



Scratch

A visual
programming
environment

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What is Scratch ?

- Scratch is a visual programming environment that makes it easy to create interactive stories, music, games, art, and animations – and share those creations on the web.
- Scratch presents powerful opportunities for learning – as people program and share with Scratch, they learn to think creatively, plan systematically, and work collaboratively, while also learning important computational ideas.

HISTORY

- The first version of Scratch was developed in 2003 by the *Lifelong Kindergarten* group, led by [Mitchel Resnick](#), at the [MIT Media Lab](#).
- The first official website was originally launched in 2006. Scratch 1.0 was then later available to the public for download on January 8, 2007.
- Scratch continued to update their site until late 2012 when they released Scratch 2.0 which offered many updates to the programming system and website design.

Objectives of Scratch unit

- Intro to visual programming environment
- Intro to programming with multimedia
- Story-telling | music-making | game-making
- Intro to programming concepts
 - objects and attributes
 - sequence, repetition
 - conditions, events, I/O

Secondary objectives

- Increase student skills with computers
- Increase student interest in programming
- Student achievement on fun project
- Learn Cartesian coordinates, distance computations, etc.

Start scratch and let's go!

- Open www.scratch.mit.edu and go to option “create”.
- When home, download from www.scratch.mit.edu
- Click on the cat icon
- Or, find “scratch” under “Programs”
- Scratch programming environment comes up quickly

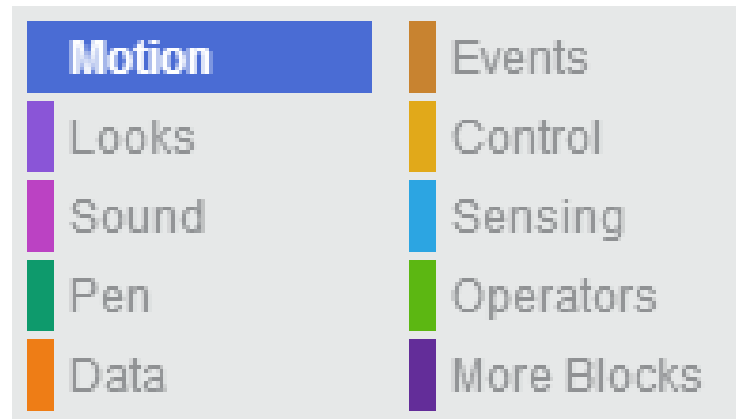
Major components

- At left: the stage with sprite[s] or objects or actors
- Center: operations and attributes for the sprites
- At right: scripts or program[s] for the behavior[s] of the sprites

- A **sprite** is a small graphic that can be moved independently around the screen, producing animated effects .
- **Blocks** are puzzle-piece shapes that are used to create code in Scratch .

Programming In Scratch!

- In the upper, center corner of your Scratch window, you will see 10 buttons .
- Each of these buttons have programming blocks in those particular areas.
- We will first experiment with the Motion blocks.



Motion!

- **Motion blocks** are the blocks that control a sprite's movement.
- There are 17 Motion blocks in Scratch 2.0 .
- Ex:-
- ✓ Move () Steps — Moves the sprite forward the amount of steps.

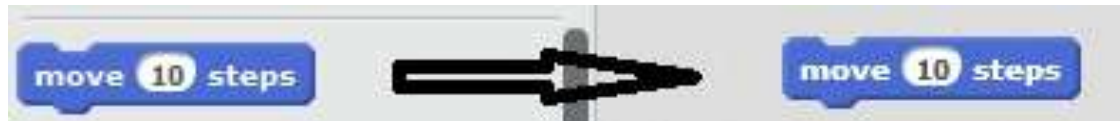


- ✓ Go to X: () Y: () — Moves the sprite to the specified X and Y position.



Motion!

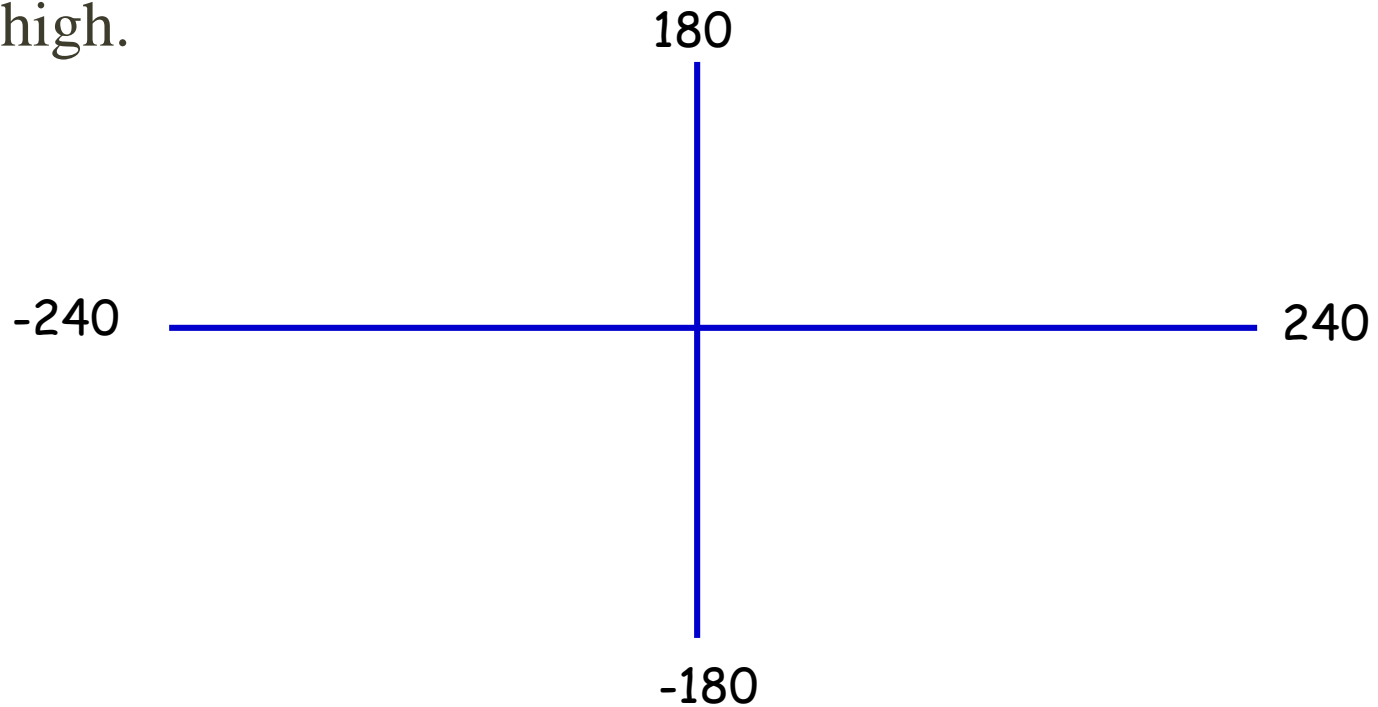
- Drag out the “move 10 steps” block.



- Change the “10” to “50” by clicking in the block and typing in 50.
- To see your sprite move 50 pixels to the right, double click on the block in the Script area. Cool, isn't it?!

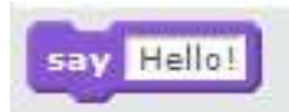
The Scratch Stage

- The Scratch stage is 480 pixels wide and 360 pixels high.

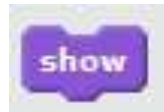


Looks!

- **Looks blocks** are the blocks that control a sprite's look.
- There are 23 Looks blocks in Scratch 2.0.
- Ex:-
 - ✓ Say () — A speech bubble appears over the sprite and will not go away over time.



- ✓ Show — Shows the sprite.



Sound!

- **Sound blocks** are the blocks that control sound and MIDI functions.
- There are 13 Sound blocks in Scratch 2.0.
- Ex:-
- ✓ Play Sound () — Plays a sound without pausing the script



- ✓ Stop All Sounds — Stops all playing sounds.



Pen!

- **Pen blocks** are the blocks that control the pen.
- There are 11 Pen blocks in Scratch 2.0.
- Ex:-
- ✓ Clear — Removes all pen marks put on the screen.



- ✓ Pen Up — Puts the sprite's pen up.



Data!

- **Variables blocks** are the blocks that hold values and strings.
- There are 5 Variables blocks in Scratch 2.0.
- Ex:-
- ✓ Set () to () — Sets the specified variable to the amount.



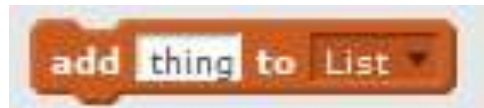
- ✓ Show Variable () — Shows the variable's Stage Monitor.



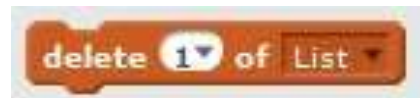
Data!

- **List blocks** are the blocks that manage lists. They are stored in the Data category.
- There are 10 List blocks in Scratch 2.0.
- Ex:-

- ✓ Add () to () — Adds an item to the list.



- ✓ Delete () of () — Deletes the item of the list.



Event!

- **Event blocks** are blocks that control events and the triggering of scripts.
- There are 8 Event blocks in Scratch 2.0.
- Ex:-
- ✓ When Green Flag Clicked — When the flag is clicked, the script activates.



- ✓ When () Key Pressed — When the specified key is pressed, the script activates.



Control!

- **Control blocks** are the blocks that control scripts.
- There are 11 Control blocks in Scratch 2.0.
- Ex:-
 - ✓ Wait () Secs — Pauses the script for the amount of time.



- ✓ Forever — A loop that will never end.



Sensing!

- **Sensing blocks** are the blocks that detect things.
- There are 20 Sensing blocks in Scratch 2.0.
- Ex:-
- ✓ Touching ()? — The condition for checking if the sprite is touching the mouse-pointer or another sprite.



- ✓ Key () Pressed? — The condition for checking if the specified key is being pressed.



Operators!

- **Operators blocks** are the blocks that perform math functions and string handling.
- There are 17 Operators blocks in Scratch 2.0.
- Ex:-
 - ✓ $() < ()$ — The condition for checking if a value is less than the other.



- ✓ $() + ()$ — The value of the addition.



More!

- **More blocks** are user-made custom blocks.
- There are 2 unique kinds of More blocks in Scratch 2.0.
- Ex:-
 - ✓ Define () — Defines a custom block.



- ✓ () — A custom block.



Let's make a small program that on hover on
sprite say
“hello world”

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