Scratch concepts

Program describes an interactive multimedia performance.

Performance takes place in window called “stage”

Actors in the performance are called “sprites”
**Sprites**

Basic “objects” of scratch programs
- A lot like a state machine

What’s a sprite:
- Information: name, location (x,y), direction, visibility, “costume” (appearance), tempo…
- Action: move, draw with pen, make sound, change costume, send message, detect event

**How a scratch program runs**

Send a “start” message to all sprites

Each runs corresponding script
- Executes actions in sequence

Fancy features of scripts
- Messages to invoke other performance elements
- Interesting control structure
Graphical language for steps – motion

- move $s$ steps
- turn $t_x$ degrees
- turn $t_y$ degrees
- point in direction $d_x$ degrees
- point towards $d_y$ degrees
- go to $x$ and $y$
- go to $x$ alone
- slide $s$ next to $x$ and $y$
- change $x$ by $s$
- set $x$ to $y$
- change $y$ by $s$
- set $y$ to $z$
- if on edge, bounce

Graphical language for steps – appearance

- switch to costume $c_x$
- next costume $c_x$
- costume $c_x$
- say $s$ for $s$ seconds
- say $s$ times
- think $s$ for $s$ seconds
- think $s$ times
- change size by $s$
- set size to $s$
- shade
- hide
- up to front
- go back $s$ layers
- clear graphic effects
Graphical language for steps – sound

Graphical language for steps – pen
Graphical language for control

Commands

Write a program to do something
Give it a name
Then “broadcast” the name whenever you need it

Example programs: square, window.
Variables

Stores a simple value
- Can change the value
- Can test the value
- Can use the value

Example program: sizesquare, panes

Loops

Repeat a set number of times
- Called “for” loop if you count as you go along
Repeat until a condition holds
- Called “while” loop if you loop until condition fails
Repeat on smaller problems
- Called “recursion”
- Have to simulate it in Scratch
**Repeat loop**

Repeat a set number of times

Examples: drumroll, spiro.

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**If-then-else**

Evaluates a Boolean condition  
Executes only one block of code, depending.

Example program: coinflip