



Don't load
Scratch



Work with a partner
of same ability

Investigate (read algorithm)

Read the algorithm on the left. It has two procedures you can tell they are procedures because they have been **defined**.

The main program algorithm uses the procedures as many times as it needs.

Work with a partner to answer these questions.

- 1, How many times in the main program algorithm is the **rectangle** procedure used?
- 2, Put a circle around the loop that is nested inside another loop.
- 3, How many times in the main program algorithm is the **square** procedure used?
- 4, Initialisation means thinking about how the idea can be reused by resetting itself back to where it started and removing the effects of previous use. Circle any instructions that might be initialisation.

Predict

Think about what the instructions do in the main program algorithm starting at the top and working through to the bottom. Explain each step to your partner. Now draw what you think the

program will look like when it runs.

<p>define rectangle</p> <p>Start drawing pen down</p> <p>loop 2</p> <p style="padding-left: 20px;">move 50 forward</p> <p style="padding-left: 20px;">right 90 degrees</p> <p style="padding-left: 20px;">pause</p> <p>Loop 2</p> <p style="padding-left: 20px;">move 20 forward</p> <p style="padding-left: 20px;">right 90 degrees</p> <p style="padding-left: 20px;">pause</p> <p>stop drawing pen up</p>	<p>define square</p> <p>Start drawing pen down</p> <p>loop 4</p> <p style="padding-left: 20px;">move 20 forward</p> <p style="padding-left: 20px;">right 90 degrees</p> <p style="padding-left: 20px;">pause</p> <p>stop drawing pen up</p>
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<p>Main program algorithm</p> <p>Start green flag</p> <p>Point right</p> <p>Return character to centre with x and y command</p> <p>Clear all lines</p> <p>Loop 4 times</p> <p style="padding-left: 20px;">right 90 degrees</p> <p style="padding-left: 20px;">rectangle procedure</p> <p style="padding-left: 20px;">Move 80 forward</p> <p style="padding-left: 20px;">Loop 3 times</p> <p style="padding-left: 20px;">square procedure</p> <p style="padding-left: 20px;">right 120 degrees</p> <p style="padding-left: 20px;">Move backwards 80</p>

**Exploring Nested
Loops Using
Procedures**



PRIMM with algorithm page 2

Work with a partner. Open Scratch and load
exploringnestedloopswithprocedures



Code-it Gold Resource

Run the code

Were your predictions correct?

Mark your investigate questions on the previous page using the answer sheet.

Modify (to make small changes)

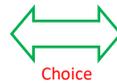
- 1, Name two ways to make the program run more slowly?
- 2, What does the move 80 and the move -80 do to the pattern?
Change the numbers to find out.
- 3, What would you change to make the program draw four squares after each rectangle?
- 4, What would you change to make the program draw five rectangles perfectly spaced?

Mark your modify questions using the answer sheet.

Make

Work on your own

Choose one or more of the make options below



Choice



Work on
your own

Option 1

Create another nested loop and another procedure called **smallsquare** to draw a pattern of squares at the end of each square.

Option 2

Change the main program so that it uses the same procedures and nested loops to create a different pattern.

Option 3

Come up with your own suggestion that uses nested loops and procedures. Talk to your partner about it first.

Exploring Nested
Loops Using
Procedures



Investigate answers

1, 4 times as it is in a loop (1 mark)

2, Circle around this loop (1 mark)

Loop 3 times

square procedure

Right 120 degrees

3, It is used 12 times. The outer counted loop multiplies by the inner counted loop ($4 \times 3 = 12$) (1 mark)

4, Point right, Return character to centre with x and y command, Clear all lines

(1 mark for each total 3 marks)

Modify answers

1, Increase the wait blocks in the procedures to longer than 0.2 seconds. Add more wait blocks into either the procedures or the main program. (1 mark for each change, 2 marks in total)

2, 80 moves the three square pattern further out from the central pattern and the -80 move back in to draw another rectangle in the centre. (1 mark)

3, You would need to change the nested loop so that instead of three loops it carried our four loops and you would need to change the turn between loops to 90 degrees as $4 \times 90 = 360$ where as $4 \times 120 = 480$ would be over 360 and lead to an uneven pattern. (1 mark)

4, Change the outer loop to 5 and the first turn right to 72 degrees. (1 mark)

Exploring Nested Loops Using Procedures

