

Problem E. Buy for More, Sell for Less

Input file: *standard input*
Output file: *standard output*
Time limit: 6 seconds
Memory limit: 1024 mebibytes

Yes, there are no typos/errors in the problem name.

Monocarp is an extremely weird person: he gets joy from buying items, even if he sells them for less money than he spends buying them. Every time Monocarp buys an item, he gets 1 unit of joy.

There are n types of items, each type is characterized by two integers b_i and s_i ($b_i > s_i$).

Initially, Monocarp has some amount of coins. He can perform the following actions:

- if he has at least b_i coins, he can buy an item of the i -th type, spending b_i coins. You may assume that the number of items of each type in stock is infinite;
- if he has at least one item of the i -th type which he has not sold yet, he can sell it, gaining s_i coins.

You have to process q queries. In the j -th query, you will be given one integer k_j , and you have to calculate the maximum amount of joy Monocarp can get if he initially has k_j coins.

Input

The first line contains two integers n and q ($1 \leq n \leq 10^4$; $1 \leq q \leq 10^6$).

The second line contains n integers b_1, b_2, \dots, b_n ($2 \leq b_i \leq 10^{14}$).

The third line contains n integers s_1, s_2, \dots, s_n ($1 \leq s_i < b_i$).

The fourth line contains three integers x, y, z ($1 \leq x, y, z \leq 10^{14}$).

The query sequence is generated as follows:

- let $a_0 = x$, $M = 10^{14} + 31$, $a_j = (a_{j-1} \cdot y + z) \bmod M$ when $j > 0$;
- then, let $c_0 = 0$, c_j be the answer to the j -th query for $j \in [1, q]$;
- finally, let $k_j = (a_j + c_{j-1}) \bmod 10^{14}$ for $j \in [1, q]$.

Output

Print one integer — $c_1 \oplus c_2 \oplus \dots \oplus c_q$, where c_j is the answer to the j -th query, and \oplus denotes the bitwise XOR operation.

Examples

standard input	standard output
4 6 10 3 6 7 8 1 3 4 2 1 4	7
7 10 5 8 11 9 10 12 4 2 6 9 8 1 11 1 13 1234567891011 37	16313242560751

Note

In the first example, the queries are 6, 12, 19, 27, 35, 43. The answers to them are 2, 5, 9, 13, 17, 21.