Expert Computation

Complex physics experiments often have an underlying simple mathematical structure. In one such experiment that compares mathematical and empirical values, you are given three integer arrays, and asked to compute the experiment result mathematically.

From the given input arrays x, y, and z, you are required to generate 3 arrays h, c, and l, each of equal length n , based on the following function.

A function $F(i)$ is defined for a given i, where a value of j is chosen such that $h_j * c_i - c_j * h_i$ is maximum where $1 \leq j \leq i - l_i$.

Let the $G(x) = \sum_{i=1}^{x} F(i)$ modulo $10^9 + 7$. Your task is to find $G(n)$.

Arrays h, c, and l are generated from x, y, and z, as follows:

- $h_1 = x_1, c_1 = y_1, and\ l_1 = z_1$
- $h_i = x_i \oplus G(i-1)$
- $c_i = y_i \oplus G(i-1)$
- $l_i = z_i \oplus G(i-1)$

where $1 < i \leq n$ ($\oplus$ is a bitwise xor operation).

For example, given $x = [3, 4, 14, 5, 6]$, $y = [4, 9, 12, 8, 9]$, $z = [0, 0, 9, 12, 13]$

$i\ h_i\ c_i\ l_i\ j_{max}\quad F(i)\quad G(i)$
13 4 0 1 3*4 - 3*40
24 9 0 1 9*3 - 4*411
Complete the function `expertComputation` that takes 3 integer arrays as input, and return a single integer denoting the appropriate value for $G(n)$.

Input Format

The first line contains a single integer n denoting the length of the arrays.

Next 3 lines contain arrays x, y, and z, respectively.

Constraints

- $1 \leq n \leq 10^6$
- $1 \leq h_i \leq 10^7$
- $h_i < h_{i+1}$ where $i < n$.
- $1 \leq c_i \leq 10^7$
- $0 \leq l_i \leq i - 1$

Output Format

Output the appropriate answer.

Sample Input 0

```
5
3 4 14 5 6
```

```
4 9 12 8 9
0 0 9 12 13
```

Sample Output 0

```
17
```

Explanation 0

Given that,

$x = [\ 3,\ 4,\ 14,\ 5,\ 6\ ]$
$y = [\ 4,\ 9,\ 12,\ 8,\ 9\ ]$
$z = [\ 0,\ 0,\ 9,\ 12,\ 13\ ]$

For every value of i from 1 to 5,

i	h_i	c_i	l_i	j_{max}	$F(i)$	$G(i)$
1	3	4	0	1	3*4 - 3*4	0
2	4	9	0	1	3*9 - 4*4	11
3	5	7	2	1	3*7 - 4*5	12
4	9	4	0	4	4*9 - 4*9	12
5	10	5	1	4	5*9 - 4*10	**17**

From the table it is clear that,

$h = [3,\ 4,\ 5,\ 9,\ 10]$
$c = [4,\ 9,\ 7,\ 4,\ 5]$
$l = [0,\ 0,\ 2,\ 0,\ 1]$

Before computing $F(i)$ in every step, choose j in such a way that the maximum value of $h_j * c_i - c_j * h_i$ can be obtained.

For example, in the case of $F(4)$, $j = 1, 2, 3, 4$

Hence,

- $j = 1 \Rightarrow 3 * 4 - 4 * 9 = -24$
- $j = 2 \Rightarrow 4 * 4 - 9 * 9 = -65$
- $j = 3 \Rightarrow 5 * 4 - 7 * 9 = -43$
- $j = 4 \Rightarrow 4 * 9 - 4 * 9 = 0$ which is the maximum value.

When $F(i)$ is computed in a similar manner for all values of i, F would be $0, 11, 1, 0, 5$ for each i respectively. So the answer is $G(5) = 17\ mod\ (10^9 + 7) = 17$

Sample Input 1

```
3
2 6 4
1 9 11
0 0 14
```

Sample Output 1

```
18
```