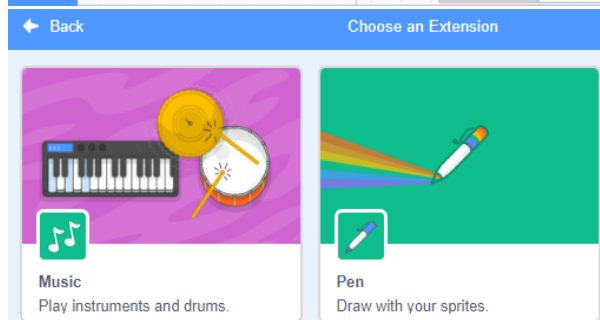
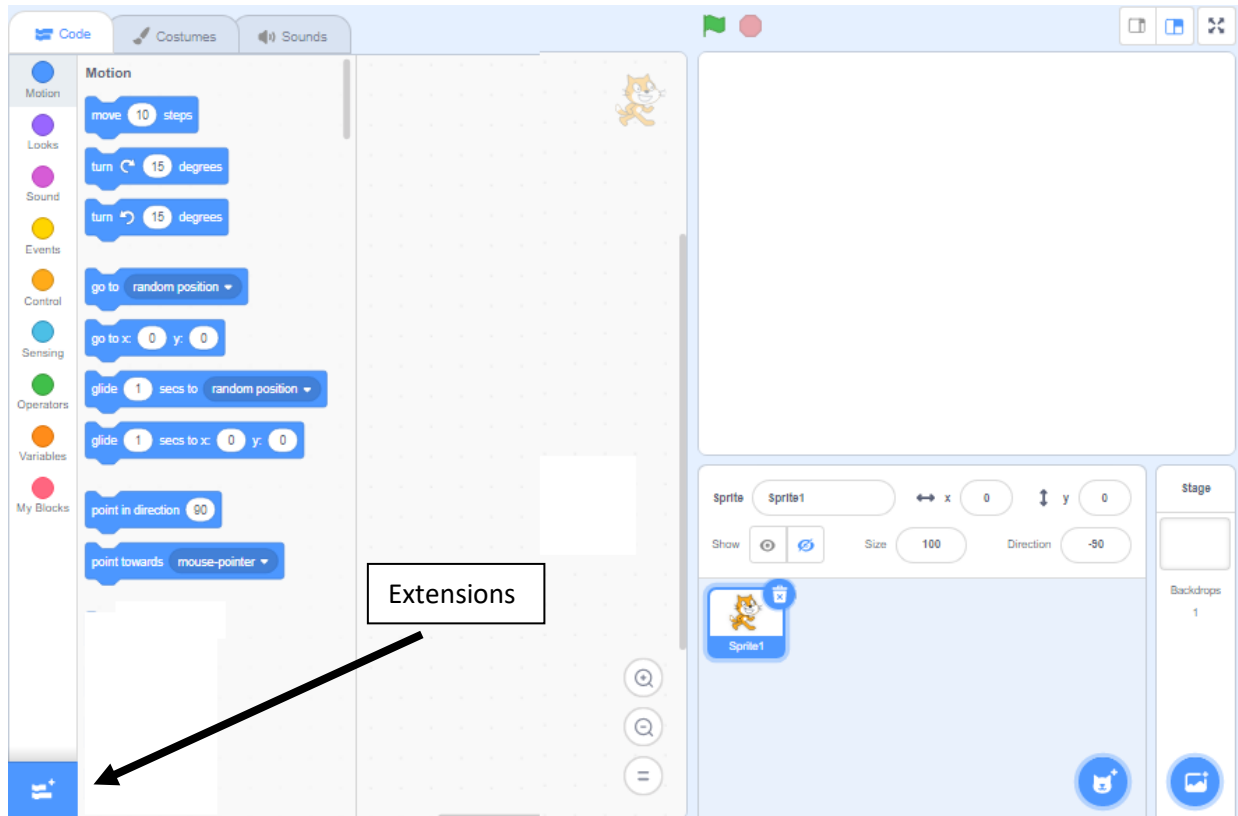


Coding Using Scratch – Geometric Designs – Squares and Rectangles

1) In this lesson you will use the basic Motion blocks, Pen blocks, and some Control blocks to create a series of squares which will create geometric designs.

A) Go to the Extensions and click to add the Pen blocks menu.



Resize your sprite to about the size of a nickel.

Click the Events blocks menu. Add Event when green flag clicked.

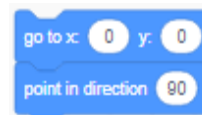


B) Add the following start up blocks. [Start up blocks get the program ready so that the action blocks can do what they need to do.]

Click the Motion blocks menu.

Add Motion go to x: 0 y: 0.

Add Motion point in direction 90 (right).



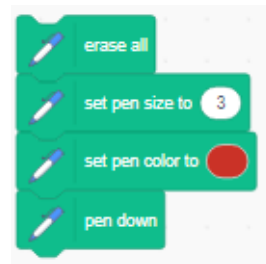
Click the Pen blocks menu.

Add Pen erase all block.

Add Pen block set pen size to 3.

Add Pen block set pen color. [You choose the colour.]

Add Pen block pen down.



C) Add the following action blocks.

Click the Control blocks menu.

Add Control block repeat 10. [This will be an outer loop.]

Inside the repeat 10 block

add Control block repeat 4. [This will form an inner loop.]

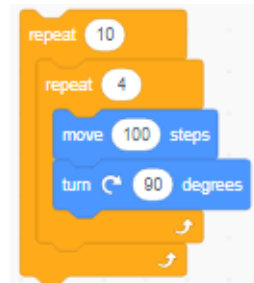
Click the Motion blocks menu.

Add Motion move 100 steps within the repeat 4 block.

Add Motion turn 90 degrees within the repeat 4 block.

[This is the last block of the inner loop.]

[All coding blocks that follow will be below the repeat 4 block.]



Click the Motion blocks menu.

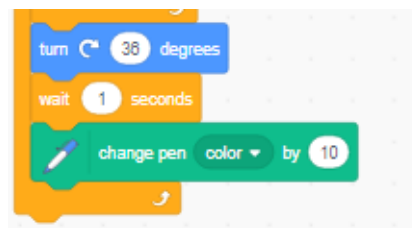
Add Motion turn 36 degrees.

Click the Control blocks menu.

Add Control wait 1 seconds.

Click the Pen blocks menu.

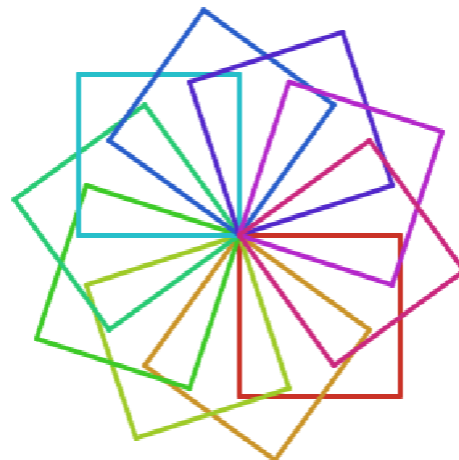
Add Pen block change pen color by 10.



D) This is what your program should look like.



Click the green flag to test your program.



Show Mr. Desmond what you have done.

Notice the inner loop creates a square.

four sides, four 90° turns

Notice all the internal angles of the shape equal 360° .

Notice your outer loop makes 10 squares with each square rotated 36° from the square before it.

10 squares, 36° turn between squares

Notice the shapes complete a full circle as they make the design. A circle equals 360° .

2) Try the following changes to see how they affect the program.

A) Click the Looks blocks menu.

Add Looks block show at the beginning of the program (below the Event block).

Add Looks block hide at the end of the program (below the Control block repeat 10).

Test your program again.

B) Remove the Pen block change pen color by 10 from the outer loop and test your program again.

C) Remove the Control block wait 1 second from the outer loop and test your program again.

Moving forward you can decide whether or not to use these changes as part of your code for your geometric designs.

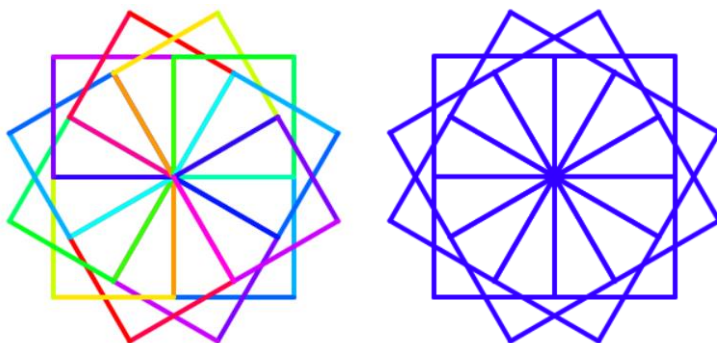
3) Notice that multiplying the outer loop repeat and loop values equals 360.

Why do we want this to equal 360?

What are some numbers that when multiplied equal 360?

Experiment with different outer loop repeat and turn values that equal 360.

Show Mr. Desmond three square based geometric designs.



4) In this lesson you will use hexagons to create geometric patterns and designs.

Use the same blocks as you used in your square design, but change the inner loop to create a hexagon instead of a square.

Experiment with different outer loop repeat and turn values that equal 360.

Show Mr. Desmond your three favourite hexagon based geometric designs.

- 5) In this lesson you will use octagons to create geometric patterns and designs.
Use the same blocks as you used in your square design, but change the inner loop to create an octagon instead of a square.
Experiment with different outer loop repeat and turn values that equal 360.
Show Mr. Desmond your three favourite octagon based geometric designs.

- 6) In this lesson you will use pentagons to create geometric patterns and designs.
Use the same blocks as you used in your square design, but change the inner loop to create a pentagon instead of a square.
Experiment with different outer loop repeat and turn values that equal 360.
Show Mr. Desmond your three favourite pentagon based geometric designs.

- 7) In this lesson you will create your own geometric designs.
Use the same blocks as you used in your square design, but change the loop and angle values to create unique designs.
Experiment with different outer loop repeat and turn values that equal 360.
Try five different designs.
Show Mr. Desmond your geometric designs.