

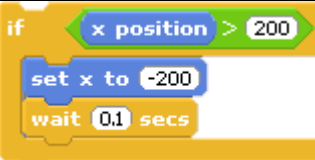


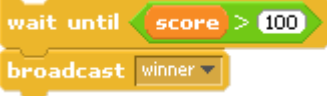

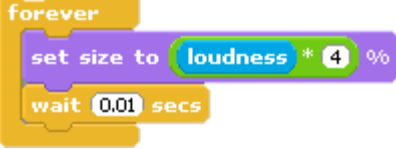
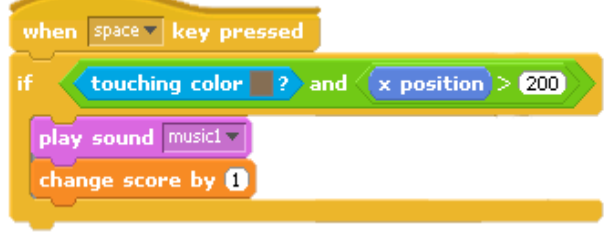





Programming Concepts and Skills Supported in Scratch

Fundamental Ideas about Computers and Programming

- computer programs tell the computer precisely what to do, step-by-step
- writing computer programs doesn't require special expertise, just clear and careful thinking

Concept	Explanation	Example
sequence	To create a program in Scratch, you need to think systematically about the order of steps.	 <pre> when space key pressed go to x: -100 y: -100 glide 2 secs to x: 0 y: 0 say 'Let the show begin!' for 2 secs play sound 'fanfare' and wait </pre>
iteration (looping)	forever and repeat can be used for iteration (repeating a series of instructions)	 <pre> repeat 36 play drum 54 for 0.2 secs move 10 steps turn 10 degrees </pre>
conditional statements	if and if-else check for a condition.	 <pre> if x position > 200 set x to -200 wait 0.1 secs </pre>
variables	The Variables category allows you to create a new variable and use it in a program. Scratch supports both global and object-specific variables.	 <pre> when clicked set score to 0 forever move 10 steps if touching color change score by 1 </pre>
threads (parallel execution)	Launching two stacks at the same time creates two independent threads that execute in parallel.	 <pre> when clicked glide 3 secs to x: -75 y: 82 glide 5 secs to x: 179 y: -130 when clicked forever next costume wait 1 secs </pre>

synchronization	broadcast can coordinate the actions of multiple sprites.	<p>For example, Sprite1 sends the message winner when condition is met:</p>  <p>This script in Sprite2 is triggered when the message is received:</p> 
real-time interaction	mouse_x , mouse_y , and loudness can be used as dynamic input for real-time interaction	
boolean logic	and , or , not are examples of boolean logic.	
random numbers	The pick random block selects random integers within a given range.	
event handling	when key pressed and when sprite clicked are examples of event handling – responding to events triggered by the user or another part of the program	
user interface design	You can design interactive user interfaces in Scratch – for example, using clickable sprites to create buttons.	

Programming concepts not currently introduced in Scratch:

- data structures (arrays, etc.)
- procedures and functions
- recursion
- inheritance
- defining classes of objects
- exception handling
- parameter passing and return values
- text input
- file input/output