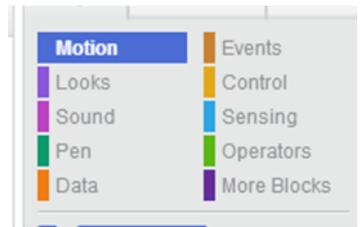




Coding with Scratch

scratch.mit.edu



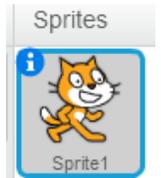
Definitions:

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 Environment

The screenshot shows the Scratch programming environment with several key components labeled:

- Menu Bar:** Located at the top left, containing 'File', 'Edit', 'Tips', and 'About'.
- Cursor Tools:** Located at the top center, containing icons for selection, pan, zoom, and help.
- Scripts Area:** Located on the right side, containing tabs for 'Scripts', 'Costumes', and 'Sounds'. Below the tabs is a list of block categories (Motion, Looks, Sound, Pen, Data, Events, Control, Sensing, Operators, More Blocks) and a stack of script blocks including 'move 10 steps', 'turn 15 degrees', 'point in direction 90', 'point towards', 'go to x: 0 y: 0', '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', and 'set rotation style left-right'.
- Stage:** The central workspace where the cat sprite is currently positioned.
- Sprite List:** Located at the bottom left, showing 'Sprite1' with a cat icon.
- Blocks Palette:** A vertical label on the right side of the Scripts Area.

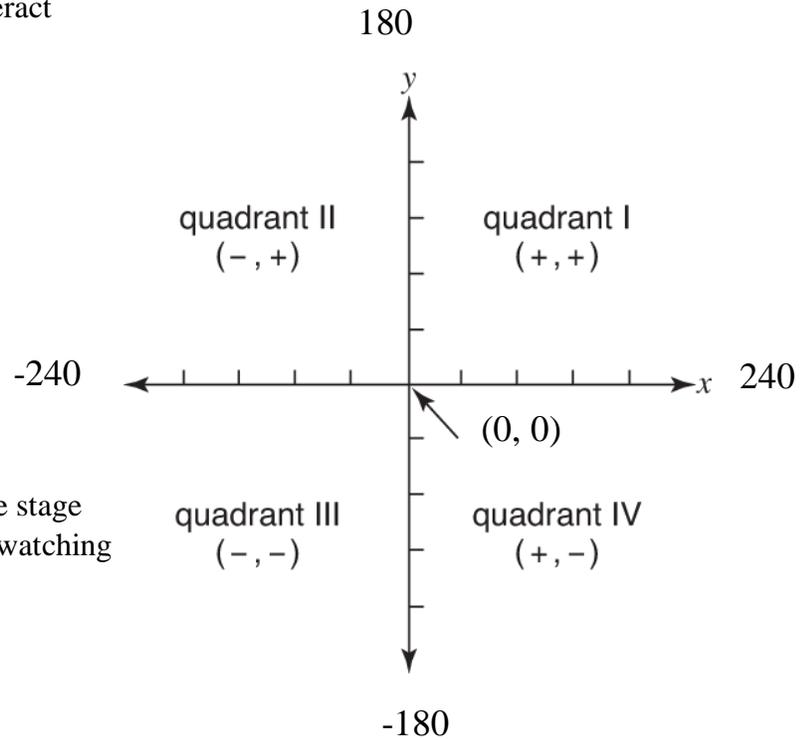
The Stage

Stage: where your sprites move, draw and interact

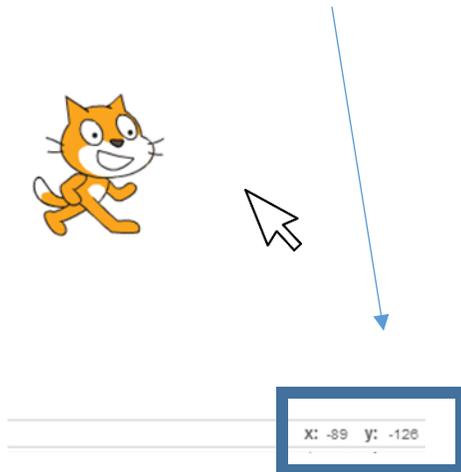
The stage is 480 steps wide and 360 steps tall.

X is horizontal

Y is vertical

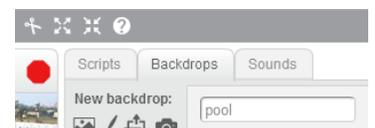
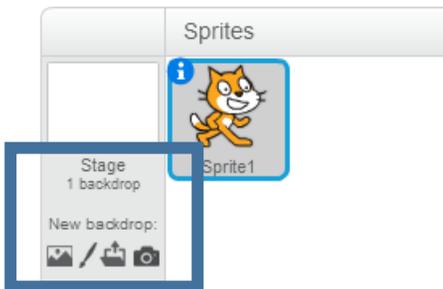


You can find the coordinates of any area of the stage by moving the mouse cursor to that point and watching the numbers in the Mouse (x, y) display area.



Backdrops Tab

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



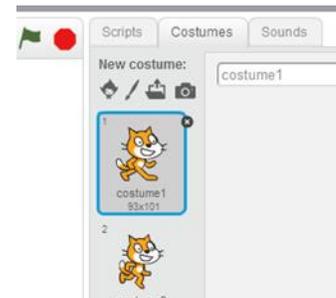
Sprite List

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:

Blue

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

Dark purple

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

Light purple

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

Dark green

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

Orange

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

Brown

- **Events:** trigger script execution

Yellow

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

Light blue

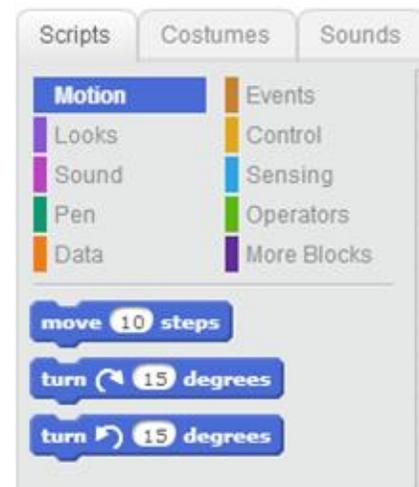
- **Sensing:** can determine location of mouse and sprites, whether touching something, etc.

Light green

- **Operators:** perform logical comparisons

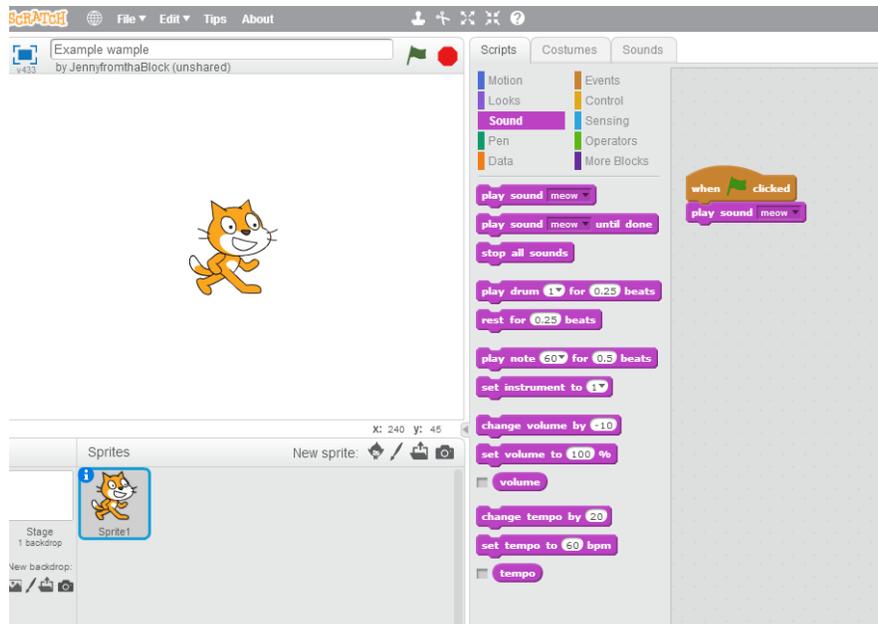
Deep purple

- **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 providing 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
 - signifies the end of a script—can only attach to other blocks

