

Enjoy Adding GP to Series

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

Given $2 \leq R \leq 10^9$.

Now you are given 3 types of query:

1. "0 St i1 i2": means add $(St, St \cdot R, St \cdot R^2, \dots)$ GP from $i1$ to $i2$ respectively. (Means add the GP with start term St and common ratio R in the series beginning 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

$1 \leq St \leq 10^9$

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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