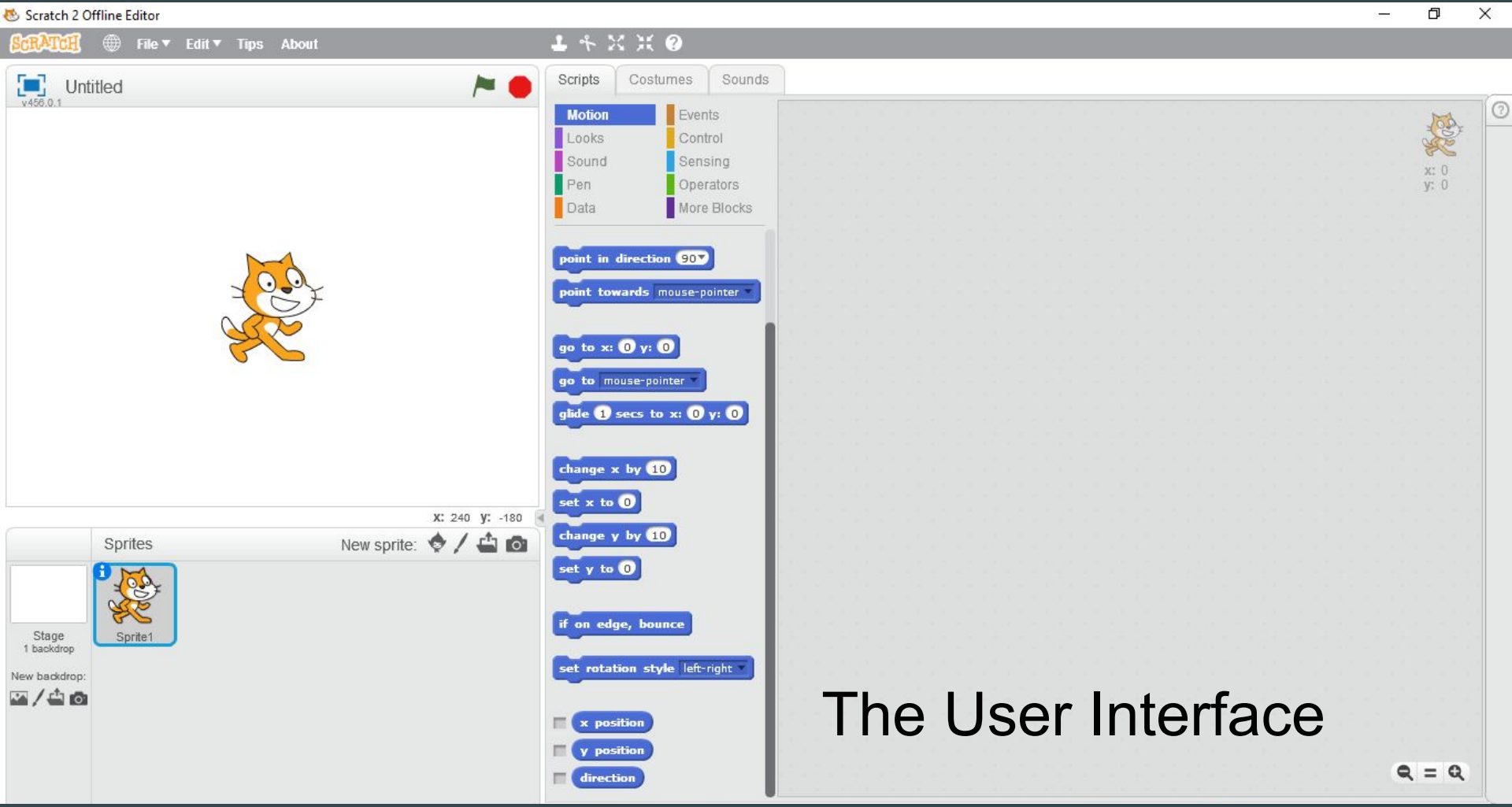
Feel free to experiment!

That is what programming is all about.

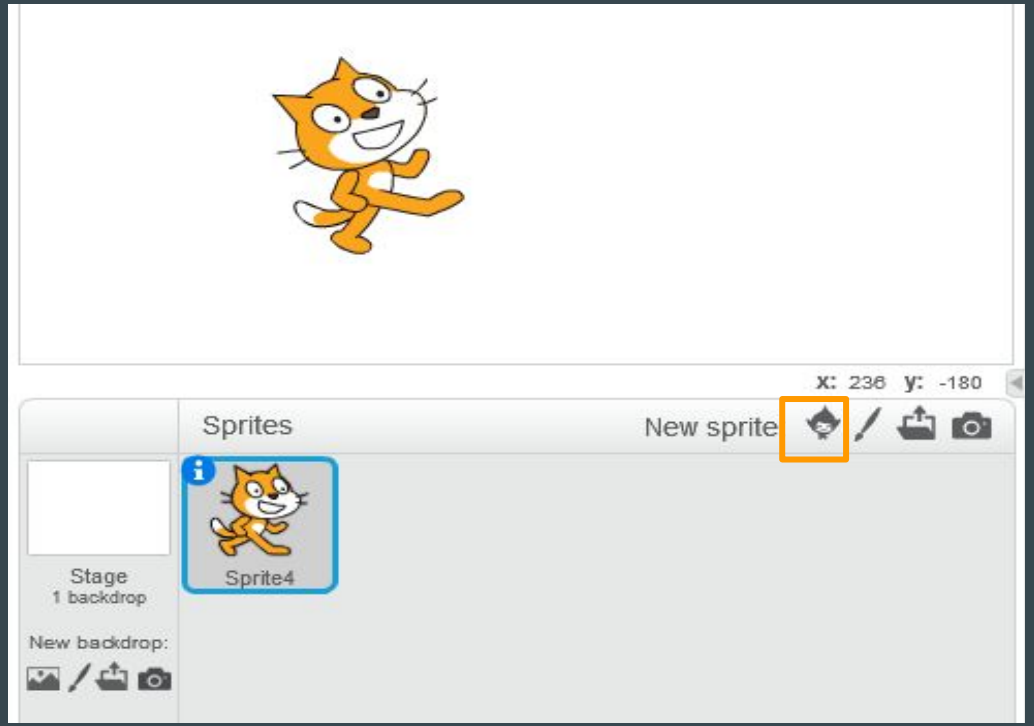
Scratch Basics


Scratch 2 Offline Editor
File
Edit
Tips
About
Untitled
Scripts
Costumes
Sounds
Motion
Looks
Sound
Pen
Data
Events
Control
Sensing
Operators
More Blocks
point in direction 90
point towards mouse-pointer
go to x: 0 y: 0
go to mouse-pointer
glide 1 secs to x: 0 y: 0
change x by 10
set x to 0
change y by 10
set y to 0
if on edge, bounce
set rotation style left-right
x position
y position
direction
x: 240 y: -180
Sprites
New sprite:
Stage
1 backdrop
New backdrop:
Sprite1
x: 0
y: 0
The User Interface

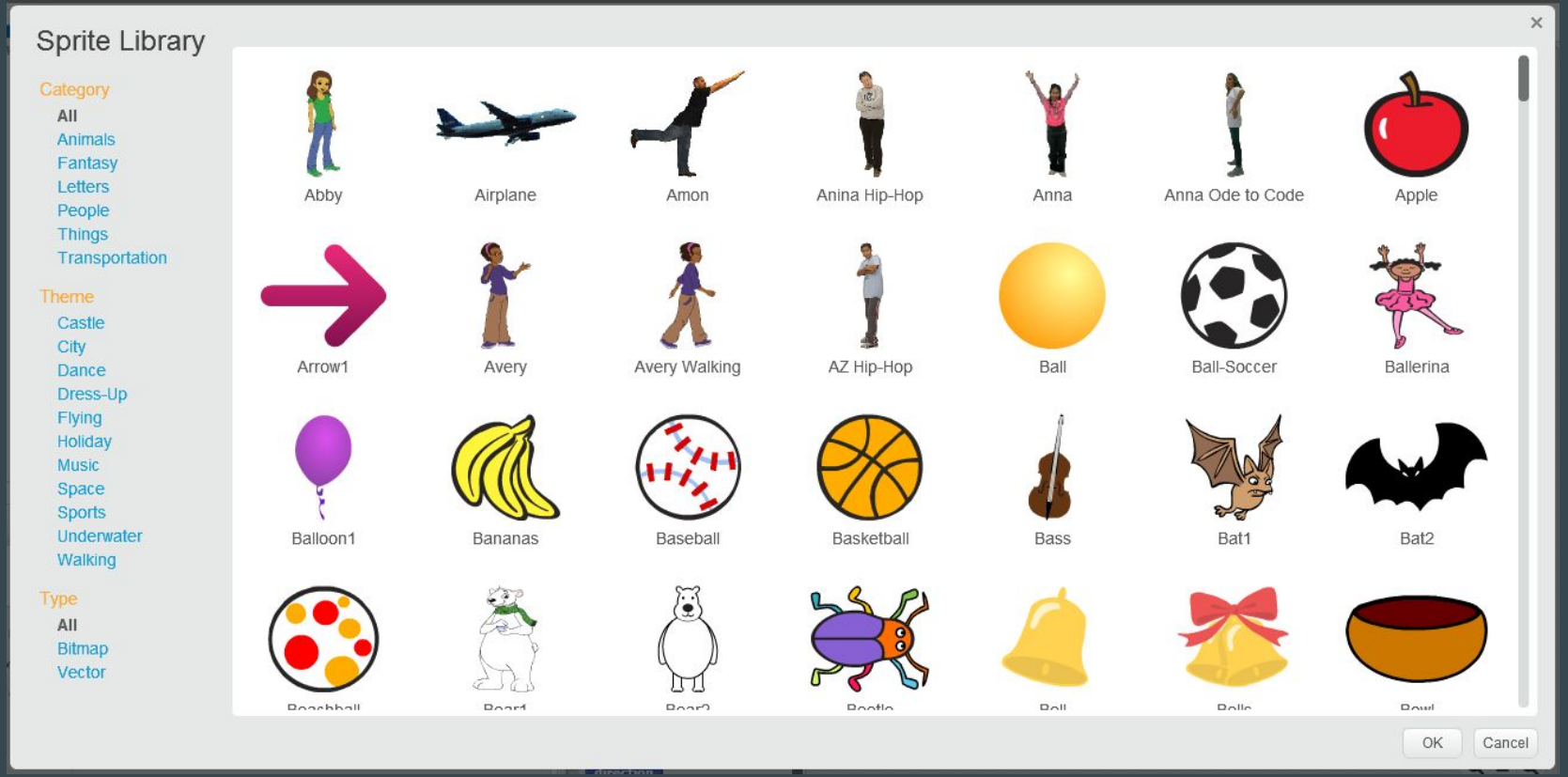
Playing with Sprites

Sprites are the objects that perform actions in your program.

They will execute your code.



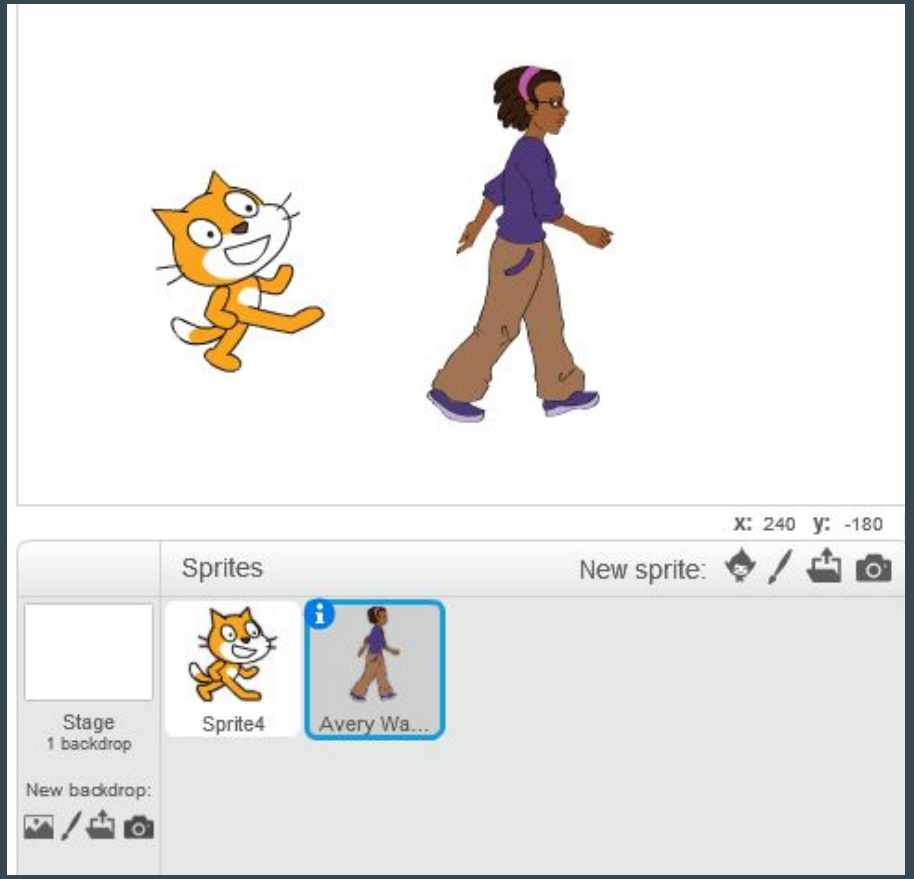
Adding a new sprite



Adding a new sprite

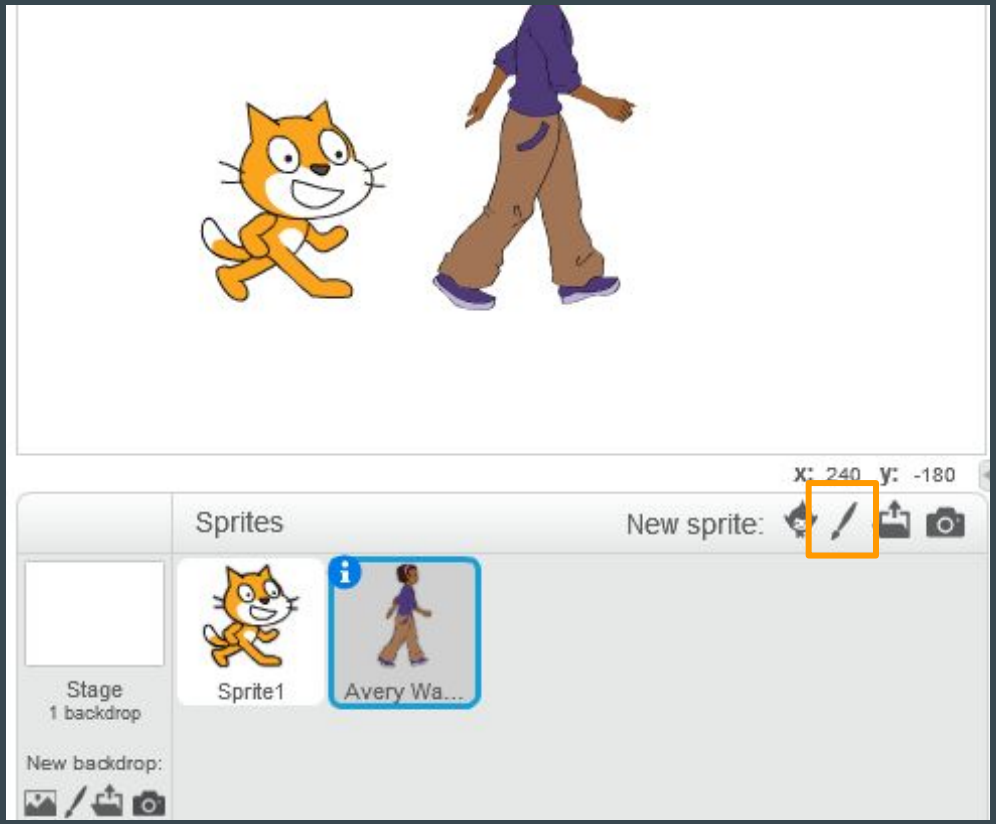
Add a new sprite to the canvas

by double-clicking it.



Drawing Your Own Sprite

Draw your own sprites by clicking on the paint-brush tool.

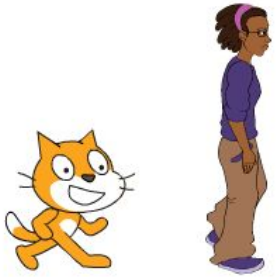


Scratch 2 Offline Editor

File Edit Tips About

Untitled

v456.0.1



x: 240 y: -95

Sprites

New sprite:

Stage
1 backdrop

New backdrop:

Sprite1

Avery Wa...

Sprite2

Scripts Costumes Sounds

New costume:

1
costume1
1x1

costume1

Clear Add Import

100%

Bitmap Mode

Convert to vector

7:19 PM
5/9/2017

Making the Sprite Move

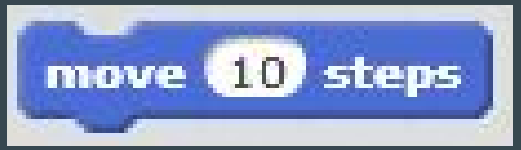
First, select the sprite that you'd like to move around, now we will need to understand blocks.

Blocks

Blocks allows users to interact with the sprites within the program through a logical and graphical mean.

In order to start, we must add this EVENT BLOCK.

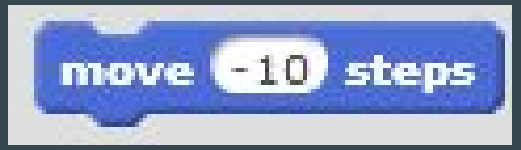
Making the Sprite Move



- Move the sprite 10 steps rightward

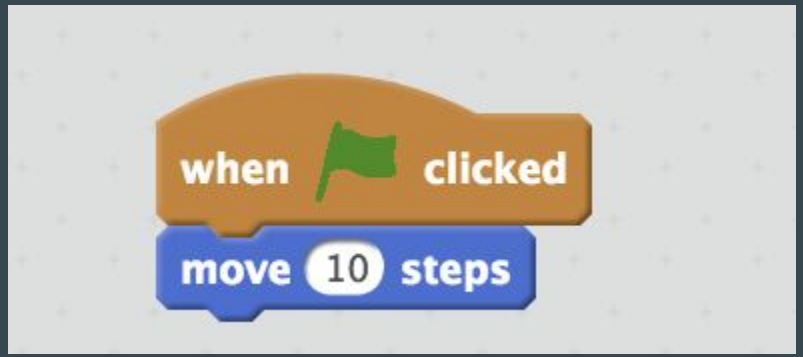
Drag the block to the scripts area and double click it to see it in action.

Make the sprite move leftward by making the number -10.



Making the Sprite Move

Attach it to the start event block to work through these blocks.



Adding an Event

- When the spacebar is pressed, do something...
- Different events may be detected by the program.

Attach this block to top of the move block.

Press the **spacebar** to make the sprite move.

Adding Control

- A *loop* allows code to be repeated a certain number of times.
- The block on the left repeats a set of actions forever.

Drag your move block inside this forever block.

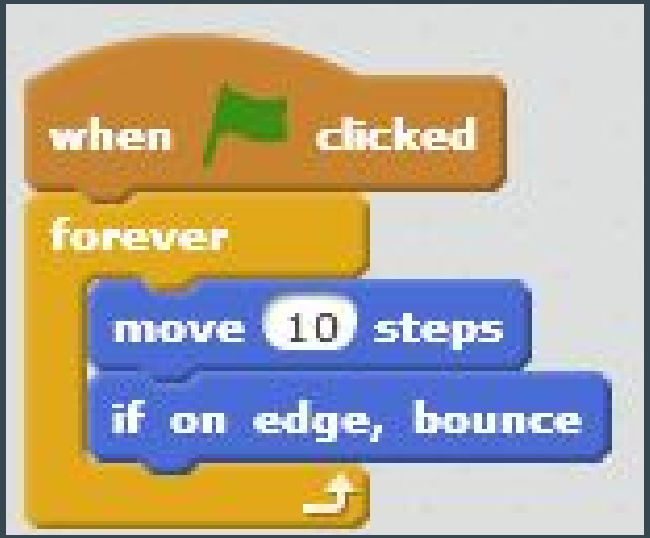
Attach the event block on top of the forever block.

when space key pressed
forever
move 10 steps

Adding Conditionals

Make your drawn sprite bounce around the screen forever when you click on the green flag.

- Add this block so the sprite bounces whenever it hits the walls


when clicked
forever
move 10 steps
if on edge, bounce

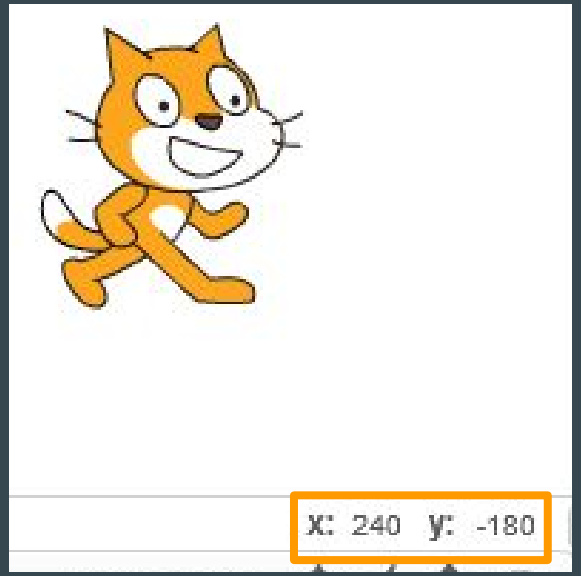
X and Y

Drag the sprite around the stage.

Notice the xy coordinates on the bottom right.

Try moving the sprite to x: 0 y: 0

- x changes as it moves left / right
- y changes as it moves up / down



Moving Up and Down

Make the sprite move up by creating this block.

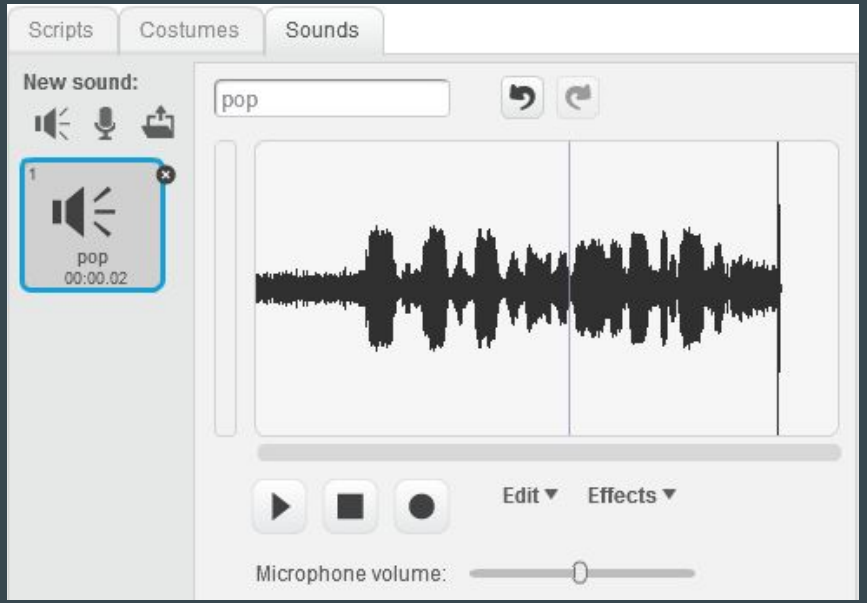
Negative values move down, while positive values move up.

How would you make the sprite move down by 10 units?

when down arrow key pressed
change y by -10

Making Noise

- Click on the sounds tab and play with the sounds.
- You may record or use the preset sounds
-



Making Noise

Play a selected sound using this block.

You may change the sound to the one you made or a preset one..

Challenge!

- Open a new Scratch project.
- Draw a trampoline sprite.
- Select or make any other sprite.
- Make the sprite bounce up and down the trampoline.
- Make the sprite “meow” when it bounces.
- Add another sprite which jumps more slowly.

Other Blocks

Blocks Categories

Blocks are divided into categories based on their purpose and the important ones are listed below:

- EVENT BLOCKS. Listens to input and gives output.
- MOTION BLOCKS. Moves the sprites within the program.
- DATA BLOCKS. Stores data for future use in the program.
- CONTROL BLOCKS. Dictates the flow of events.
- OPERATOR BLOCKS. Performs arithmetic operations.

EVENT BLOCKS

Listens to keyboard presses and reacts when triggered.

Listens to mouse clicks on the sprite

EVENT BLOCKS

Listens to background variables and reacts based on that.

MOTION BLOCKS

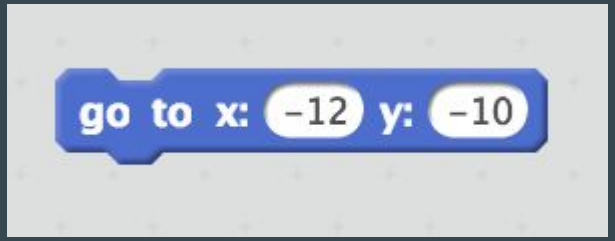
Moves the sprite 10 points relative to the facing axis

Rotates the sprite by given degrees

MOTION BLOCKS

Rotates the sprite to a certain degree

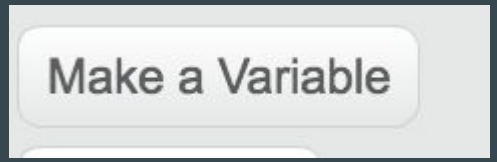
Changes the location of the sprite



MOTION BLOCKS

Control statement that bounces sprite if sprite hits the edge of the screen

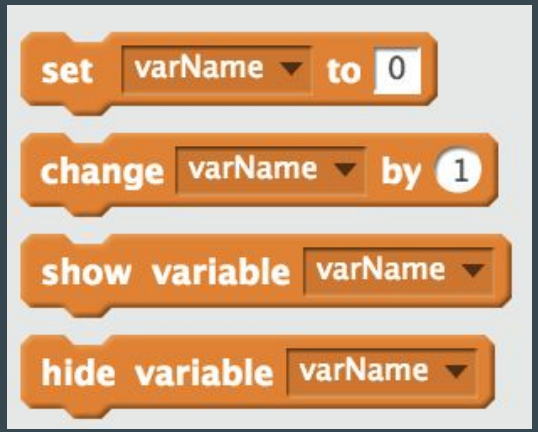
DATA BLOCKS



Creates a variable that stores data

SET. Assigns a variable to an integer

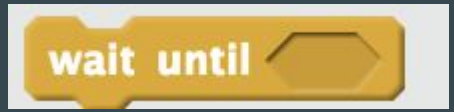
CHANGE. Changes given integer of a certain variable



CONTROL BLOCKS

Holds the flow for a certain number of second before proceeding

Holds the flow until a certain an event is triggered or completed



CONTROL BLOCKS

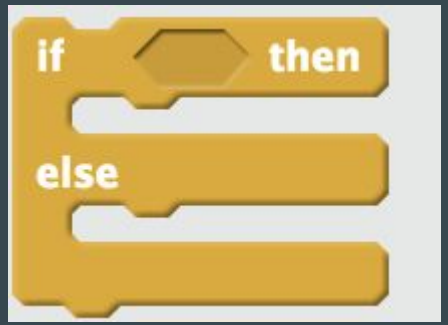
Repeats a certain chain of blocks for a certain number of times

Loops a certain chain of blocks infinite times

CONTROL BLOCKS

Executes a certain chain of blocks when a condition is met

Executes a certain chain of blocks when conditions are met and are not met



CONTROL BLOCKS

Repeats a certain chain of blocks until an event is completed or triggered

OPERATORS BLOCKS

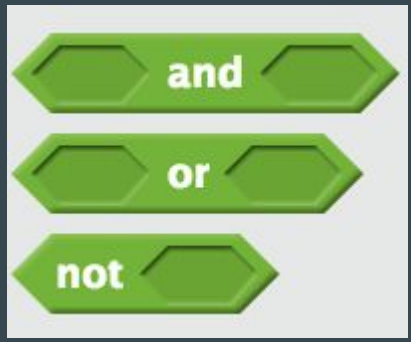
Arithmetically operate on two variables

Picks a random integer given a certain range

OPERATORS BLOCKS

Compares two variables and gives a boolean value

Conditional block that checks if two or one variables conditions are met



Challenge!

SITUATION: There is a ball and player. The ball is going to bounce n number of times. Once the ball stops bouncing, the player must go to the ball.