Sequence is important in describing the behavior of dynamic system. Two common sequences are the arithmetic sequence and geometric sequence. The arithmetic sequence is a sequence that the differences between every two consecutive elements are the same:

$$a_i - a_{i-1} = c.$$

The geometric sequence is a sequence whose ratio of two consecutive elements is fixed:

$$\frac{a_i}{a_{i-1}} = c$$

Therefore, a sequence can be defined by giving the first element a_0, the value of difference (ratio) c, and the length of the sequence n. Write a program for generating arithmetic and geometric sequences with different a_0, c, and n.

Input

The input contains several cases and ends with EOF. Each case contains integer values and one character, which in turn represent a_0, c, n, and the type of sequence ('a' for arithmetic sequence and 'g' for geometric sequence.)

Output

For each case, output the corresponding sequence. Each two consecutive elements should be separated by space and comma character and each two consecutive sequences should be separated by a newline character.

Sample Input

1 3 5 a
2 4 6 g

Sample Output

1, 4, 7, 10, 13
2, 8, 32, 128, 512, 2048