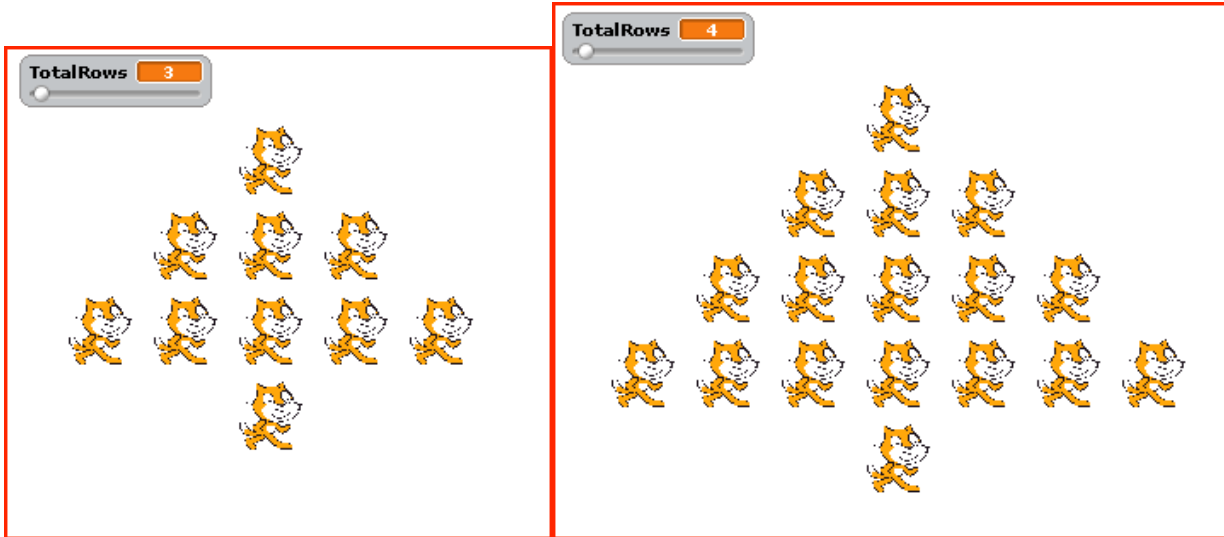


# Scratch Variables & Loops: Stamping Trees with Nested Loops

Name: \_\_\_\_\_ Period: \_\_\_\_\_

Earlier we created a grid of stamped sprites, now we're going to create a tree:



We're going to create a slider for the number of rows the triangle part of the tree (not the trunk).

## Part 1: Analysis

Size 3 Tree			
Row		Spaces	Stamps
1	*	2	1
2	***	1	3
3	*****	0	5
Trunk	*	2	1

Size 4 Tree			
Row		Spaces	Stamps
1	*	3	1
2	***	2	3
3	*****	1	5
4	*****	0	7
Trunk	*	3	1

Now fill in the blanks for the Size 5 Tree below

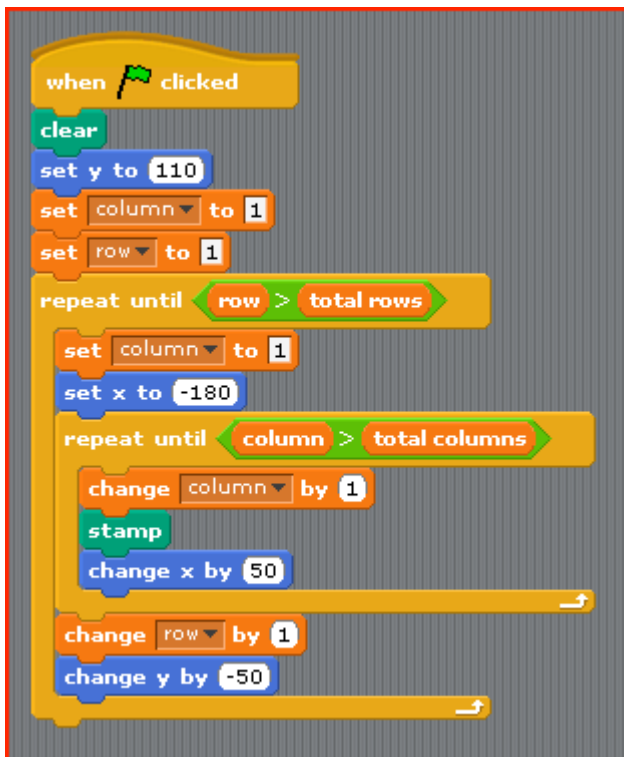
Size 5 Tree			
Row		Spaces	Stamps
1			
2			
3			
4			
5			
Trunk			

And now time for a little Algebra... (top of next page)

## Scratch Variables & Loops: Stamping Trees with Nested Loops

- A) Write an expression to determine the number of spaces on any row based on the current row number. Use *row* as the variable
- B) Are the number of stars on each row even or odd?
- C) How many stars are added to go from one row to the next?
- D) Write an expression to determine the number of stars on any row based on the current row number. Use *row* as the variable
- E) How many spaces are in the trunk row (before stamping the trunk). Hint: you can write an expression to calculate this using the variable *TotalRows*:

Open the file you last worked with (BoxCats.sb or similar). Your code should look something like this:



```
when clicked
clear
set y to 110
set column to 1
set row to 1
repeat until row > total rows
  set column to 1
  set x to -180
  repeat until column > total columns
    change column by 1
    stamp
    change x by 50
  change row by 1
  change y by -50
```

When the script starts  
We clear the screen  
We set the sprit at the top  
We keep track of the row and column  
For each row  
We move the stamp to the left  
We reset the column to 1  
For each column  
Add one to the column  
Stamp  
Move the stamp over  
Once we're done with a row – move down a row  
We add one to the row

Click on the Save As button and save your file as [treecats.sb](#)

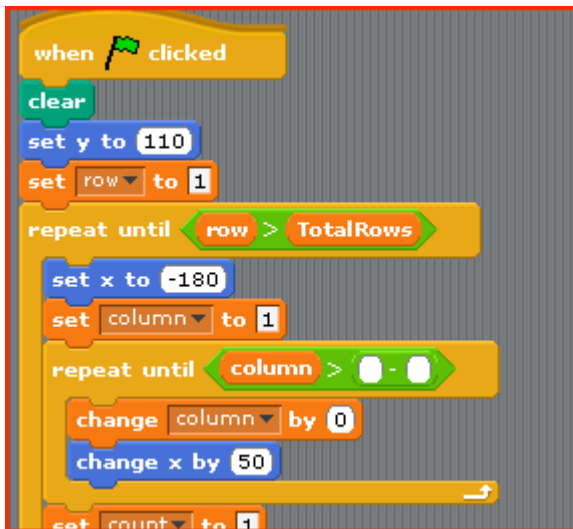
# Scratch Variables & Loops: Stamping Trees with Nested Loops

## Part 2: Coding

- A) To make our tree – will we still need our outer loop (repeat until row > TotalRows)?
- B) For each row we do two things – we print a bunch of spaces and then a bunch of stamps. Our inner loop currently only prints stamps. As it turns out, you can put two loops in a row in your code: one to do the spaces, then the other to do the stamps. Fill in the blanks here for the loop to do the spaces. Be sure to look at Part 1-A) from page 2 for what to fill in the blanks

repeat until column > \_\_\_\_\_ - \_\_\_\_\_  
change column by \_\_\_\_\_  
change x by 50

- C) Add this loop to your code inside your outer loop just after you set your column to 1 (as shown here):

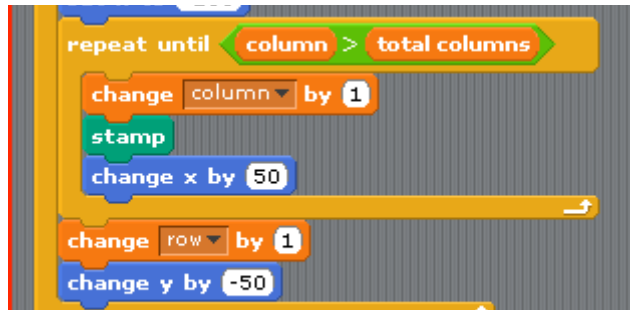


- D) What command is missing from the above loop that is in your original inner loop? If you're unsure, try running the code right now and see what happens?

- E) Recall that the rest of our inner loop looked like what is shown below. Look back at the expression you came up with in Part 1-D) of your Analysis. How can you modify the repeat until statement so that it only

## Scratch Variables & Loops: Stamping Trees with Nested Loops

repeats for the right number of stamps?



repeat until column > \_\_\_\_\_

F) What happens if you run this right now? Does the tree print out correctly? What can you do to make it print out correctly? (Hint: you may have to re: initialize something)

G) We're missing one last thing on our tree, the trunk! In order to do this we have to add one more row. Does this row go inside or outside the outer loop?

H) Now, show your coding expertise and add the code that will put the trunk on the tree

**Get your Program working.**

**Make sure to test it out with a variety of values.**

**Save it as treecats.sb (or similar) and have it signed off!**

**+ What else can you do with these kinds of loops?? Can you create another program to draw another object? Perhaps the Space needle?**