Programming Turtle Logo and Scratch: Backwards

Aim:

Design, write and debug programs that accomplish specific goals, including controlling or simulating physical systems; solve problems by decomposing them into smaller parts.

Use sequence, selection, and repetition in programs; work with variables and various forms of input and output.

Use logical reasoning to explain how some simple algorithms work and to detect and correct errors in algorithms and programs.

This unit continues the learning from the Year 2 Turtle Logo units and links well to shape and direction in Maths.

I can create and debug an algorithm using the move, rotate and repeat commands.

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 commands fd, bk, lt, rt to move or rotate the turtle.

I can use cs to clear the screen.

I can use the repeat command.

Key/New Words:

Algorithm, instructions, commands, forward (fd), left (lt), right (rt), move, turn, clear screen (cs), variable.

Resources:

Lesson Pack

Desktop computer /laptop

Turtle Logo application (installed or online)

Whiteboards and pens or books, pens and pencils for recording.

Preparation:

None needed

Prior Learning: It will be helpful if children can use and understand the commands; forward (fd), right (rt) and left (lt) alongside a variable.

Learning Sequence

Whole Class	**What Can You Remember?** Ask the children what they can remember about programming Turtle Logo. Give the children a few minutes to remind themselves of how to draw a square, rectangle and a rectilinear letter L.
	Can You Go Backwards? Talk partners discuss how to make the turtle move backwards then feedback their ideas to the class.
	Turtle Logo Commands: Make sure all of the children can draw rectangles and squares using the repeat command. Demonstrate how backward or bk can be used to move backwards.
	Repeating Squares: Demonstrate drawing a set of growing squares, all starting from the same place. **Snipping Tool:** Show how to snip an area of the screen and save the snipped picture. **Screenshot:** Alternatively, screenshot using print screen and copy into paint using select, crop and save.
	Growing Squares and Rectangles: Using the differentiated **Backwards Activity Sheet** children draw repeating squares and rectangles. ★ Children are given the algorithms to copy and edit. ★★ What happens when you draw the squares or rectangles backwards instead of forwards? ★★★ Can you create an algorithm to make this pattern in one go?
	Share: Children share their pictures, patterns and algorithms and then continue with the **Activity Sheets** and respond to what they have shared or discovered after talking to their partner.
Whole Class	**Which Letter?** Children look at the algorithm on the **Lesson Presentation** and decide which letter is drawn by following the command. What do you need to do to draw 2 squares that are not touching?

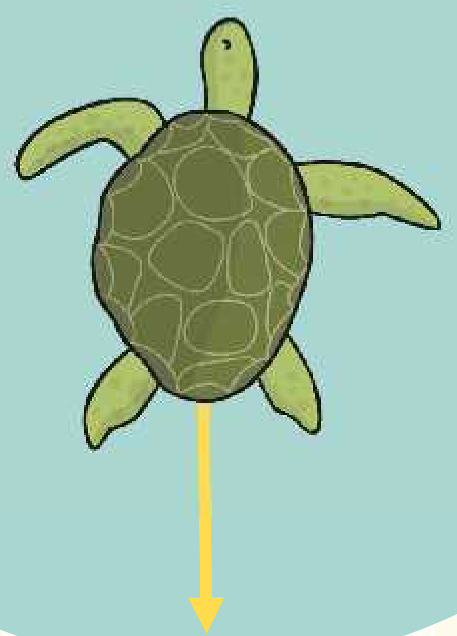
Task*it*

***Rotate**it*: Children make algorithms repeating shapes after rotating the turtle.

Computing

Programming Turtle Logo and Scratch

Backwards



Aim

- I can create and debug an algorithm using the move, rotate and repeat commands.

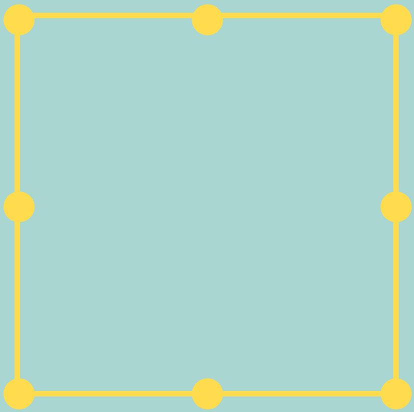
Success Criteria

- 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 commands fd, bk, lt, rt to move or rotate the turtle.
- I can use cs to clear the screen.
- I can use the repeat command.

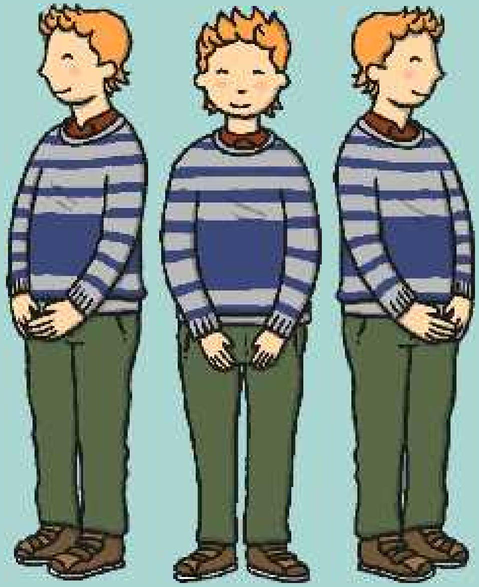
What Can You Remember?

Whole Class

Can you use the basic Turtle Logo commands to write down the algorithm for drawing a square, rectangle or other rectilinear shape?



Can you remember the commands for moving forward, or rotating right and left?



Shapes With Turtle Logo

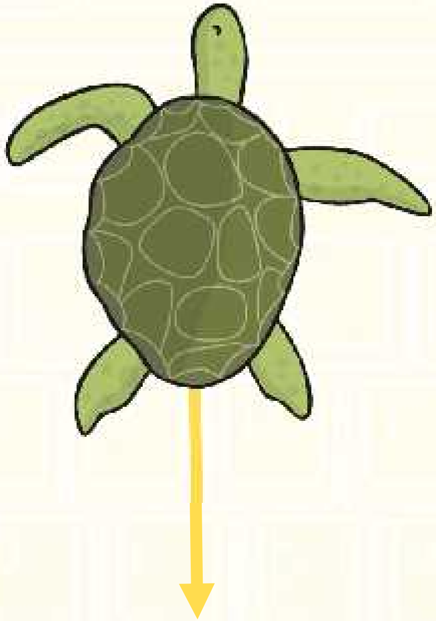
Whole Class

Write an algorithm for:

- a square with sides of 120
- a rectangle of sides 50 and 80
- an L shape

Can You Go Backwards?

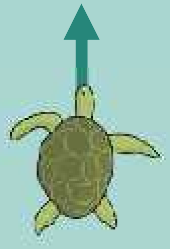
Can you give the turtle a command to go backwards?



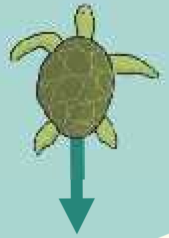
backward 100
Or
bk 100
(or any other number)

Turtle Logo Commands

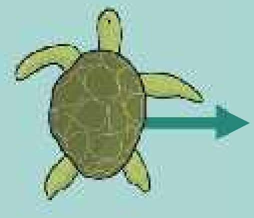
fd 100
move forward



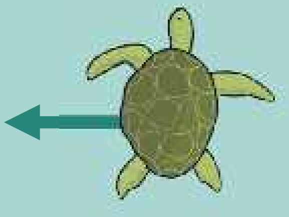
bk 100
move backward



rt 90
turn right



lt 90
turn left



cs
clear screen

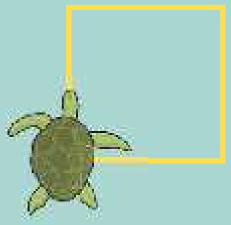
repeat

fd 4 rt 90

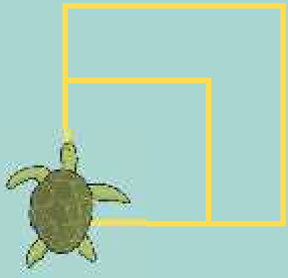
fd 4 rt 90

Repeating Squares

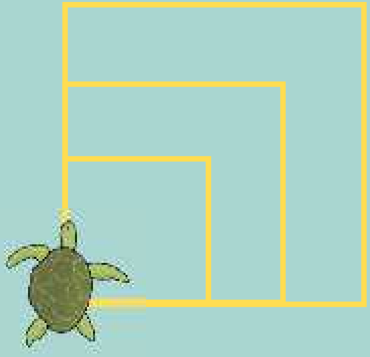
repeat 4[fd 100 rt 90]



repeat 4[fd 150 rt 90]



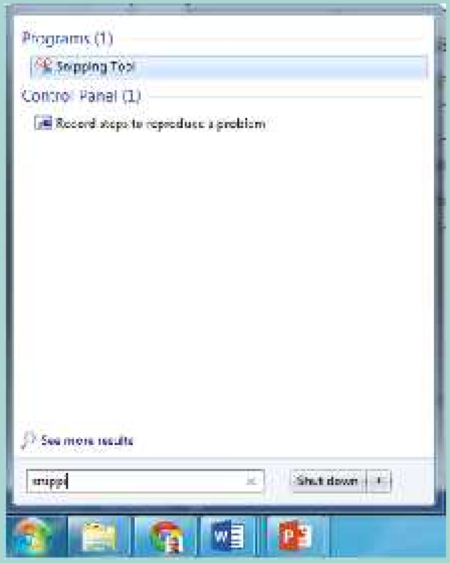
repeat 4[fd 200 rt 90]



Snipping Tool

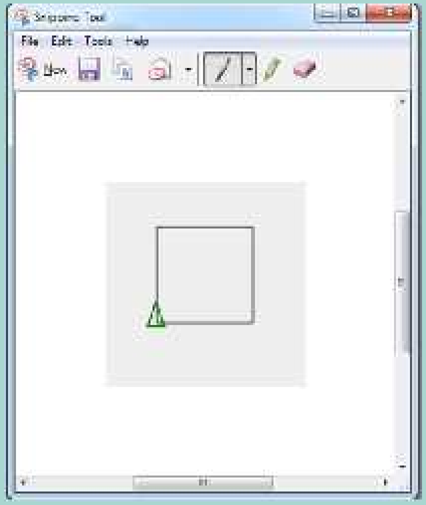
Use the snipping tool to save your pictures and patterns.

1. Go to the start menu



2. Type snip into the search bar and select the snipping tool.

3. Select the area to snip (or click new to do so).

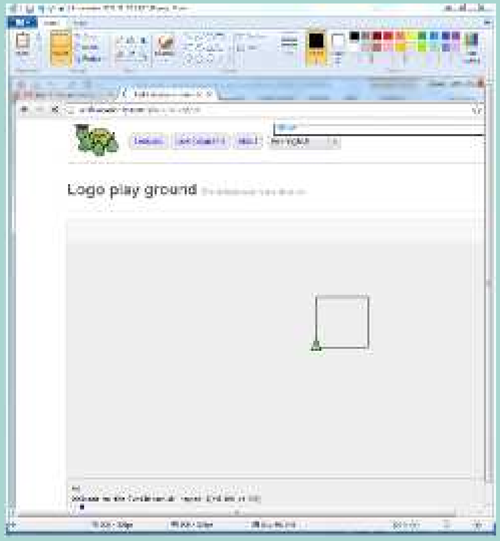


4. Save your snip.

Screenshot

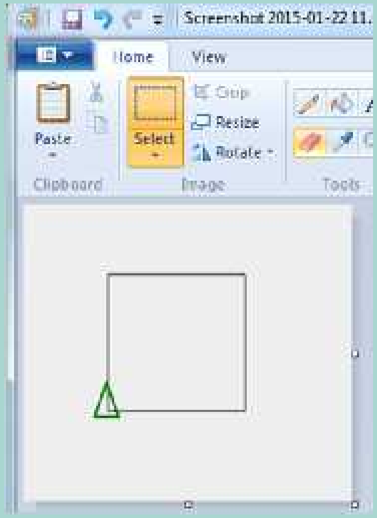
Alternatively you can take a screenshot to save your pictures and patterns.

1. Press "Print Screen" to copy the screen.



2. Paste the screenshot into Paint.

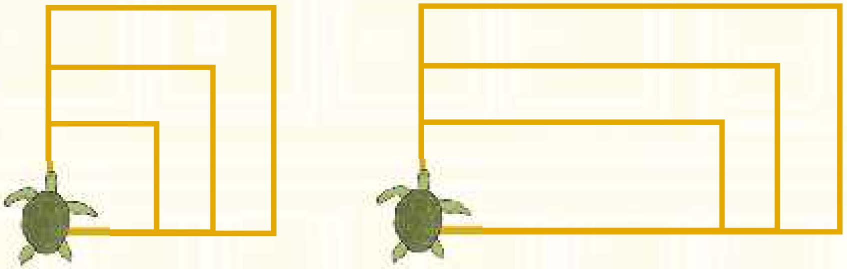
3. Select the picture with the select tool.

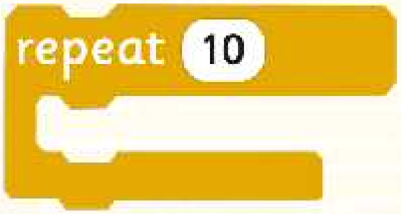


4. Crop and save the picture.

Growing Square and Rectangles

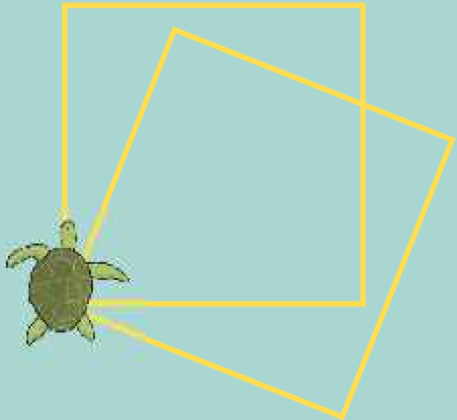
Draw some growing square and rectangles using the repeat command.





Can you use the backwards command to draw the squares?

Can you create an algorithm for this?



Share

Share your pictures, patterns and algorithms.

What difficulties did you have?

How did you overcome them?

What has your partner done well?

Which Letter?

Which letter is drawn by this algorithm?

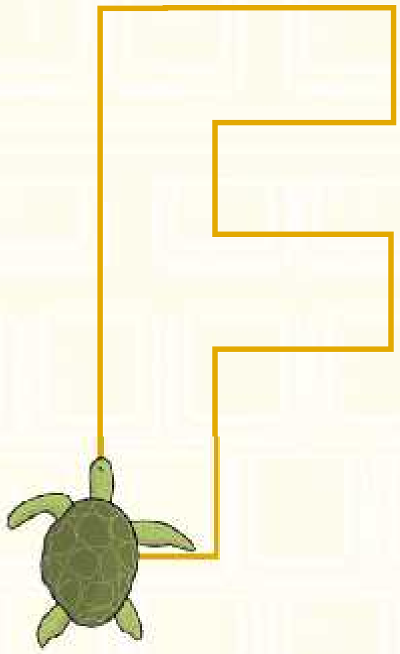
fd 100 rt 90 fd 50 rt 90

fd 20 rt 90 fd 30 lt 90

fd 20 lt 90 fd 20 rt 90

fd 20 rt 90 fd 20 lt 90

fd 40 rt 90 fd 20 rt 90



How would you draw 2 squares that are not touching?

Aim

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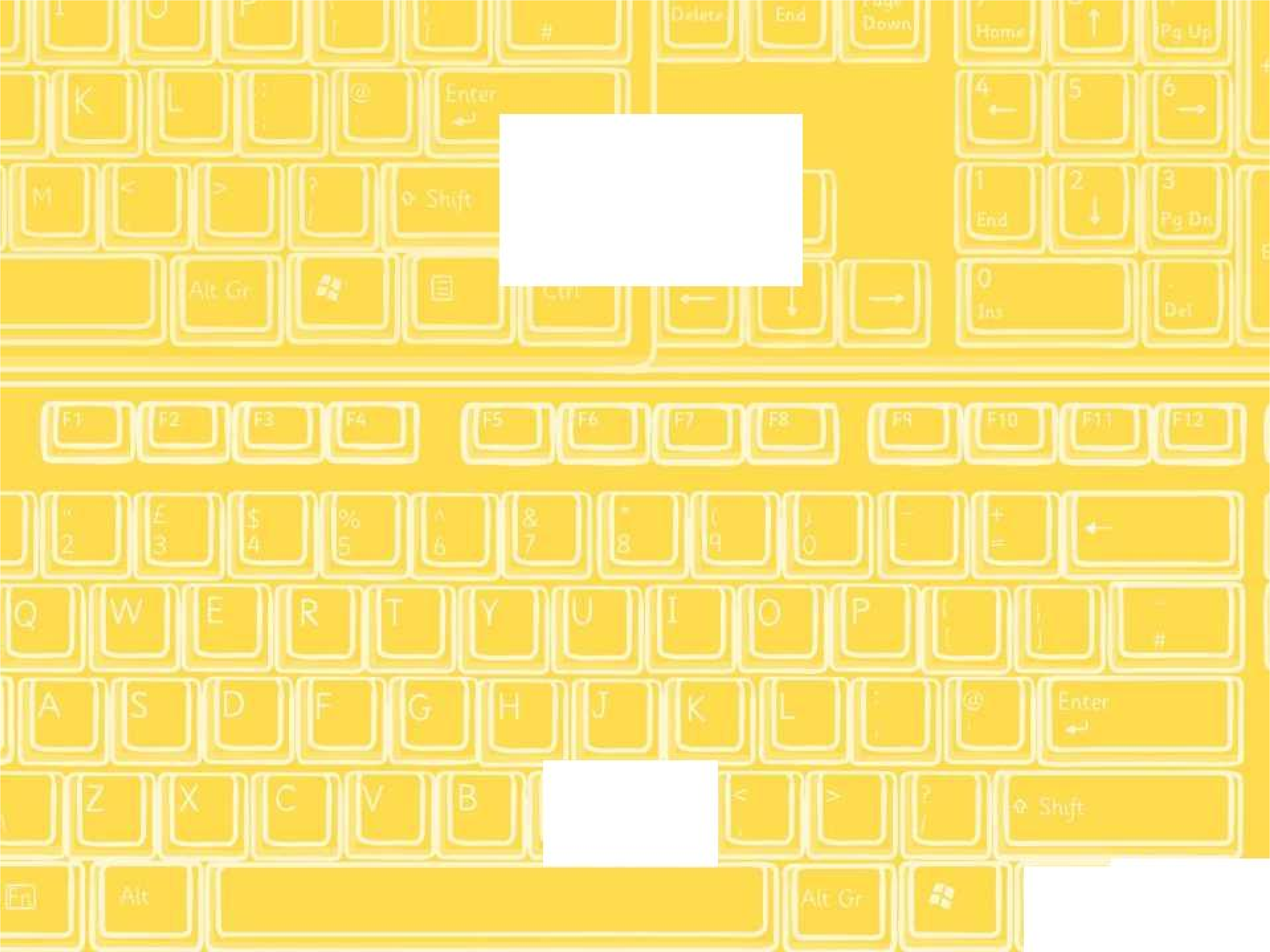
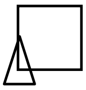
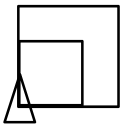
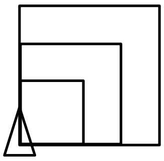
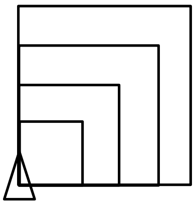
Success Criteria

- 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 commands fd, bk, lt, rt to move or rotate the turtle.
- I can use cs to clear the screen.
- I can use the repeat command.

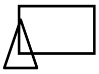
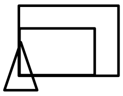
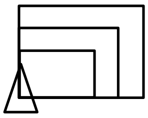
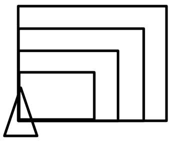


Backwards

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 square with a size of 100 using the algorithm, repeat 4[fd 100 rt 90].	
2.	Draw a square of side 150 using the algorithm, repeat 4[fd 150 rt 90].	
3.	Draw a square of side 200.	
4.	Add a smaller square to complete thepattern.	

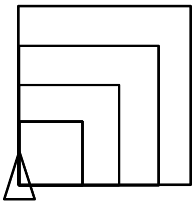
Create a set of rectangles that are all different sizes.

1.	Draw a rectangle with a side of 50 and 100 using the algorithm, repeat 2[fd 50 rt 90 fd 100 rt 90].	
2.	Draw a rectangle of side 75 and 150 using the algorithm, repeat 2[fd 75 rt 90 fd 150 rt90].	
3.	Draw a rectangle of side 100 and200.	
4.	Add a smaller rectangle to complete thepattern.	

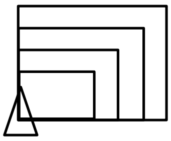
Now try drawing the square and rectangular patterns again but this time use the backwards command, repeat 4[bk 100 rt 90].

Backwards

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.

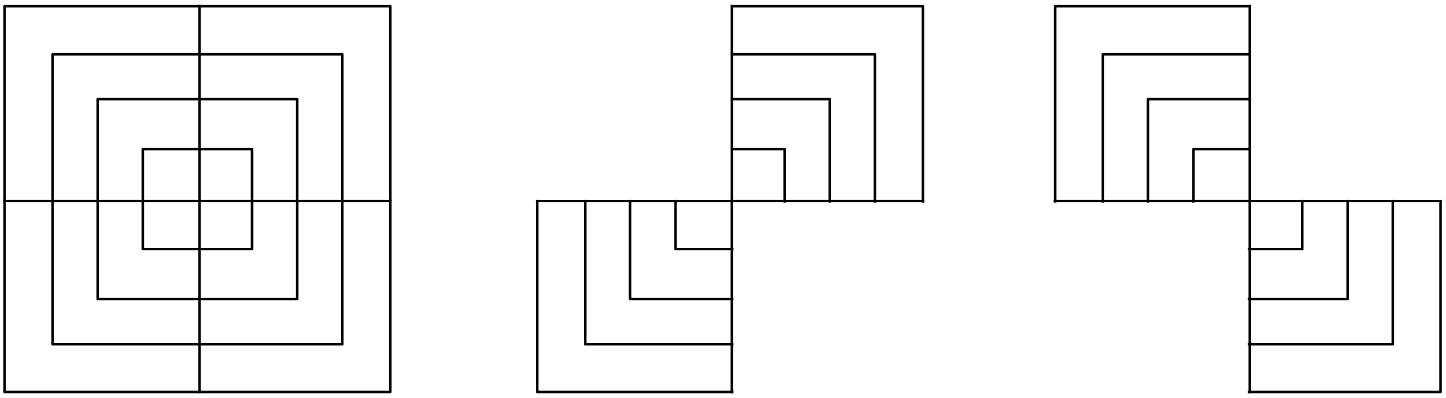
1.	Draw a square with a size of 100 using the algorithm, repeat 4[fd 100 rt 90].	You should end up with a pattern like this: 
2.	Draw a square of side 150.	
3.	Draw a square of side 200.	
4.	Add a smaller square to complete thepattern.	

Create a set of rectangles that are all different sizes.

1.	Draw a rectangle with a side of 50 and 100 using the algorithm, repeat 2[fd 50 rt 90 fd 100 rt 90].	You should end up with a pattern like this: 
2.	Draw a rectangle of side 75and 150.	
3.	Draw a rectangle of side 100 and200.	
4.	Add a smaller rectangle to complete thepattern.	

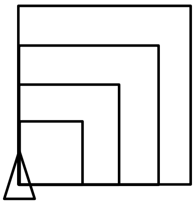
Now try drawing the square and rectangular patterns again but this time use the backwards command, repeat 4[bk 100 rt 90].

Draw the patterns below using the backwards command. Don't forget to snip or take a screen shot of your pattern when you have completed it.

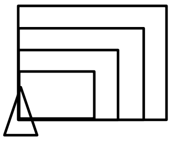


Backwards

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.

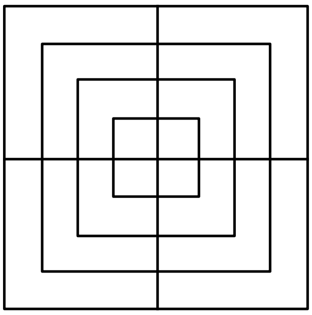
Use the repeat command to create a set of squares that are a different size. You should end up with a pattern like the one opposite.	

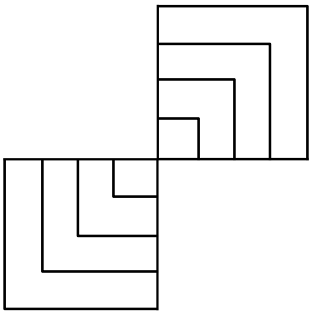
Create a set of rectangles that are all different sizes.

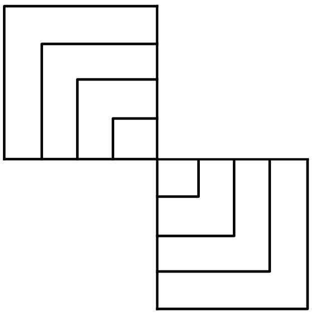
Use the repeat command to create a set of rectangles that are a different size. You should end up with a pattern like the one opposite.	

Now try drawing the square and rectangular patterns again but this time use the backwards command, repeat 4[bk 100 rt90].

Draw the patterns below using the backwards command. Don't forget to snip or take a screen shot of your pattern when you have completed it.



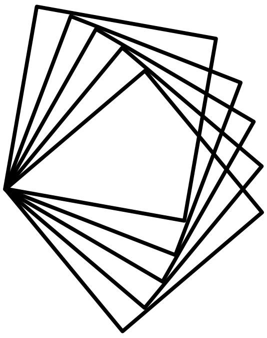




Challenge

Draw a square, rotate the turtle 10° and then repeat these commands to create a pattern. Now tryg to include 2 repeat commands.

Draw the pattern again, this time with arectangle.



Backwards

Draw the following algorithms in Turtle Logo.
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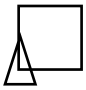
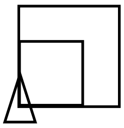
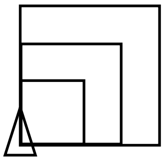
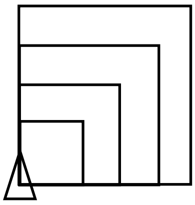
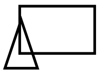
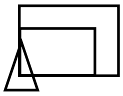
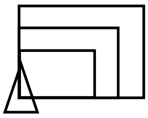
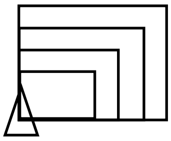
Create a set of squares that are all different sizes.

1.	Draw a square with a size of 100 using the algorithm, repeat 4[fd 100 rt 90].	
2.	Draw a square of side 150 using the algorithm, repeat 4[fd 150 rt 90].	
3.	Draw a square of side 200.	
4.	Add a smaller square to complete the pattern.	

Create a set of rectangles that are all different sizes.

1.	Draw a rectangle with a side of 50 and 100 using the algorithm, repeat 2[fd 75 rt 90 fd 150 rt 90].	
2.	Draw a rectangle of side 75 and 150 using the algorithm, repeat 2[fd 150 rt 90 fd 75 rt 90].	
3.	Draw a rectangle of side 100 and 200.	
4.	Add a smaller rectangle to complete the pattern.	

Now try drawing the square and rectangular patterns again but this time use the backwards command, repeat 4[bk 100 rt 90].

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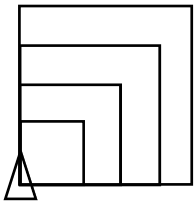
1.	Draw a square with a size of 100 using the algorithm, repeat 4[fd 100 rt 90].	You should end up with a pattern like this: 
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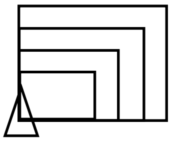
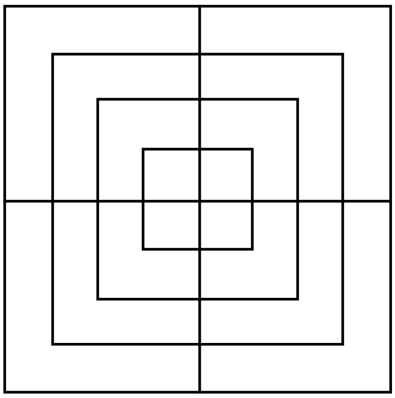
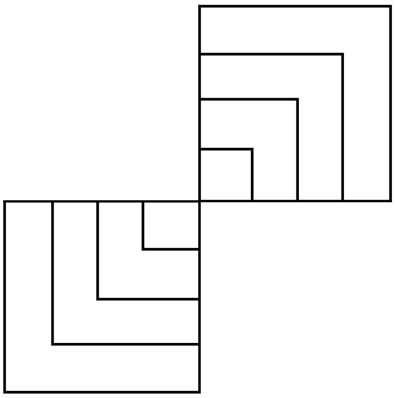
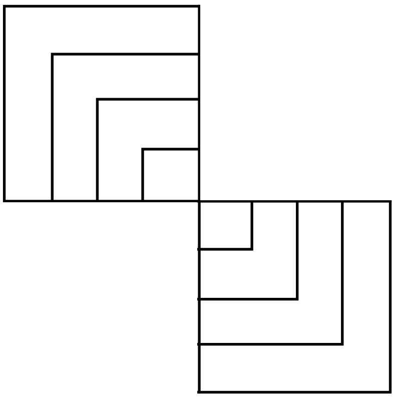
1.	Draw a rectangle with a side of 50 and 100 using the algorithm, repeat 2[fd 50 rt 90 fd 100 rt 90].	You should end up with a pattern like this: 
2.	Draw a rectangle of side 75 and 150.	
3.	Draw a rectangle of side 100 and 200.	
4.	Add a smaller rectangle to complete the pattern.	

Now try drawing the square and rectangular patterns again but this time use the backwards command, repeat 4[bk 100 rt 90].

Draw the patterns below using the backwards command. Don't forget to snip or take a screen shot of your pattern when you have completed it.







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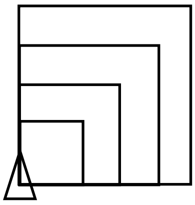
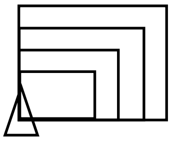
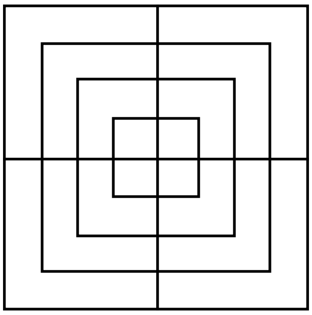
Use the repeat command to create a set of squares that are a different size. You should end up with a pattern like the one opposite.	

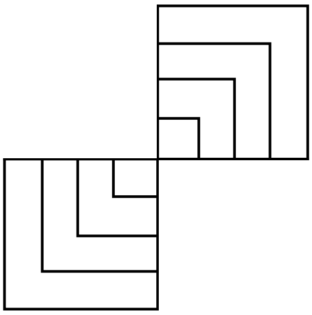
Create a set of rectangles that are all different sizes.

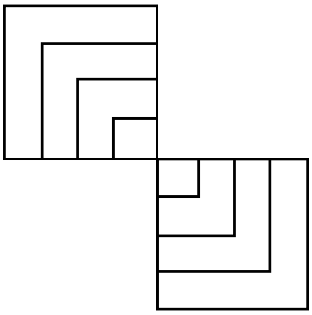
Use the repeat command to create a set of rectangles that are a different size. You should end up with a pattern like the one opposite.	

Now try drawing the square and rectangular patterns again but this time use the backwards command, repeat 4[bk 100 rt 90].

Draw the patterns below using the backwards command. Don't forget to snip or take a screen shot of your pattern when you have completed it.

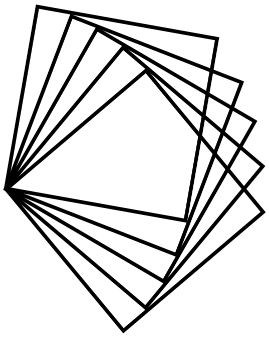






Challenge

Draw a square, rotate the turtle 10° and then repeat these commands to create a pattern. Now try writing an algorithm that will make this pattern in one go. Your algorithm will need to include 2 repeat commands.



Draw the pattern again, this time with a rectangle.

Avery Template: Name Badge Label, 8 per sheet | **Compatible Products**:15395, 25395, 42395, 45395, 48395, 5395, 8395, 88395, 85395.

Programming Turtle Logo and Scratch | Backwards

I can create and debug an algorithm using the move, rotate and repeat commands.		
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 commands fd, bk, lt, rt to move or rotate the turtle.		
I can use cs to clear the screen.		
I can use the repeat command.		

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