
Problem A. Mr. Panda and Sequence Puzzle

Input file: **standard input**
Output file: **standard output**
Time limit: 15 seconds
Memory limit: 256 megabytes

Mr. Panda enjoys solving hard puzzles. On Mr. Panda's birthday, Mr. Sheep gives Mr. Panda a puzzle as a birthday gift.

In the puzzle, Mr. Panda is given a sequence consisting of positive integers. He can perform multiple operations to the sequence. An operation is defined as taking a prefix of the sequence and reversing it^[1]. Mr. Panda must perform the operations in increasing order of the length of prefixes. To solve the puzzle, Mr. Panda needs to figure out the smallest sequence in lexicographical order^[2] after the operations.

Mr. Sheep feels the puzzle is too easy for Mr. Panda. Thus, Mr. Sheep blacklists some prefixes of the sequence. Mr. Panda cannot reverse any blacklisted prefixes.

Even though it is Mr. Panda's birthday, he feels sad because he has no idea on how to solve this puzzle. Could you please help Mr. Panda solve this puzzle to make him happy?

Input

The first line of input gives the number of test cases T ($1 \leq T \leq 100$). T test cases follow.

Each test case starts with a line consisting of two integers N ($1 \leq N \leq 3 \times 10^5$), the length of Mr. Panda's sequence, and M ($0 \leq M \leq N$), the number of blacklisted prefixes. It is guaranteed that the sum of N is not greater than 5×10^6 .

Then, a line consisting of N integers follows, the i^{th} integer A_i ($1 \leq A_i \leq 10^9$) indicates the i^{th} integer in Mr. Panda's sequence.

Finally, a line consisting of M distinct integers follows, the i^{th} number B_i ($1 \leq B_i \leq N$) indicates i^{th} length of the blacklisted prefixes.

Output

For each test case, output one line containing "Case x : y ", where x is the test case number (starting from 1) and y is the hash code of smallest sequence that Mr. Panda can make separated by spaces.

Hash code of an integer sequence can be computed by using the following formula.

$$\text{HashCode}(s) = \left(\sum_{i=1}^{\text{len}(s)} 37^{i-1} s_i \right) \pmod{20181125}$$

For example,

$$\text{HashCode}([1, 2, 3]) = (1 + 2 \times 37 + 3 \times 37^2) \pmod{20181125} = 4182$$

and

$$\text{HashCode}([1, 2, 3, 456789]) = (1 + 2 \times 37 + 3 \times 37^2 + 456789 \times 37^3) \pmod{20181125} = 10168149$$

Example

standard input	standard output
5	Case 1: 104119
4 0	Case 2: 1926221
2 2 1 2	Case 3: 4182
	Case 4: 1482
5 0	Case 5: 1446
1 1 1 1 1	
3 0	
3 2 1	
3 1	
3 2 1	
3	
3 2	
3 2 1	
3 2	

Note

1. For a sequence x_1, x_2, \dots, x_n after reversing it, it becomes x_n, x_{n-1}, \dots, x_1 .
2. For two sequences x and y of the same length, x is lexicographically smaller than y if there exists such i , that $x_1 = y_1, x_2 = y_2, \dots, x_{i-1} = y_{i-1}, x_i < y_i$.