Scratch Programming

Key Concepts & Vocabulary

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1 The Scratch Interface

Sprite

A character or object that can be programmed. Not the background, not a sound — the thing you control with code.

Stage

The area where sprites appear and perform. Think of it as the screen of your project — everything visible happens here.

Costume

A sprite's visual appearance. Switching costumes creates animation, like flipping pages in a flipbook.

2 X, Y & the Motion Category

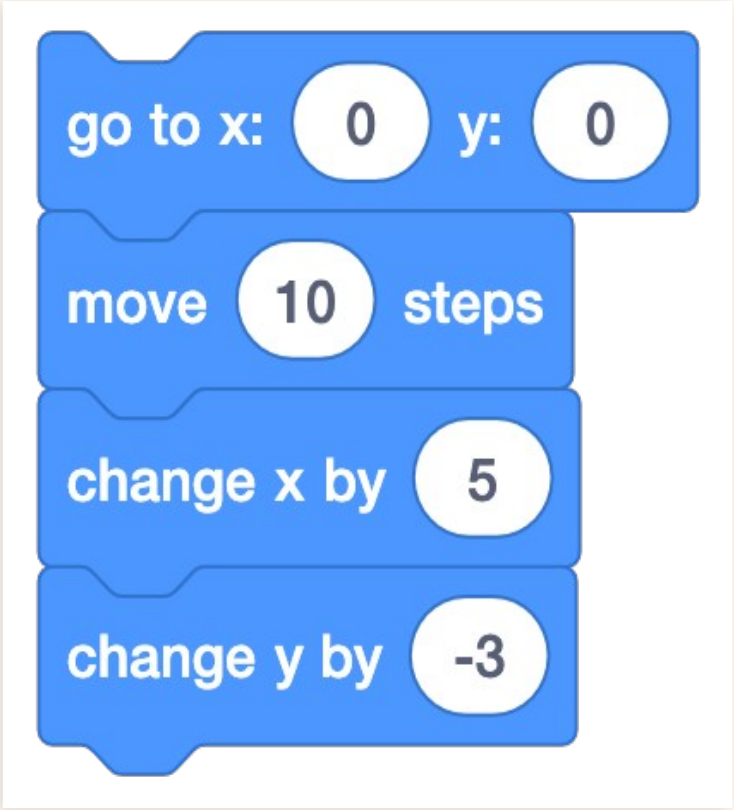
X = horizontal position (left/right)

Y = vertical position (up/down)

- Center of the Stage is (0, 0)
- X ranges −240 to 240, Y ranges −180 to 180

Motion (blue blocks) contains move, glide, go to, and change x/y

move 10 steps is in the Motion category



3 Events: Starting Your Code

- An event is a trigger that starts a script

when green flag clicked — the most common; starts code when the player hits ▶

when [key] pressed — responds to keyboard input

when this sprite clicked — responds to mouse clicks

- Without an event hat block, code won't run!

4 Algorithms & Debugging

Algorithm

- A step-by-step set of instructions to solve a problem.
- Like a recipe: do step 1, then step 2, then step 3.
- Sequencing = arranging code in order for the desired outcome. Order matters!

Debugging

- A bug is an error in your program — code that doesn't behave as expected.
- Debugging means finding and fixing those errors.
- Read your code line by line. Test often. Think like a detective.

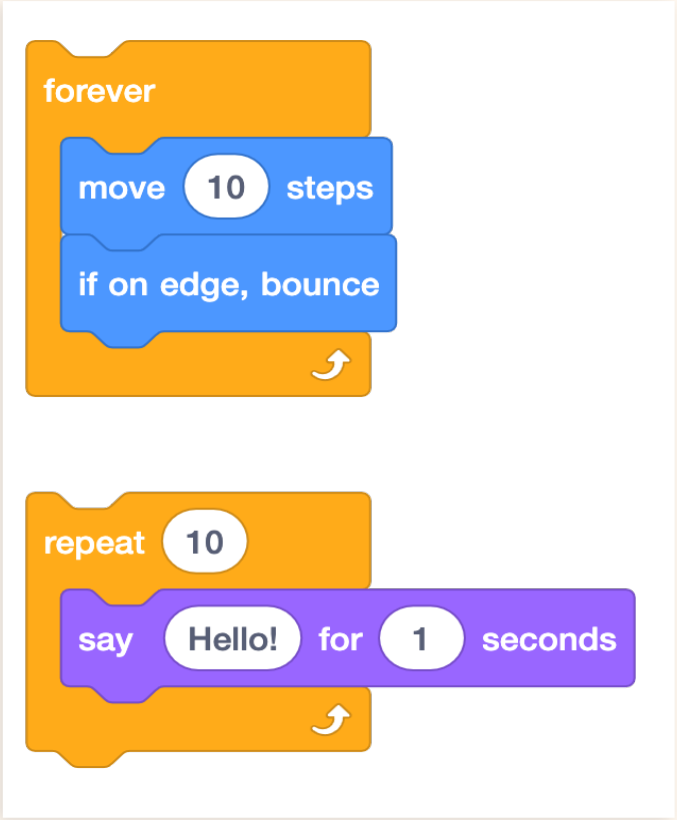
5 Loops (Iteration)

Iteration means repeating a set of instructions

forever — repeats blocks inside over and over without stopping

repeat (10) — repeats blocks a specific number of times

- Loops save you from writing the same code over and over
- Most game scripts use a forever loop to keep checking for input



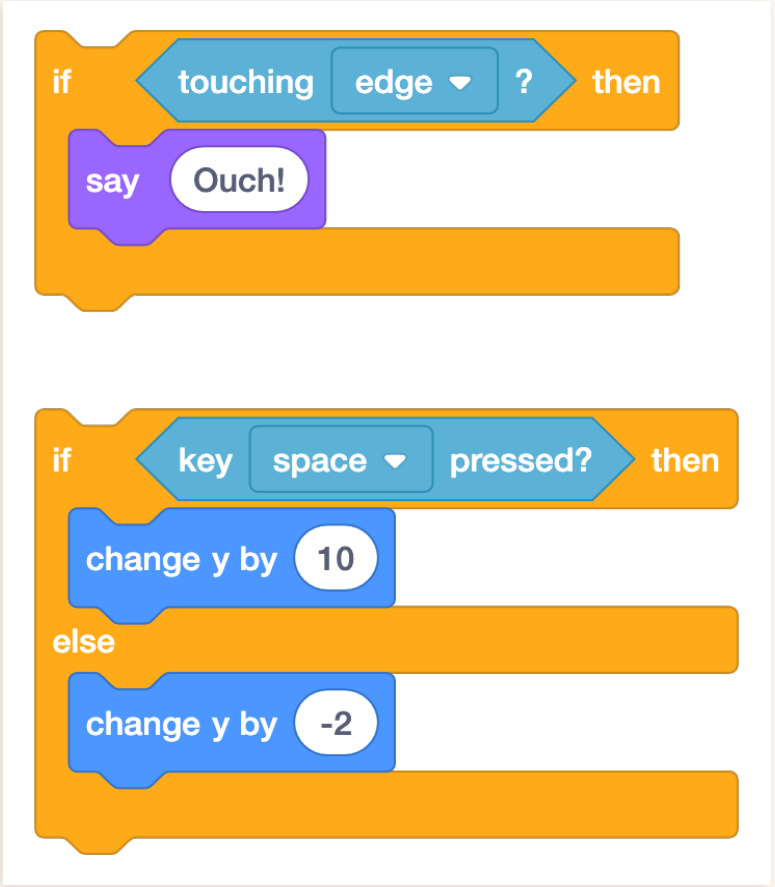
6 Conditionals: Making Decisions

- A conditional runs code only if a certain condition is true

if <> then — checks a condition; runs code if true

if <> then / else — two paths: one if true, one if false

- The diamond-shaped slot holds a boolean (true/false) value
- Conditionals let your program react to the world



7 Flow Diagrams

- Flow diagrams map out logic before you code

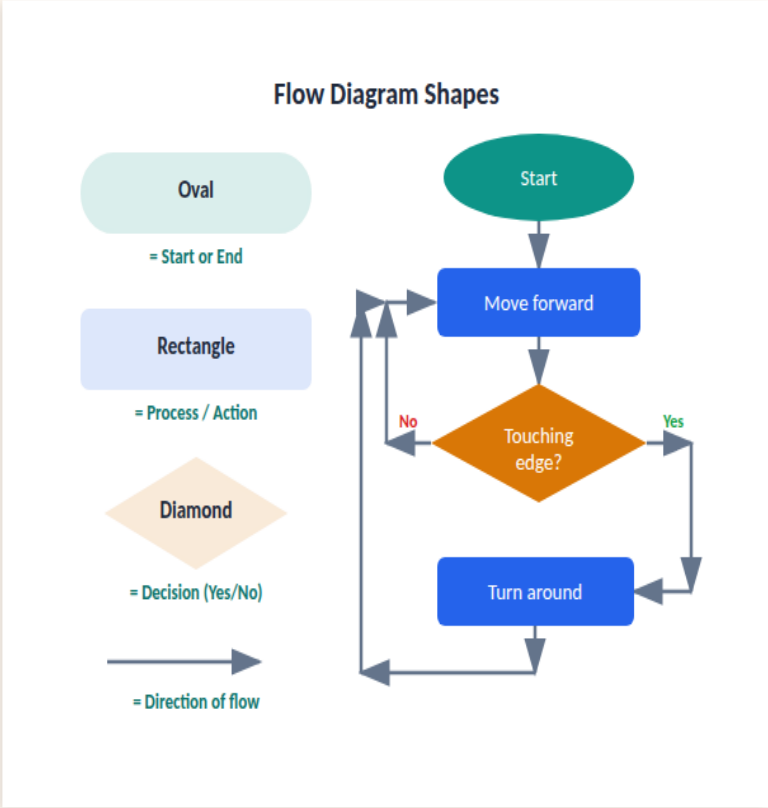
Oval = Start or End of the program

Rectangle = A process or action step

Diamond = A decision (yes/no question)

Arrows show the direction of flow

- Plan first, then code — it saves debugging time!



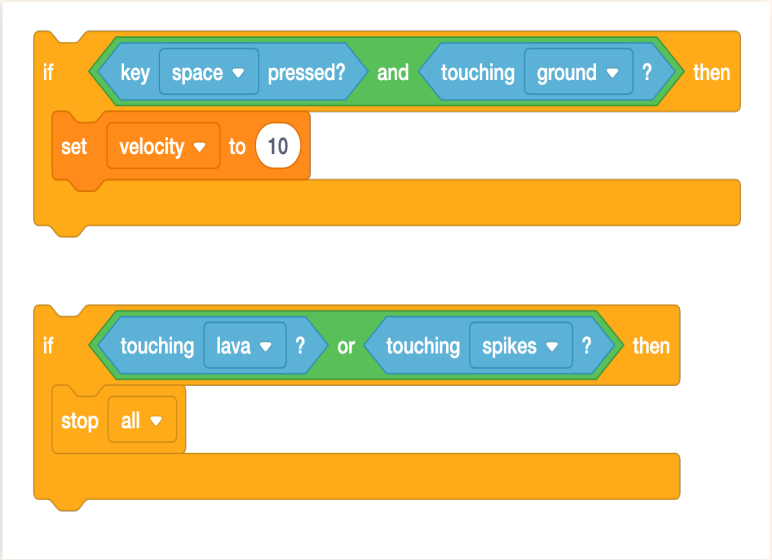
8 Boolean Operators: AND, OR, NOT

AND — true only when both conditions are true

OR — true when at least one condition is true

NOT — flips the result (true → false)

- Jump when pressing space AND touching ground
- Game over if touching lava OR touching spikes



Sensing: Detecting the World

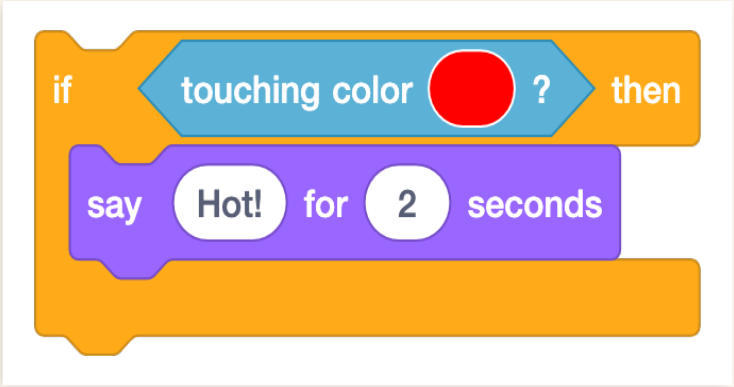
- Sensing blocks let sprites detect what's happening

touching [sprite] ? — is this sprite touching another?

touching color ? — is this sprite touching a specific color?

key [space] pressed? — is a key held down?

- Used for collision detection, controls, and game logic



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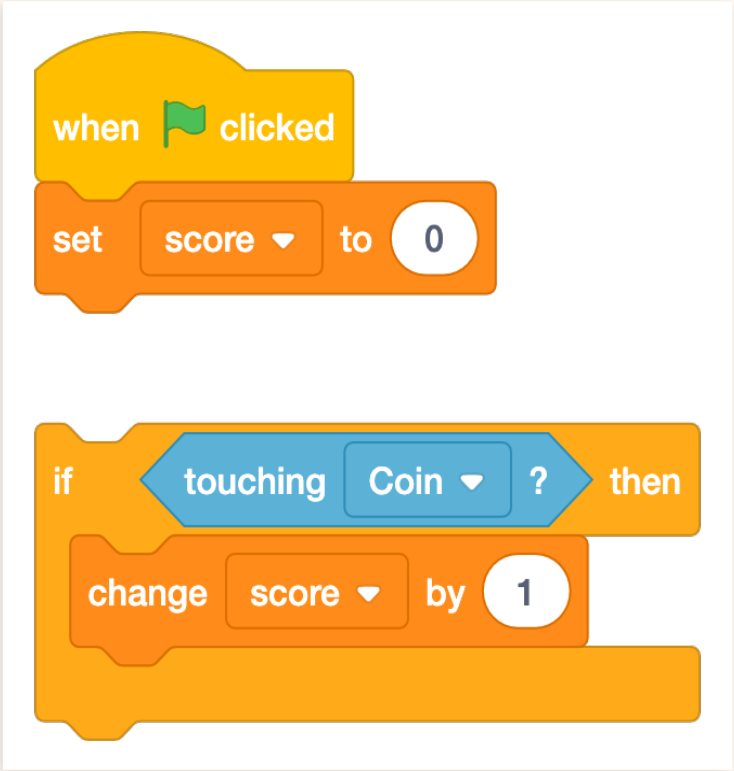
Variables: Keeping Score

- A variable is a named container that stores data (score, lives, timer)

set [score] to (0) — replaces the current value with 0

change [score] by (1) — adds 1 to the current value

- Set = replace entirely. Change = adjust by amount.
- These are NOT the same thing!



11 Clones: Copies at Runtime

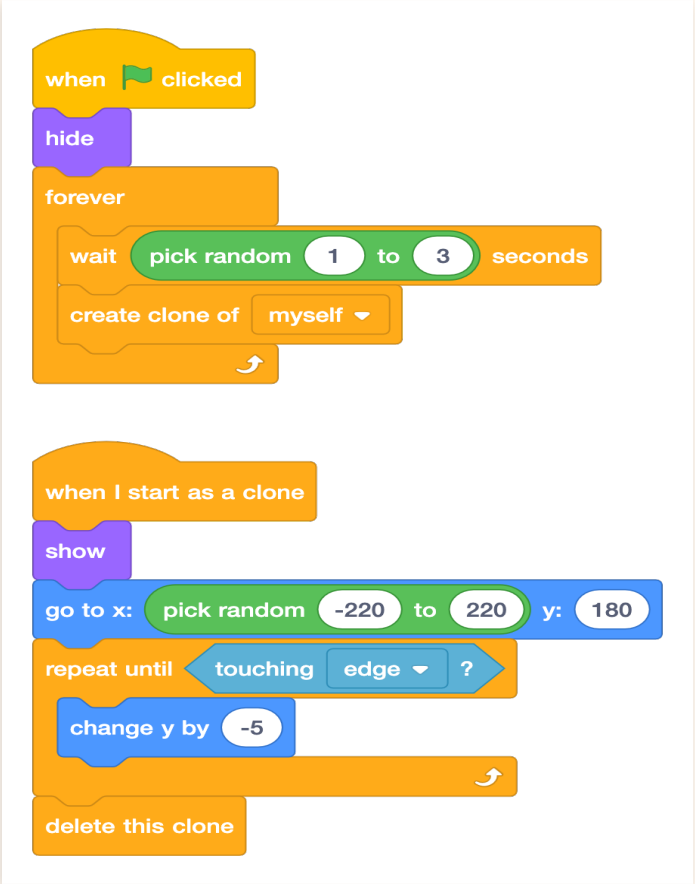
- A clone is an independent copy of a sprite created while the program runs

create clone of [myself] — makes the copy

when I start as a clone — runs code on the new clone

delete this clone — removes the clone from the Stage

- Different from duplicate — clones are created by code, not by hand



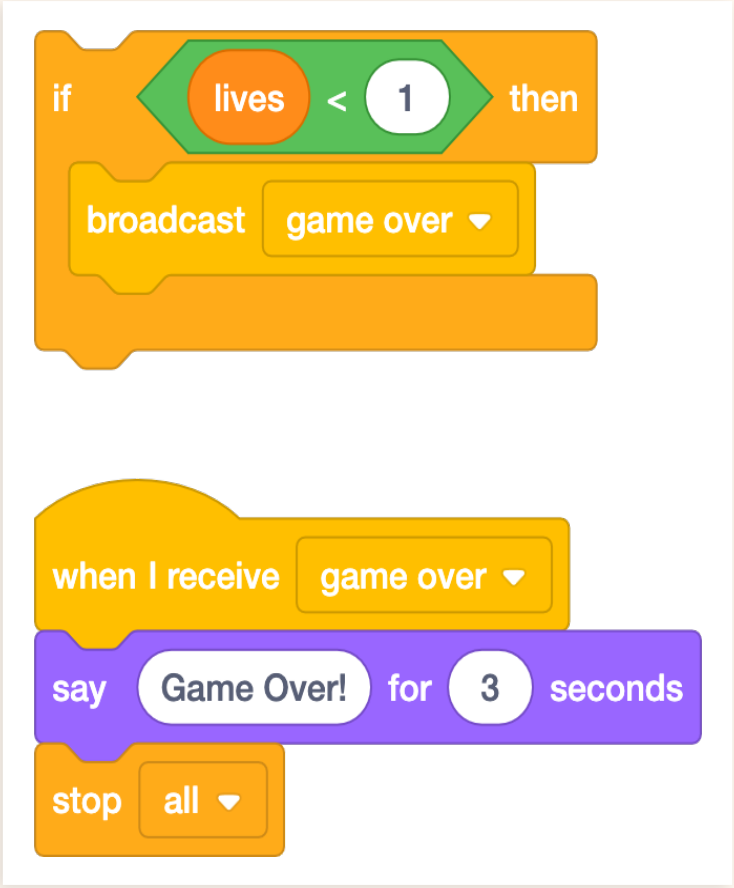
Broadcast & Receive

- Broadcast sends a message to every sprite in the project

broadcast [message] — sends the message

when I receive [message] — runs code when a sprite hears it

- Used for communication: “game over,” “next level,” “start”
- Sprites don’t need to know about each other — just listen



Key Vocabulary Review

Sprite A character or object you program

Stage Where sprites appear and perform

Algorithm Step-by-step instructions

Debugging Finding and fixing errors

Event A trigger that starts code

Motion Blue blocks for movement

Loops Repeating instructions. Each repetition called an iteration

Conditional Code that runs only if true

Boolean Values that are TRUE or FALSE (eg, 4 > 3 = FALSE)

Boolean Operators AND, OR, NOT (eg. NOT 4 > 3 = TRUE)

Sensing Detecting touches and keys

Variable Named container for data

Clone Runtime copy of a sprite

Broadcast Message to all sprites