



Block Coding 2: Loops

Repeat blocks, and draw shapes with the Pen

NAME _____

DATE _____

CLASS _____

Loops and the Pen

A **loop** runs the same blocks over and over. Loops are the C-shaped blocks in the Control category. The blocks inside the C are the loop's **body**, and each trip through the body is one **iteration**.

`repeat (10)` runs its body exactly 10 times, then the script goes on to the block under the loop.

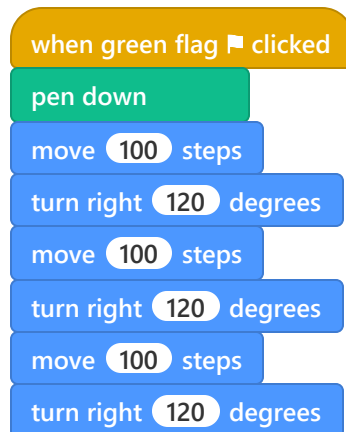
`forever` runs its body again and again until the red stop sign is clicked. Loops beat copy-pasting: scripts get shorter and easier to change.

With the **Pen** extension, a sprite draws a line wherever it moves after `pen down`; `pen up` stops drawing and `erase all` clears the stage. To draw a **regular shape** (all sides and angles equal), the sprite turns 360 degrees in all, so each **turn angle** = $360 / \text{number of sides}$. Square: $360 / 4 = 90$.

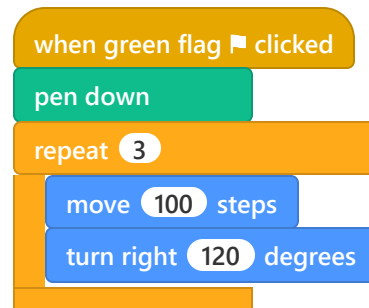
1 Copy-Paste vs. Loop

Both scripts start with the sprite at the center, facing right. They draw exactly the same picture.

Script A



Script B



a. What shape do both scripts draw?

b. To make every side 150 steps, how many numbers must you change?

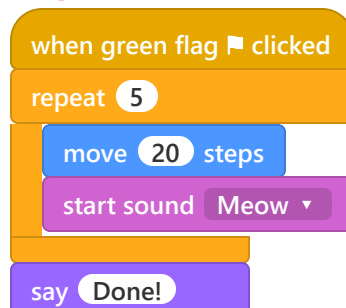
Script A: _____

Script B: _____

c. Why is the loop better than copy-pasting?

2 Count the Runs

Script C



a. How many times does `move (20) steps` run?

b. How many times does `say (Done!)` run? Why? Use the word **body**.

c. It started at `x: 0, y: 0`, facing right. Where does it end up?

x: _____

y: _____

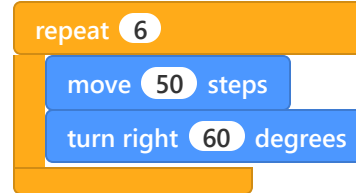


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3 Turn Angles

a. Fill in each turn angle (360 / number of sides).

Shape	Sides	Turn angle
Square	4	90
Triangle	3	
Pentagon	5	
Hexagon	6	
Octagon	8	

Script D

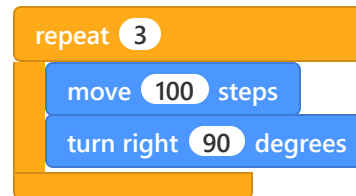
b. The pen is down. What does Script D draw? Why?

4 Debug It!

Each loop draws the wrong picture. Both sprites start facing right with the pen down.

Leo wants a triangle

a. What is wrong? What should Leo change?

Ava wants a square

b. What is wrong? What should Ava change?

5 Write Your Own Loop

a. When the green flag is clicked, clear the stage, put the pen down, and draw a **pentagon** with sides of 80 steps. Use one `repeat` loop. Write one block per line and indent the loop's body.

b. A pinwheel sprite should spin until the stop sign is clicked. Which loop should hold its `turn right (15) degrees` block? Circle one.

A. `repeat (10)`

B. `forever`