Enjoy Adding GP to Series

You are initially given an empty array of Size **N** (<=100000). (i.e. each element is 0).

Given 2 <= **R** <=10^9.

Now you are given 3 types of query:

1. "0 St i1 i2": means add (St, St*R , St*R^2 ,....) GP from i1 to i2 respectively. (Means add the GP with start term St and common ratio R in the series begining from i1 and ending at i2.)
2. "1 i j": means find the sum of values of the array from index **i** to index **j** with modulo 1000000007.
3. "2 i": resets the **i**-th index array to 0.

Constraints

Queries <=90000
1 <= St <= 10^9

Input

First Line contains **N R Q**.
Then Follows **Q** lines, each line can be of any 3 types described above.

Output

Output only second type of Query.

Example

Input:
2 2 3
0 2 1 2
1 1 2
1 2 2

Output:
6
4

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