Grade 4 - Coding Patterns

Patterning and Algebra
Patterns and Relationships - Specific Expectations
By the end of Grade 4, students will:

– extend, describe, and create repeating, growing, and shrinking number patterns (e.g.,"I created the pattern 1, 3, 4, 6, 7, 9, ... I started at 1, then added 2, then added 1, then added 2, then added 1, and I kept repeating this.");
– connect each term in a growing or shrinking pattern with its term number (e.g., in the sequence 1, 4, 7, 10, ..., the first term is 1, the second term is 4, the third term is 7, and so on), and record the patterns in a table of values that shows the term number and the term;
– create a number pattern involving addition, subtraction, or multiplication, given a pattern rule expressed in words (e.g., the pattern rule "start at 1 and multiply each term by 2 to get the next term" generates the sequence 1, 2, 4, 8, 16, 32, 64, ...)
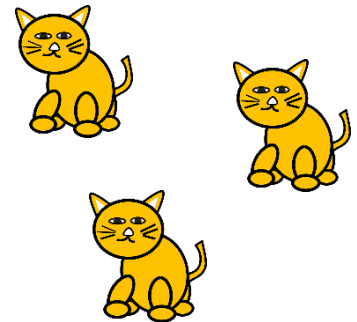
Part A — Basic Understanding of Patterns

Show the pattern that is described in each situation by drawing pictures and/or using numbers. The first one has been done for you.

1) Cindy draws a picture of a cat every day.
   On the first day, she draws 1 cat.
   On the second day, she draws another cat, making it 2 cats in total.

   How many cats will Cindy have drawn after 8 days?

   Answer:

Day	1	2	3	4	5	6	7	8
Number of Cats	1	2	3	4	5	6	7	8

   After 8 days, Cindy will have drawn 8 cats.

2) Cindy draws two pictures of cats every day.
   On the first day, she draws 2 cats.
   On the second day, she draws 2 more cats, making it 4 cats in total.

   How many cats will Cindy have drawn after 6 days?

PART B — The Basic Program

Create a program that does the following:

✓ Asks the user for the number of cats that Cindy draws each day
✓ Outputs the number of cats after each day for 5 days
✓ Test your program with the following numbers entered by the user: 1,2,4,5.

Here is a video tutorial link that shows you how to create this program. You may adjust the sprites, colours, etc., to your liking:

The Basic Program Link (https://www.youtube.com/watch?v=ZBDRzoTbY_k&feature=youtu.be)

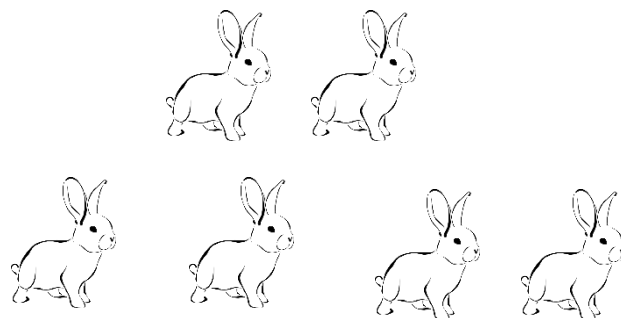**PART C**   **The Challenge Program**

Roger has 2 pet rabbits.

One month later, he has 4 pet rabbits.

Every month for 10 months, the rabbit population DOUBLES.

Write a program that shows the user how many rabbits Roger will have after 10 months if he starts out with two rabbits at month 1.

E.g.

Month	Number of Rabbits
1 (starting month)	2 **
2	4 ** **
3	8 ** ** ** **
4	16 ** ** ** ** ** ** ** **

Possible Answer (link to video Tutorial):

The Challenge Program Link (https://www.youtube.com/watch?v=sQN4kJqkrdM)

PART D   **Further Extensions**

a) Adjust your Part C program to allow the user to enter the number of months.
b) Write a program that will also draw the number of rabbits for each month on the screen.
c) Write a program that uses lists as well as variables and displays the output in a table format.
d) Write a scenario for a pattern and create a program to go with it.

Lisa Floyd

@lisaannefloyd (Twitter)