

Turtlestitch Investigations: recursion garden

Growing a fractal tree

1. A very simple tree is just a single branch.

The code block contains the following steps:

- reset
- point in direction 0
- running stitch by 10 steps
- branch 100

The 'branch' block contains the following steps:

- move length steps
- turn 180 degrees
- move length steps
- turn 180 degrees

The canvas shows a single vertical line representing a branch, with a turtle at the bottom.

2. Make a block for a branch.

3. In a more interesting tree the branch splits into two.

The code block contains the following steps:

- reset
- point in direction 0
- running stitch by 10 steps
- tree 100

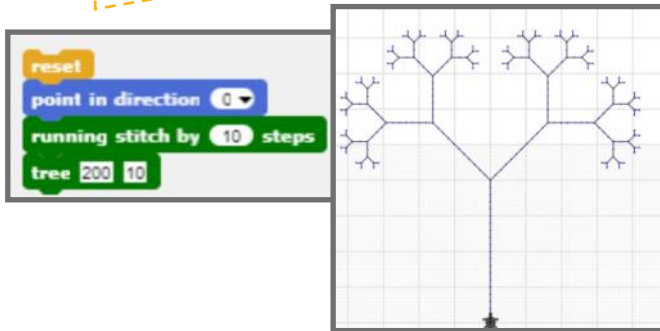
The 'tree' block contains the following steps:

- move length steps
- turn 45 degrees
- branch length / 2
- turn 90 degrees
- branch length / 2
- turn 135 degrees
- move length steps
- turn 180 degrees

The canvas shows a tree with a vertical trunk and two diagonal branches, with a turtle at the bottom.

4. Make a block for a tree.

5. To make each branch split several times, you will have to repeat a lot of code. To do this simply, a block can use itself. This marvellous trick is called recursion.



6. Here the tree block uses itself. Think of a tree as having two smaller trees at the end of each branch, until they get too small. When they are too small, stitch the final branch.



Taking it further...

- Why use these turning angles?
- Can you change the angle between branches?
- What happens if you change the scale of the smaller trees?
- Can you add some randomness?
- Can you change the number of branches?