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Contest Code: SNCK1A21 Problem Code: LAZYMACHINE



Read problem statements in <u>Mandarin Chinese</u>, <u>Russian</u>, and <u>Vietnamese</u> as well.

You're given an array A with N integers. Define $F(A,i,j) = (A[j] - A[i]) \cdot (j-i)$.

Consider the set P of all pairs (i,j) such that $1 \leq i < j \leq N$. For a subset S of P, we define beauty(S,A) as the sum of F(A,i,j) over all pairs (i,j) contained in S. We also define V(A) as the maximum value of beauty(S,A) over all subsets S of P.

You also have a machine that takes a copy of the initial array A as an input and performs K pre-defined operations on it in a fixed order. In each operation, it takes two indices, X_i and Y_i , and swaps the elements present at those positions in the array at that moment in time. After that, it outputs the final array. You know what these operations are and the order in which they are performed.

However, the machine is a bit lazy. It may skip some operations. But the order of operations does not change. In other words, it chooses a subsequence (possibly empty) of the operations and performs them in that order.

Find the sum of V(P) over all possible outputs P of the machine (modulo 10^9+7).

In other words, consider the multiset R of the arrays we get as an output after the machine takes input as A and performs one of the subsequences (possibly empty) of the pre-defined operations. Note that there can be multiple occurrences of the same array in this multiset. Find the value $\sum\limits_{P \subseteq R} V(P)$.

Output the remainder of this value when divided by $10^9 + 7$.

Input Format

- \bullet $\;$ The first line contains one integer T the number of test cases. Then T test cases follow.
- For each test case, the first line contains integers N and K, the length of array A and the number of
 predefined operations respectively.
- The second line contains N integers $A[1], A[2], \ldots A[N]$.
- Then K lines follow. The i-th of these lines contains integers X_i and Y_i , the indices to be swapped in the i-th operation.

Output Format

For each test case, output the answer to the problem modulo $10^9 + 7$ on a separate line.

Constraints

- $1 \le T \le 10^3$
- $2 \le N \le 4 \cdot 10^3$
- $1 \le K \le 4 \cdot 10^3$
- $-10^9 \le A[i] \le 10^9$
- $1 \le X_i < Y_i \le N$
- Sum of N over all test cases is at most $4\cdot 10^3$.
- Sum of K over all test cases is at most $4\cdot 10^3$.

Sample Input 1 😩

	Oddcc	ther Competitive Programming Partic	orpate a Learn educerier		
1					
3 2					
1 2 3					
1 2					
2 3					
Sample Output 1 🖆					
15					
Explanation					
There are 4 ways to sele	ect a subsequ	ence from the given list of 2 operations:			
[2,1,3] . Then, after sways to get the great $V(A)=F(A,1,2)$	swapping valuest beauty in $=(A[2]-A[2])$::ion 1: After s	2: After swapping values at indices 1 and uses at indices 2 and 3, the array finally be this array is by by choosing $S=\{(1,2)\}$ of $A[1])\cdot (2-1)=(3-2)\cdot (2-1)=0$ swapping values at indices 1 and 2, the array indices 1 and 2, the array indices 1 and 2.	ecomes $\left[2,3,1\right]$. One of the $\left.\right\}$, ending up with 1		
• Perform only operation 2: After swapping values at indices 2 and 3, the array becomes $[1,3,2]$. For this final array, $V(A)=4$.					
Perform no operation	ns: The arra	y A remains $\left[1,2,3\right]$. Here, $V(A)=6$.			
YTH 3.6 (Python 3.6)		Code gets autosaved every second	6 ± • •		
# cook your dish here					

✓ Custom Input

Run

Submit

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Upcoming Coding Contests	Medium	CodeChef for Schools	Privacy Policy
Contest Hosting	<u>Hard</u>	College Chapters	Refund Policy
Problem Setting	<u>Challenge</u>	CodeChef for Business	Code of Conduct
CodeChef Tutorials	<u>Peer</u>		Bug Bounty Program
CodeChef Wiki	School		
	FAQ's		