Recursion Activity

Recursion is the process of breaking a problem down into smaller versions of itself. Today we’re going to experiment with various fractal shapes and create our own.

In particular, notice that:

* Each of the functions calls itself at least once
* We use a base case to avoid working forever

Assignment:

First, we’re going to experiment with the tree sprite. Click on the sprite and look at the create\_tree function.

1. What is the input and the output of the function?
2. How many recursive calls does the create\_tree function have?
3. In a 2-3 sentences, explain what the base case is and how it affects the overall shape. How does the min\_branch\_size factor in?
4. Create a program (using “when green flag clicked”) to draw the tree.
5. Alter the create\_tree function so it’s short and stocky. What did you change?
6. Alter the create\_tree function so it branches three times. What did you change?
7. Alter the create\_tree function so at the end of each branch the sprite stamp’s itself (use the stamp block in the pen section).

Now, we’re going to experiment with the snowflake sprite. Click on the sprite and look at the create\_koch\_flake function.

1. What is the input and the output of the function?
2. How many recursive calls does the create\_koch\_flake function have?
3. In a 2-3 sentences, explain what the base case is and how it affects the overall shape. How does the min\_koch\_distance factor in?
4. Create a program (using “when green flag clicked”) to draw following shape:

A blue snowflake on a white background

Description automatically generated

Finally, it’s your turn. In the space below, create a self-similar pattern. Then, encode it in a program and see how it turns out.