

Problem D. Diferencia

Input file: *standard input*
Output file: *standard output*
Time limit: 30 seconds
Memory limit: 256 mebibytes

Professor Zhang has two sequences $a_1, a_2, \dots, a_n$ and $b_1, b_2, \dots, b_n$. He wants to perform two kinds of operations on the sequences:

- $+ \ l \ r \ x$: set a_i to x for all $l \leq i \leq r$.
- $? \ l \ r$: find the number of i such that $a_i \geq b_i$ and $l \leq i \leq r$.

Input

There are multiple test cases. The first line of input contains an integer T indicating the number of test cases. For each test case:

The first line contains four integers n, m, A and B ($1 \leq n \leq 10^5$, $1 \leq m \leq 3\,000\,000$, $1 \leq A, B \leq 2^{16}$): the length of the sequence, the number of operations and two parameters. The second line contains n integers $a_1, a_2, \dots, a_n$ ($1 \leq a_i \leq 10^9$). The third line contains n integers $b_1, b_2, \dots, b_n$ ($1 \leq b_i \leq 10^9$).

As the number of operations can be rather large, the m operations are specified by parameters A and B given to the following generator routine.

```
int a = A, b = B, C = ~(1<<31), M = (1<<16)-1;
int rnd(int last) {
    a = (36969 + (last >> 3)) * (a & M) + (a >> 16);
    b = (18000 + (last >> 3)) * (b & M) + (b >> 16);
    return (C & ((a << 16) + b)) % 1000000000;
}
```

For the i -th operation, first call `rnd(last)` three times to get l, r and x (that is, $l = \text{rnd}(\text{last}) \bmod n + 1$, $r = \text{rnd}(\text{last}) \bmod n + 1$, $x = \text{rnd}(\text{last}) + 1$). Then, if $l > r$, you should swap their values. And at last, the i -th operation has type '?' if $(l + r + x)$ is an even number, or type '+' otherwise.

Note: *last* is the answer of the latest type '?' operation. Assume $\text{last} = 0$ at the beginning of each test case.

There are at most 300 test cases, and the total size of the input is at most 8 mebibytes.

Output

For each test case, output the integer $S = (\sum_{i=1}^m i \cdot z_i) \bmod (10^9 + 7)$, where z_i is the answer for i -th query. If the i -th query is of type '+', assume $z_i = 0$.

Example

standard input	standard output
3	81
5 10 1 2	88
5 4 3 2 1	87
1 2 3 4 5	
5 10 3 4	
5 4 4 2 1	
1 2 3 4 5	
5 10 5 6	
5 4 5 2 1	
1 2 2 4 5	