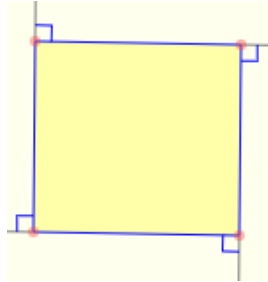


Lesson 2 - Square and Triangle Step by Step

PART I:

Before we decide to draw a square, we must define what a square is.



To help understand how to draw polygons, such as a triangle or square, you need to physically act out the drawing process:

Students will physically get up and walk in a square paying attention to their movement and direction.

Algorithm for Drawing a Square:

Review this Algorithm with students (they will have a copy of it)

Step 1: Put pen down on paper.

Step 2: Move pen a set amount of units.

Step 3: Turn clockwise to make a right angle (90 degrees).

Step 4: Move pen the same amount of units.

Step 5: Turn clockwise to make a right angle (90 degrees).

Step 6: Move pen the same amount of units.

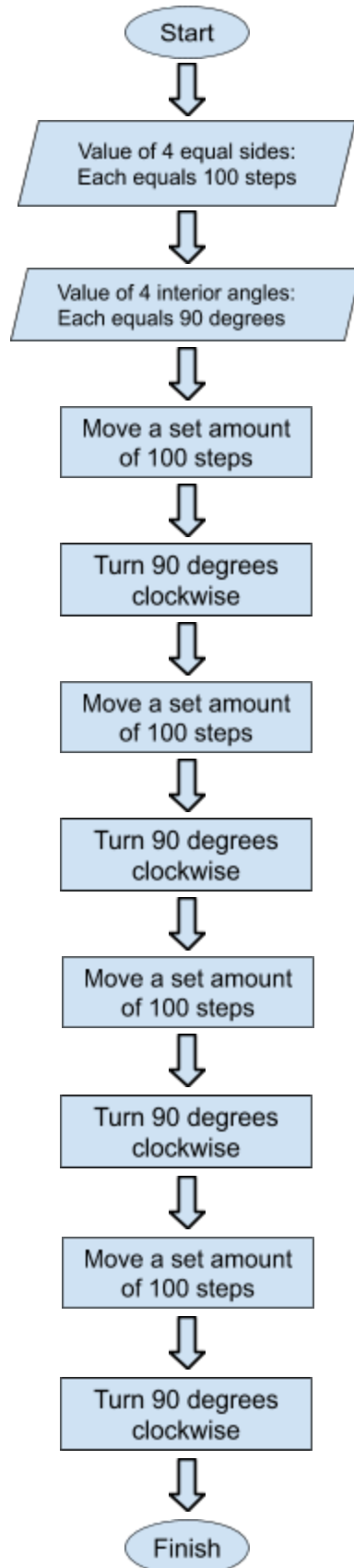
Step 7: Turn clockwise to make a right angle (90 degrees).

Step 8: Move pen the same amount of units.

Step 9: Turn clockwise to make a right angle (90 degrees).

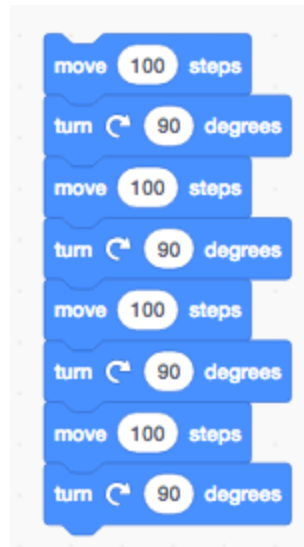
Step 10: Pick up pen from paper.

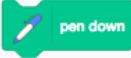
Below is a flowchart to help draw a square in scratch (refer to flowchart handout):



- Algorithm:
- ❖ Move a certain amount of steps.
 - ❖ Turn 90 degrees
 - ❖ Move a certain amount of steps.
 - ❖ Turn 90 degrees
 - ❖ Move a certain amount of steps.
 - ❖ Turn 90 degrees
 - ❖ Move a certain amount of steps.
 - ❖ Turn 90 degrees

Let us take our algorithm and write a code in Scratch. Below is what that algorithm should look in Scratch:



Don't forget to add the  block at the beginning so you can actually see where your sprite is going.

You've drawn a square!

Checkpoint 1

Questions to think about:

Q1. What is the perimeter of the shape in the above script?

Answer: The perimeter is $4 * 100 = 400$ units.

Q2. How many degrees does the sprite turn in total?

Answer: It is $4 * 90 = 360$ degrees.

Q3. What number do you need to change to make the shape larger/smaller?

Answer: Instead of "move 100 steps", if you write 150 steps then the drawing will be larger.

PART II:

Before we decide to draw an equilateral triangle, we must define what an equilateral triangle is.

Algorithm for Drawing an Equilateral Triangle:

To draw a triangle, keep in mind:

- ❖ The interior angle is 60 degrees.
- ❖ A triangle has three sides, so the steps should be repeated three times.

Create an algorithm and flowchart for drawing an equilateral triangle. Refer to the algorithm and flowchart in Part I as your guide. Imagine yourself telling a robot to do these steps; what would they need to do?

Now create a script using Scratch based on your algorithm and flowchart to construct an equilateral triangle.

Hopefully students code will look like this to allow teacher to work through checkpoint 2:

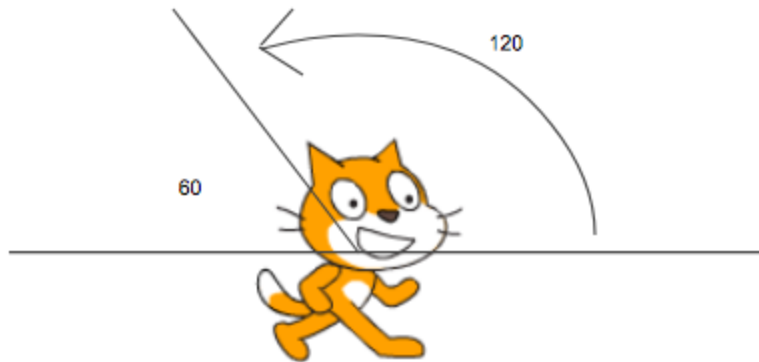


Now run your code.

Checkpoint 2

What went wrong?

To get a better understanding of what happened, let's look at the angles:



In order to create the 60 degree interior angle for the triangle, our sprite has to turn the supplementary 120 degrees.

→ With this new knowledge of Scratch and angles, write your new script for an equilateral triangle:



Checkpoint 3

Questions to think about:

Q4. If you've made a script to draw a triangle by turning clockwise 120 degrees at each corner, what will happen if you change the script to turn counter clockwise 120 degrees at each corner?



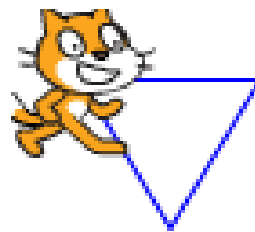
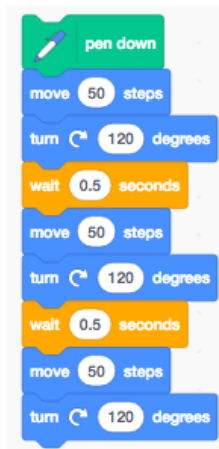
Answer: The script will draw a triangle in a different orientation.

Part III:

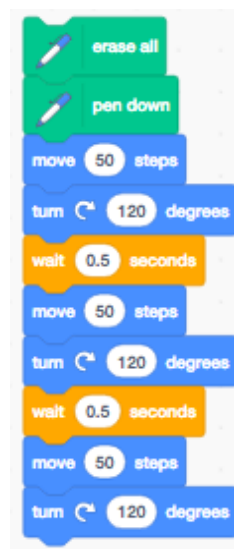
Introduce “Wait” Block”

Checkpoint 4

Q5: What happens when you add “wait” blocks? How does this help you?



Q6: What happens when you add a “clear” block? How does this help you?



Checkpoint 5

Explore. How many times will the sprite turn to draw a pentagon and a hexagon. How many degrees did the sprite turn in total?



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