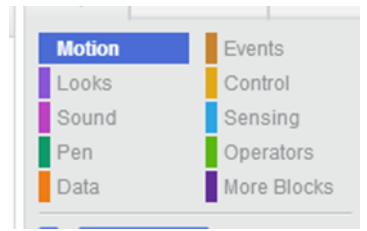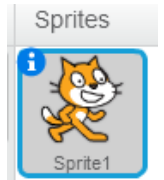# Coding with Scratch

scratch.mit.edu

Definitions:

Scratch: a visual programming language developed by MIT Technology Lab to make programming easier and more fun to learn.

Sprite: a character (such as a cat) that understands and obeys the commands given to them.

Scripts: stacks of blocks you connect together to create commands

Script execution: when your script runs

Scratch Programming Envirnoment

Cursor Tools

Tabs
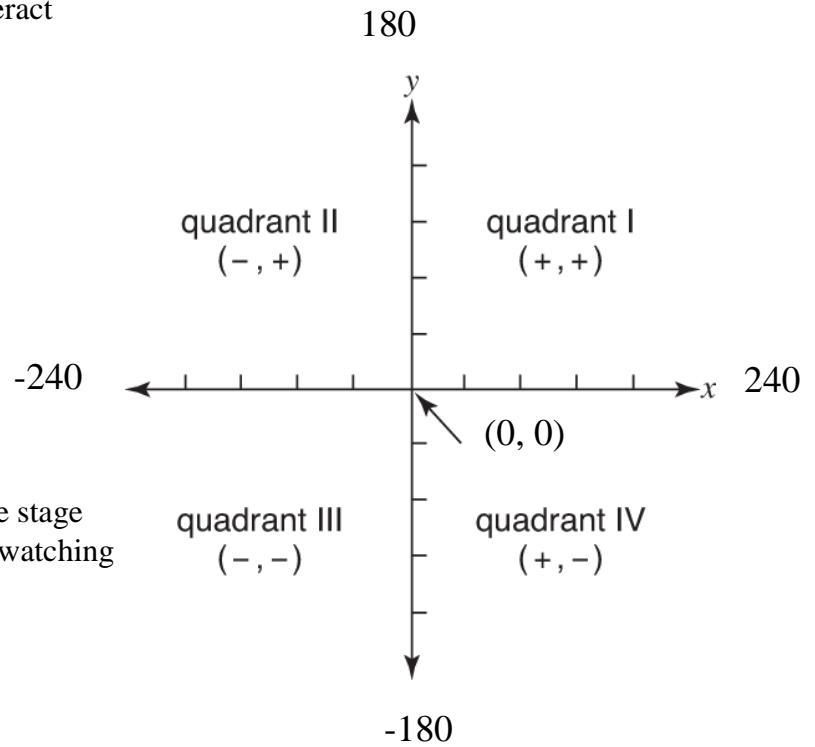
Menu Bar

Scripts Area

Stage

Blocks Palette

Sprite List

The Stage

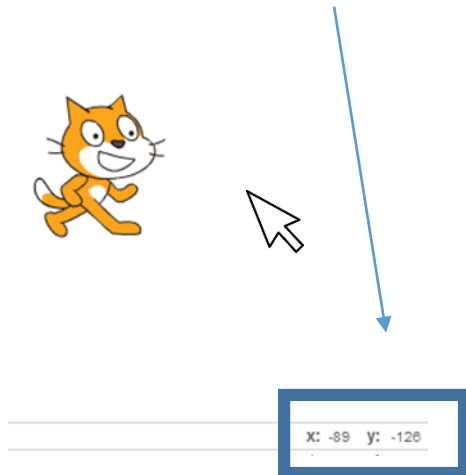**Stage**: where your sprites move, draw and interact

The stage is 480 steps wide and 360 steps tall.
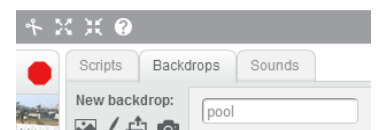
X is horizontal ————————

Y is vertical

You can find the coordinates of any area of the stage by moving the mouse cursor to that point and watching the numbers in the Mouse (x, y) display area.

180

y

quadrant II
$(-, +)$

quadrant I
$(+, +)$

-240 ⟵————————⟶ *x* 240

$(0, 0)$

quadrant III
$(-, -)$

quadrant IV
$(+, -)$

-180

x: -89   y: -126

Backdrops Tab

You can change the background of the stage by opening a new backdrop.

Sprites

Sprite1

Stage
1 backdrop

New backdrop:

Example Scratch
by JennyfromthaBlock (unshared)

Scripts   Backdrops   Sounds

New backdrop:

pool
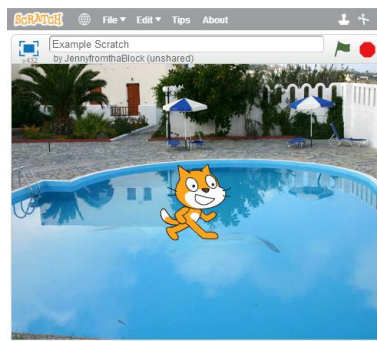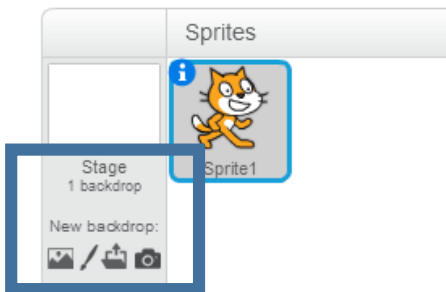
Sprite List

Each sprite on the list has own scripts, costumes and sounds.
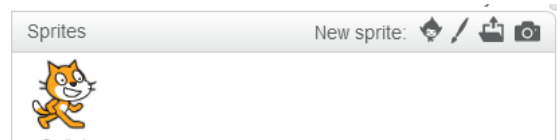
Costumes Tab

You can change the appearance of sprites with "costumes."
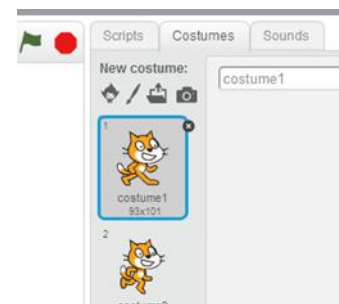
Sounds Tab

Sprites can play a wide variety of sounds. There are preexisting ones within Scratch or you can record sounds (if your computer has a microphone) or import existing sound files from your computer. Scratch can only read MP3 and WAV sound files.

Blocks Tab

There are 10 categories of code blocks in the Block Palette:

- **Motion**: controls sprite placement, direction, rotation and movement

- **Looks**: affect sprite and backdrop appearance and can display text

- **Sound**: control playback and volume of audio

- **Pen**: use to draw with different colors and pen styles

- **Data**: store data to be used by applications when they execute

- **Events**: trigger script execution

- **Control**: execute programming logic using loops or conditional logic

- **Sensing**: can determine location of mouse and sprites, whether touching something, etc.

- **Operators**: perform logical comparisons

- **More Blocks**: custom code blocks programmers can create

Scripts Area

This is the area where you can program the sprites to do things and for the background to change by dragging and dropping blocks and snapping them together.
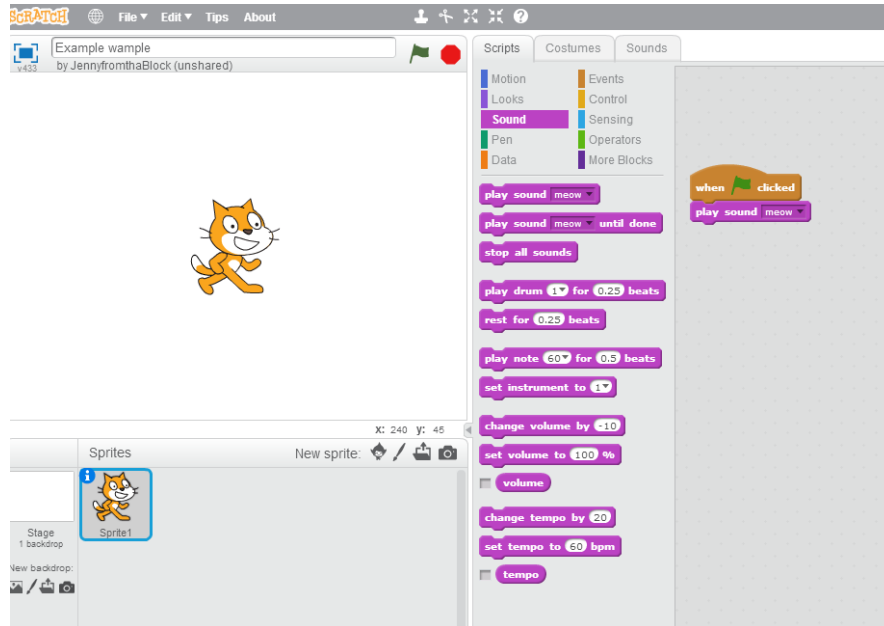
Types of Scratch Blocks

- **Stack blocks**: a notch in the top and a bump at the bottom
  - Can be attached to the underside of blocks and other blocks can be attached to it
- **Hat blocks**: a rounded or curved top and bump on the bottom
  - Can create an event-driven script
- **Reporter blocks**: rounded sides
  - Designed as a mechanism for provding input for other blocks to process
- **Boolean blocks**: angled sides
  - You need to embed in another block of code
- **C blocks**: shaped like and named for the letter C
  - Control blocks used to create a loop, grouped around other blocks
- **Cap blocks**: notch on top and flat bottom
  - signifes the end of a script—can only attach to other blocks