



Block Coding 4: Variables and Broadcasts

Keep score, and let sprites send each other messages

Variables and Broadcasts

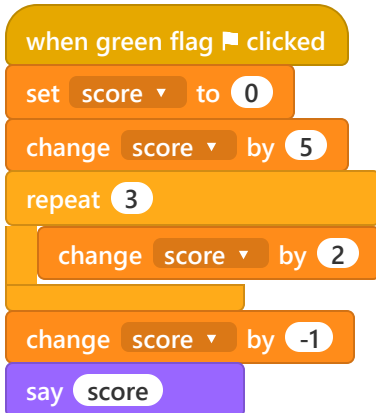
A **variable** stores a value that can change while the program runs, like a labeled box that holds one number. Games use variables such as `score` and `lives`. A variable holds only **one value at a time**.

`set score to (0)` **replaces** whatever is in the box with 0. `change score by (1)` **adds** 1 to the value already there, and `change score by (-1)` subtracts 1. The round `(score)` block reports the current value, so `say (score)` shows it.

A **broadcast** sends a **message** to every sprite. `broadcast [game over]` sends it, and every script that starts with `when I receive [game over]` then runs. The names must match.

1 Trace the Variable

Script A



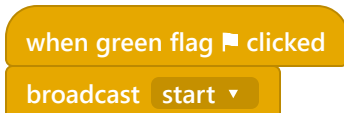
a. Track `score` in Script A. Write its value after each step.

Step	score
<code>set score to (0)</code>	
<code>change score by (5)</code>	
the <code>repeat (3)</code> loop finishes	
<code>change score by (-1)</code>	
<code>say (score)</code> shows:	

b. If the last change block were `set score to (-1)` instead, what would the sprite say? Why?

2 Sprites Talking

Cat sprite



Dog sprite



Ball sprite



a. The green flag is clicked. Which sprite's script runs when the Cat broadcasts **start**? Why?

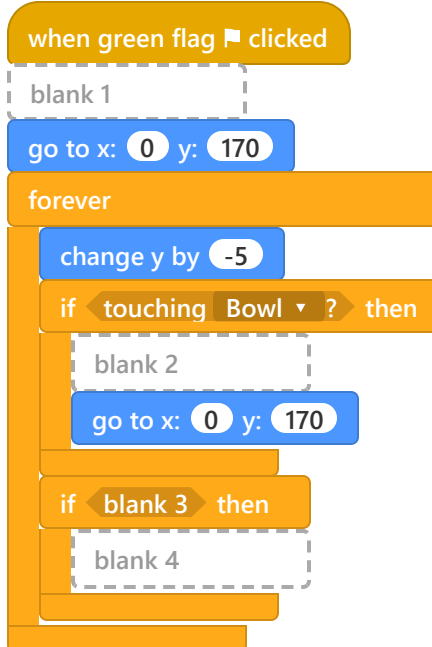
b. Does the Ball ever hide? If not, what one block would make it hide?



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3 Capstone: Plan a Catch-the-Apple Game**GAME RULES (USE EVERYTHING FROM LESSONS 1-4)**

1. Four sprites: **Bowl**, **Apple**, **Ground** (a strip along the bottom of the stage), and **Game Over** (a sign).
2. The left and right arrow keys move the Bowl left and right.
3. When the green flag is clicked, `score` starts at 0 and the Apple starts at the top (`x: 0`, `y: 170`), then keeps falling.
4. The Apple keeps checking. If it touches the Bowl, `score` goes up by 1 and the Apple goes back to the top. If it touches the Ground, it broadcasts **game over**.
5. The Game Over sign hides at the start. When it receives **game over**, it shows itself and stops everything.

The Apple's script

a. Fill in the four blanks in the Apple's script. Write the exact block for each.

- 1: _____
- 2: _____
- 3: _____
- 4: _____

b. Why does the Apple use `forever` around its `if` blocks?

4 Finish the Game

Write each sprite's scripts, one block per line. Each script starts with its own hat block.

a. **Bowl.** Use `change x by ( )`.

b. **Game Over.** Use `hide`, `show`, `stop [all]`.
