














Programming Turtle Logo and Scratch: Pen Up and Pen down

<p>Aim: Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.</p> <p>Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.</p> <p>Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.</p> <p>This unit continues the learning from the Year 2 Turtle Logo units and links well to shape and direction in Maths.</p> <p>I can create and debug algorithms using pen up and pen down.</p>	<p>Success Criteria: I can write commands in the correct order.</p> <p>I can write a variable value where required.</p> <p>I can correct any mistakes.</p> <p>I can use the pen up and pen down command.</p>	<p>Resources: Lesson Pack</p> <p>Desktop computer /laptop</p> <p>Turtle Logo application (installed or online)</p> <p>Whiteboards and pens or books, pens and pencils for recording.</p>
	<p>Key/New Words: Algorithm, instructions, commands, forward (fd), left (lt), right (rt), move, turn, clear screen (cs), variable, pen up, pen down.</p>	<p>Preparation: None needed</p>

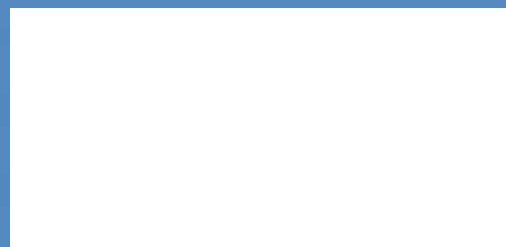
Prior Learning: Children will have created an algorithm using the move, rotate and repeat commands in lesson 1.

Learning Sequence

	<p>How Many? Give the children 2 minutes to draw as many squares as they can. They must start in the same corner and grow. What time saving commands can you use? (Repeat and up arrow to copy previous algorithms).</p>	
	<p>Lifting the Pen: Introduce children to penup and pendown commands. Ask the children what algorithm would make a dotted line? Remind the children to snip or screenshot their work as they did last lesson.</p>	
	<p>Pen Up and Pen Down: Children use the differentiated Activity Sheets and use a dotted line to draw concentric squares and rectangles.</p> <div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">  <p>Children are given step by step support to write the algorithms.</p> </div> <div style="text-align: center;">  <p>Children are given prompts to help them write the algorithms.</p> </div> <div style="text-align: center;">  <p>Children work independently.</p> </div> </div>	
	<p>Share: Children share the pictures and patterns they have created and the algorithms they have used to create the patterns and letters.</p>	
	<p>Which Algorithm Will Draw This Shape? Which algorithm will draw the shape on the slide? Children decide as a class which answer to select, ask them to explain their choice. (If the incorrect answer is chosen you can click on the shape to return to the question to try again.)</p>	

Taskit

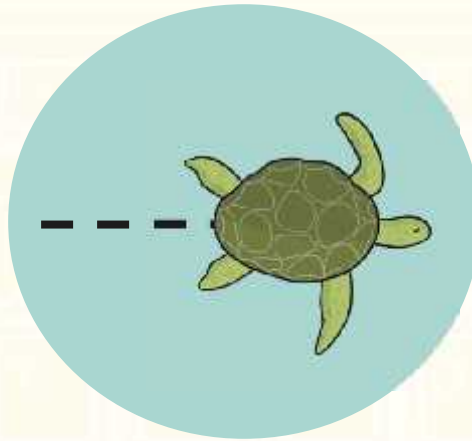
Patternit: Children make algorithms for repeating shapes with spaces between.



Computing

Programming Turtle Logo and Scratch

Pen Up and Pen Down



Aim

- I can create and debug algorithms using pen up and pen down.

Success Criteria

- I can write commands in the correct order.
- I can write a variable value where required.
- I can correct any mistakes.
- I can use the pen up and pen down commands.

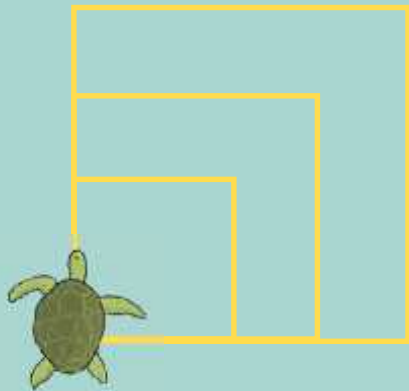
How Many?



You have 2 minutes to draw as many squares as you can.
All of the squares need to start at the same corner.

Which commands will help?

- Repeat
- Up arrow to use previous algorithm



Click on the timer to start

Lifting the Pen

Penup will lift the pen so the turtle will not draw as it moves.

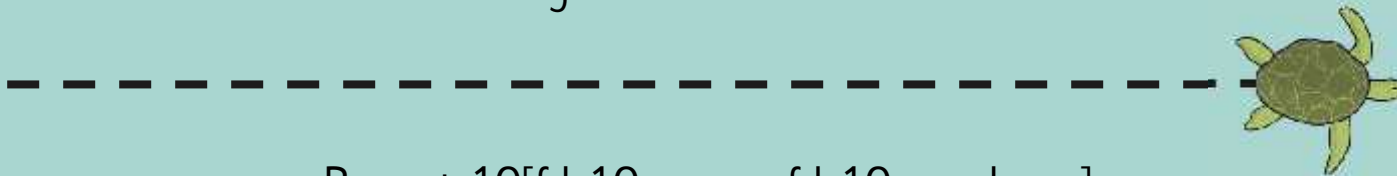


Pendown places the pen back down so that it draws again.



These commands allow you to leave a space between objects.

How could you make this dashed line?

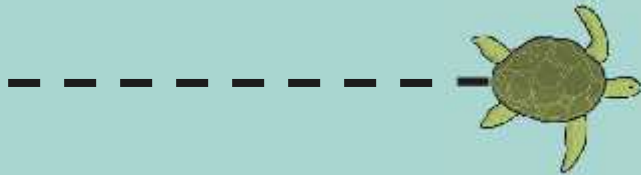


Repeat 10[fd 10 penup fd 10 pendown]

Pen Up and Pen Down



1. Draw a dashed line using penup and pendown.



2. Draw a set of concentric circles and squares.



Remember to snip or take a screenshot of your pictures and algorithms.

Can you create algorithms for the capital letters T, O, P and A?

Can you create an algorithm for a 3 letter word?

Share

Share your pictures, patterns and algorithms.



What difficulties did you have?

How did you overcome them?

What has your partner done well?



Which Algorithm Will Draw This Shape?



A

```
repeat 4[fd 50 rt 90]
fd 100
repeat 4[fd 50 rt 90]
```

B

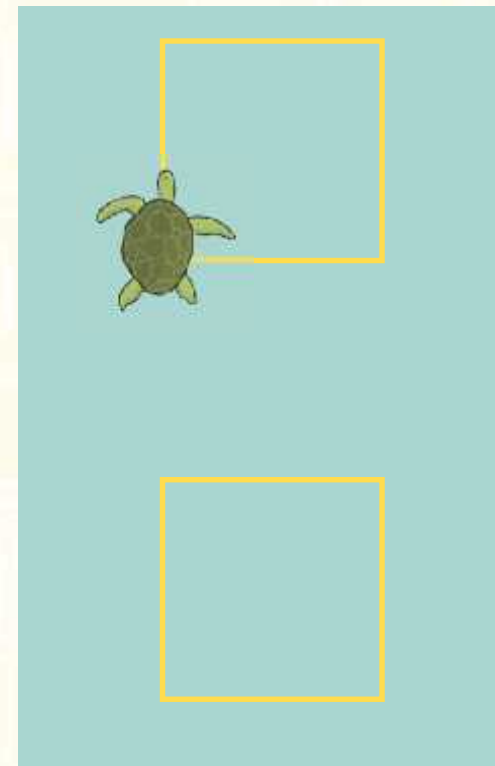
```
repeat 4[fd 50 rt 90]
penup fd 50
pendown
repeat 4[fd 50 rt 90]
```

C

```
repeat 4[fd 50 rt 90]
penup fd 150
pendown
repeat 4[fd 50 rt 90]
```

D

```
repeat 4[fd 50 rt 90]
penup fd 100
pendown
repeat 4[fd 50 rt 90]
```



Click on the algorithm that you think is correct

Which Algorithm Will Draw This Shape?



A

```
repeat 4[fd 50 rt 90]
fd 100
repeat 4[fd 50 rt 90]
```

Incorrect:

Pen not lifted so there would be a line joining squares.

B

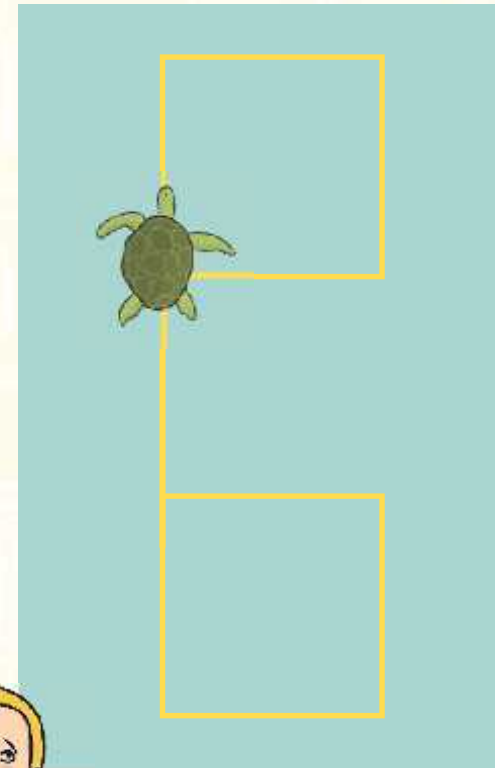
```
repeat 4[fd 50 rt 90]
penup fd 50
pendown
repeat 4[fd 50 rt 90]
```

C

```
repeat 4[fd 50 rt 90]
penup fd 150
pendown
repeat 4[fd 50 rt 90]
```

D

```
repeat 4[fd 50 rt 90]
penup fd 100
pendown
repeat 4[fd 50 rt 90]
```



Click on the shape to try again.

Which Algorithm Will Draw This Shape?



A

```
repeat 4[fd 50 rt 90]
fd 100
repeat 4[fd 50 rt 90]
```

B

```
repeat 4[fd 50 rt 90]
penup fd 50
pendown
repeat 4[fd 50 rt 90]
```

Incorrect:

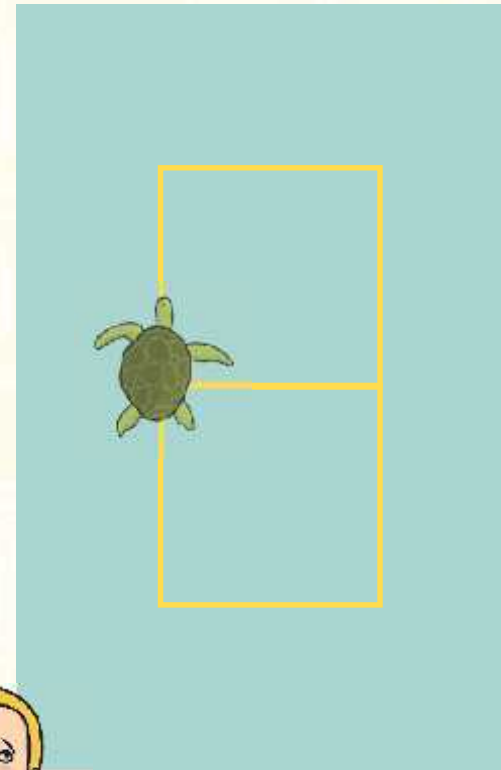
Squares would be touching,
one above the other.

C

```
repeat 4[fd 50 rt 90]
penup fd 150
pendown
repeat 4[fd 50 rt 90]
```

D

```
repeat 4[fd 50 rt 90]
penup fd 100
pendown
repeat 4[fd 50 rt 90]
```



Click on the shape to
try again.

Which Algorithm Will Draw This Shape?



A

```
repeat 4[fd 50 rt 90]
fd 100
repeat 4[fd 50 rt 90]
```

B

```
repeat 4[fd 50 rt 90]
penup fd 50
pendown
repeat 4[fd 50 rt 90]
```

C

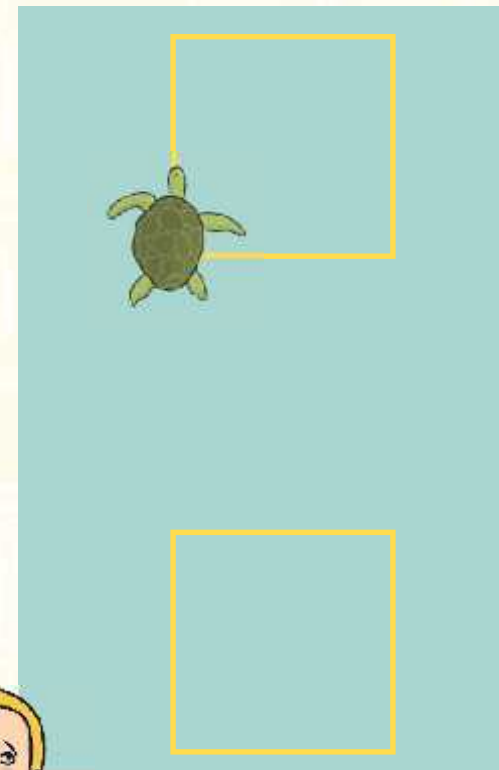
```
repeat 4[fd 50 rt 90]
penup fd 150
pendown
repeat 4[fd 50 rt 90]
```

D

```
repeat 4[fd 50 rt 90]
penup fd 100
pendown
repeat 4[fd 50 rt 90]
```

Incorrect:

Space between squares too big (100).



Click on the shape to try again.

Which Algorithm Will Draw This Shape?



A

```
repeat 4[fd 50 rt 90]
fd 100
repeat 4[fd 50 rt 90]
```

B

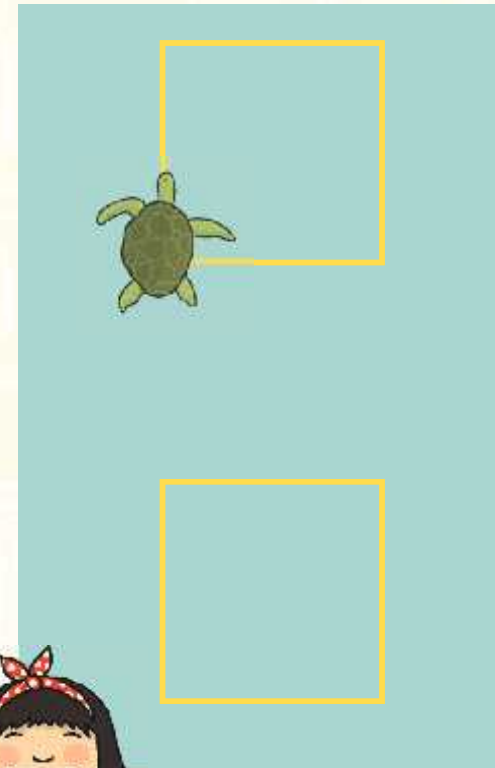
```
repeat 4[fd 50 rt 90]
penup fd 50
pendown
repeat 4[fd 50 rt 90]
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C

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repeat 4[fd 50 rt 90]
penup fd 150
pendown
repeat 4[fd 50 rt 90]
```

D

```
repeat 4[fd 50 rt 90]
penup fd 100
pendown
repeat 4[fd 50 rt 90]
```



Correct



Well done!



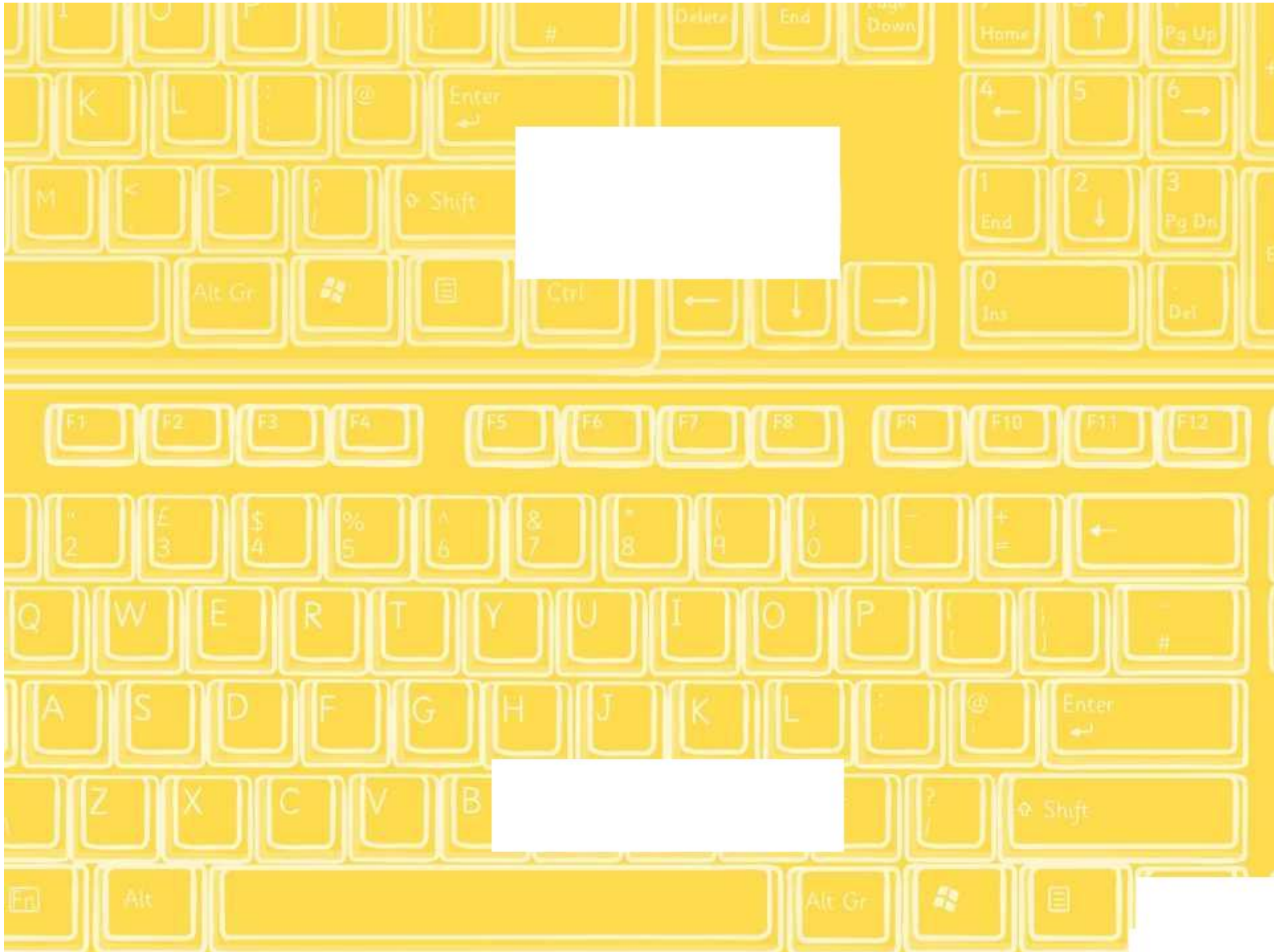
Aim



- I can create and debug algorithms using pen up and pen down.

Success Criteria

- I can write commands in the correct order.
- I can write a variable value where required.
- I can correct any mistakes.
- I can use the pen up and pen down commands.





Pen Up and Pen Down

Draw the following algorithms in Turtle Logo.

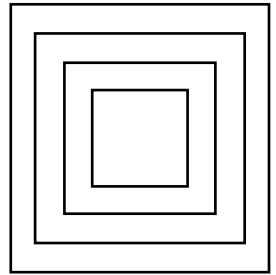
Remember to snip or take a screen shot of your work to save your pictures, patterns and algorithms.

Concentric Squares

Draw a set of concentric squares (squares with the same centre).

1. Draw a square of side 50 using the algorithm, repeat 4[fd 50 rt 90].
2. Use the penup command.
3. Move to a new position using the algorithm, bk 25 lt 90 fd 25 rt 90.
4. Use the pendown command.
5. Draw a square of side 100.
6. Move the turtle again (remember penup and pendown).
7. Draw a square of side 150.
8. Move the turtle again (remember penup and pendown).
9. Draw a square of side 200.

You should end up with a pattern like this.

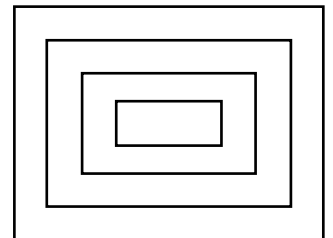


Concentric Rectangles

Draw a set of concentric rectangles (rectangles with the same centre).

1. Draw a rectangle of side 25 by 50 using the algorithm, repeat 2[fd 25 rt 90 fd 50 rt 90].
2. Use the penup command.
3. Move to a new position using the algorithm, bk 25 lt 90 fd 25 rt 90.
4. Use the pendown command.
5. Draw a rectangle of side 75 by 100 using the algorithm, repeat 2[fd 75 rt 90 fd 100 rt 90].
6. Move the turtle again (remember penup and pendown).
7. Draw a rectangle of side 125 by 150.
8. Move the turtle again (remember penup and pendown).
9. Draw a rectangle of side 175 by 200.

You should end up with a pattern like this.





Pen Up and Pen Down

Draw the following algorithms in Turtle Logo.

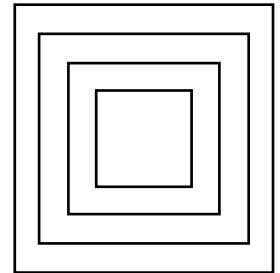
Remember to snip or take a screen shot of your work to save your pictures, patterns and algorithms.

Concentric Squares

Draw a set of concentric squares (squares with the same centre).

1. Draw a square of side 50.
2. Lift the pen.
3. Move the turtle 25 to the left and 25 down.
4. Put the pen down again.
5. Draw a square of side 100.
6. Move the turtle again (remember penup and pendown).
7. Repeat this for squares of side 150 and 200.

You should end up with a pattern like this.

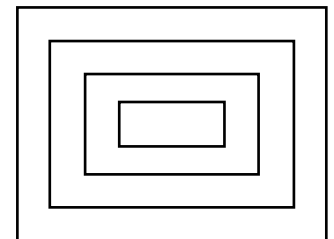


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4. Put the pen down again.
5. Draw a rectangle of side 75 by 100.
6. Move the turtle again.
7. Draw a rectangle of side 125 by 150.
8. Move the turtle again.
9. Draw a rectangle of side 175 by 200.

You should end up with a pattern like this.



Now create algorithms for the letters T, O, P and A.

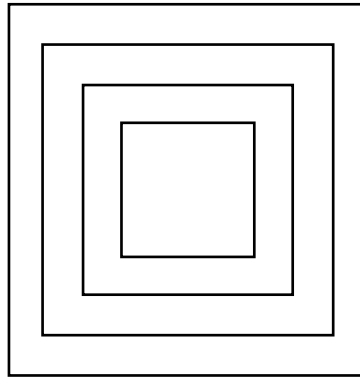


Pen Up and Pen Down

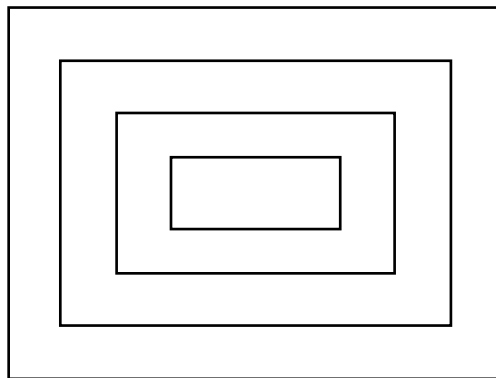
Draw the following algorithms in Turtle Logo.

Remember to snip or take a screen shot of your work to save your pictures, patterns and algorithms.

1. Draw a set of concentric squares (squares with the same centre). You should end up with a pattern like this.



2. Draw a set of concentric rectangles (rectangles with the same centre). You should end up with a pattern like this.



3. Now create algorithms for the letters T, O, P and A.
4. Create an algorithm to write a 3 letter word, you can use capital letters or lowercase.

Programming Turtle Logo and Scratch | Pen Up and Pen Down

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