DSA PROBLEMS

PROBLEM LEVEL -> HARD

71. Totient sum

Problem statement

Given a positive integer, *N*.

Euler phi function denoted by ϕ(n) counts the number of positive integers up to *n* that are co-prime to *n*. Let us have a function *F* as: F(x)=∑i=1x∑j=1iϕ(i)×ϕ(j)
Task Your task is to calculate the value of *F(N)*. Since the value can be large output it modulo 109+7.
Example

Assumptions

- *N = 4*

Approach

- F(4) = (ϕ(1).ϕ(1) + ϕ(2).ϕ(1) + ϕ(2).ϕ(2) + ϕ(3).ϕ(1) + ϕ(3).ϕ(2) + ϕ(3).ϕ(3) + ϕ(4).ϕ(1) + ϕ(4).ϕ(2) + ϕ(4).ϕ(3) + ϕ(4).ϕ(4)) % (109+7 *)*.
- F(4) *= 23.*

Function description

Complete the *solve* function provided in the editor. This function takes the following single parameter and returns the value of the function *F*:

- *N*: Represents the value of a number.

Input format

Note: This is the input format that you must use to provide custom input (available above the Compile and Test button).

- The first line contains a single integer *T*, which denotes the number of test cases. *T* also specifies the number of times you have to run the *solve* function on a different set of inputs.
- For each test case:
    - First line contains a single integer denoting the value of *N*.

Output format

For each test case, print in a new line, a single integer denoting the value of *F(N)* mod 109+7.

Code snippets (also called starter code/boilerplate code)

This question has code snippets for C, CPP, Java, and Python.

72. Absent?

Problem statement

John is attending a workshop for *N* days. He gets into trouble if he misses the workshop for two consecutive days.

Task

Determine the probability of him getting into trouble if he misses the workshop organized on the last day.

It can be shown that the probability can be represented as PQ where *P* and *Q* are coprime integers. Print the value of $P*Q^{-1}$ modulo 10^9+7.

Note: There is an equal probability of John getting absent or present on any day.

Example

Assumption

- *N = 2*

Approach

- All possible combinations are *(A,A)* and *(P,A)* where *P* = Present , *A* = Absent.
- Out of these, only *(A, A)* gets john into trouble.
- The probability of this is *1/2*. Thus the value of *(1/2)* modulo (10^9+7) is *500000004*.

Therefore the answer is *500000004*.

Function description

Complete the *absent* function provided in the editor. This function takes the following parameter and returns the probability of John getting into trouble:

- *N*: Represents the number of days of the workshop

Input format

Note: This is the input format you must use to provide custom input (available above the Compile and Test button).

- The first line contains *T* denoting the number of test cases. *T* also specifies the number of times you have to run the *absent* function on a different set of inputs.
- For each test case:
    - The first line contains *N* denoting the number of days of the workshop

Output format

For each test case in a new line, print the required probability.

Code snippets (also called starter code/boilerplate code)

This question has code snippets for C, CPP, Java, and Python.

73. Odd Xor Subsequences

Problem statement

DSA PROBLEMS

Problem:

You are given a sequence A of size N and Q queries. For each query:

- You are given an integer K.
- Your task is to count the number of subsequences of A of size K such that Bitwise Xor Sum of elements of the subsequence is odd. Since the answer can be large, compute it modulo 998,244,353.

Note: Bitwise Xor Sum of a sequence is Bitwise XOR of its elements.

Input Format:

- The first line of the input contains a single integer N.
- The second line of the input contains N space-separated integers A1,A2,...,AN.
- The third line of the input contains a single integer Q.
- Q lines follow. Each of these lines contains a single integer K describing a query.

Output Format:

- For each query, print a single line containing one integer — the count of subsequences of A of size K having odd Bitwise Xor Sum modulo 998,244,353.

74. Path Queries

Problem statement

You are given an undirected tree with N nodes and the tree is rooted at node 1. Each node has an integer value A[i] associated with it represented by an array A of size N.
Also, you are given Q queries of the following type:

- u v: Find the value of Minimum + Maximum + Median of all the values present on the simple path between node u and node v.
- Suppose, K nodes are present on the simple path, then Median is defined as ((K+1)/2)th smallest element present on the simple path.

Input format

- The first line contains two space-separated integers N, Q denoting the number of nodes and queries respectively.
- The second line contains N space-separated integers denoting array A.
- Next N−1 lines contain two space-separated integers denoting the edges of the tree.
- Next Q lines contain two space-separated integers denoting the queries.

Output format

Print Q space-separated integers denoting the answer of queries.

75. Maximize Array Function

Problem statement

For array A[] of N integers we call a function fA=∑i=1Ni∗AiGiven array of N integers and in one move you can select a position and delete the array element. Then all elements to the right are shifted to the left by 1 position. For example, given array is [5,9,15,25,15,9], if you delete A2 then the array will be [5,15,25,15,9] and then if you delete A2 the array will be [5,25,15,9]. Find the maximum value of fA of modified array by performing the above move any number of times (possibly 0).

Input format

- The first line contains T denoting the number of test cases. The description of each test case is as follows.
  - The first line contains an integer N denoting the number of array elements.
  - The next line contains N space-separated integers.

Output format

For each test case, print the answer in a new line.

76. Query In Hackland

Problem statement

There are N houses H1,H2,....,HN in 2D cardinal plane and given the coordinate of i′th house for each 1≤i≤N. Now you're given Q queries. For each query you're given four integers l,r,x,k. Find the smallest index i such that l≤i≤r and euclidean distance between the position of Hi and (x,0) is greater than or equal to k. If no such index present then answer will be −1.Euclidean distance between two point (xi,yi) and (xj,yj) is (xi−xj)2+(yi−yj)2

Input format

- The first line contains T denoting the number of test cases. The description of each test case is as follows.
  - The first line contains an integer N denoting the number of houeses.
  - Next N lines contain two space-separated integers xi and yi denotes the coordinate of Hi.
  - The next line contains Q denoting number of queries to be performed.
  - Next Q lines contain four space-separated integers l,r,x,k.

Output format

For each query, print the answer in a new line.

77. Avoid Maxima-Minima

Problem statement

You are given an array *A* consisting of *N* integers.

An index of the array i (1<i<N) is called :

- local maximum if the element on the ith index is strictly greater than the two adjacent elements (that is, Ai>Ai−1,Ai>Ai+1)
- local minimum if the element on the ith index is strictly less than the two adjacent elements (that is,Ai<Ai−1,Ai<Ai+1).

You want to obtain an array such that it does not contain any local maximums and local minimums. To do that, you can do the following operation any number of times:

- Choose an index *i* (1≤i≤|A|) and delete the element *A[i]* from the array. Here |A| denotes the current length of array *A*. After each operation, the length of the array decreases by one.

Find the maximum length of the final array *A* which does not contain any local maximums and local minimums.

Input format

- The first line contains *T* denoting the number of test cases. The description of *T* test cases is as follows:
- For each test case:
    - The first line contains *N* denoting the size of array *A*.
    - The second line contains *N* space-separated integers *A[1], A[2], ..., A[N]* - denoting the elements of *A*.

Output formatFor each test case, print the maximum length of the final array *A* which does not contain any local maximums and local minimums.

78. Maximum component

Problem statement

You are given a graph consisting of *N* nodes. Initially, there is no edge in the graph. You have to process *Q* queries of the following two types:

- *1 X Y:* connect nodes *X* and *Y* with an undirected edge.
- *2 K:* Print the size of the largest connected component if *K* extra undirected edges are added between any pair of nodes of the graph.

Note that the edges connected in the type *2* query are not considered in further queries.

Note: Since the size of input-output is large, prefer using fast input-output methods.

Input format

- The first line of input contains *N* denoting the number of nodes and *Q* denoting the number of queries respectively.
- *Q* lines follow. Each of these lines contains an integer *type[i],* denoting the type of the *i*-th query. if *type[i]* is *1*, it contains two more integers *X, Y*, if *type[i] = 2,* it contains an integer *K*.

Output format
For each query of type 2, print the size of the largest connected component in a separate line.

79. Modulus of Grid

Problem statement

You are given a grid of size $N*M$. The rows are numbered from 0 to $N-1$, and the columns are numbered from 0 to $M-1$.
In a single move, you can go from (x,y) to $((x+A) \mathrm{mod} N, y)$ or $(x, (y+B) \mathrm{mod} M)$ where A and B are positive integers satisfying $1 \le A \le N-1$ and $1 \le B \le M-1$.
You are also given Q queries. You have to solve each query independently.
In each query, you will be given two positions (x1, y1) and (x2, y2). You have to find the number of possible pairs of (A, B) so that (x2, y2) is reachable from (x1, y1) using any number of moves (possibly zero).

Input Format:
The first line of the input contains two space-separated integers N and M representing the size of the grid.
The next line contains a single integer Q representing the number of queries.
The next Q lines contain 4 space-separated integers x_1, y_1, x_2, y_2.

Output Format:
Output Q lines, where the ith line represents the answer to the ith query.

80. Collect Maximum Coins

Problem statement
There are N cities in a country, numbered 1 through N. They are connected with $N-1$ undirected roads in such a way that one can move from one city to any other city through these roads. Each city contains a box filled with coins. The ith city contains a box with Ai coins, and it requires Bi consecutive seconds to open the box.
Alice is initially in city 1. While standing in city $i (1 \le i \le N)$, Alice can either:

- move to an adjacent city in 1 second, or
- spend Bi consecutive seconds to open the box in the ith city and collect Ai coins.

Find the maximum number of coins Alice can collect in K seconds.

Alice can visit a city any number of times but can collect the coins only once from a city.

Input format

- The first line of input contains two integers N denoting the number of cities and K denoting total seconds available to collect the coins.
- The second line contains N integers A1,A2,…,AN, denoting the number of coins in the cities.
- The third line contains N integers B1,B2,…,BN, denoting the number of seconds to open the boxes.
- $N-1$ lines follow. The ith line contains two integers Xi,Yi denoting a road between the cities Xi,Yi. It is guaranteed that the roads and cities form a tree structure.

Output format For each query, print the maximum number of coins Alice can collect in K seconds.

81. LCM Range Queries

Problem statement

You are given Q queries. In each query, you are given two integers X and R, find the number of pairs of integers (A,B) such that$1 \le A < B \le R$, and$LCM(A,A+1,...,B)=X$.

Input format

- The first line of the input contains a single integer Q — the number of queries.
- The next Q lines contain two space-separated integers X and R for each query respectively.

Output format Output Q lines, each line containing a single integer — the answer to the corresponding query.

82. Minimize nodes

Problem statement
You are given N strings. Each string is given in the form of an array *cnt* of size *26* where the ith element in array denotes the count of the ith character of lowercase English alphabets in the string.

You have to select exactly *4* strings and insert the strings into a *Trie*. You are allowed to shuffle the characters in each string.

Task

Determine the minimum number of nodes present in *Trie* if the strings are selected optimally.

Notes

- *Trie* will always have a root node. Include root node in the count of nodes present in Trie.
- Insertion proceeds by walking the Trie according to the string to be inserted, then appending new nodes for the suffix of the string that is not contained in the Trie.

Input format

- The first line contains a single integer T which denotes the number of test cases.
- The first line of each test case contains an integer N.
- The next N lines of each test case contain *26* space-separated integers denoting the count of each lowercase English alphabet in the string.

Output format

For each test case, print the minimum number of nodes present in Trie in a new line.

83. The longest subarray

Problem statement
You are given an array of N positive integers and Q queries. In each query, you are given two integers l and r.
For each query, find the length of the longest subarray such that the bitwise AND of the subarray is 2k where $l \le k \le r$ and if no subarray exists, then the answer will be 0.

Input format

- The first line contains T denoting the number of test cases. The description of each test case is as follows.
  - The first line contains an integer N denoting the number of array elements.

  - The next line contains N space-separated integers.
  - The next line contains an integer Q denoting the number of queries that are required to be performed.
  - Each of the next Q lines contains two integers l and r.

Output format

For each test case, Q lines must be printed and the ith line should contain the output for the ith query.

84. Totient sum

Problem statement

Given a positive integer, *N*.

Euler phi function denoted by ϕ(n) counts the number of positive integers up to *n* that are co-prime to *n*.Let us have a function *F* as:F(x)=∑i=1x∑j=1iϕ(i)×ϕ(j)
TaskYour task is to calculate the value of *F(N).* Since the value can be large output it modulo 109+7.Example

Assumptions

- *N = 4*

Approach

- F(4) =
  (ϕ(1).ϕ(1) + ϕ(2).ϕ(1) + ϕ(2).ϕ(2) + ϕ(3).ϕ(1) + ϕ(3).ϕ(2) + ϕ(3).ϕ(3) + ϕ(4).ϕ(1) + ϕ(4).ϕ(2) + ϕ(4).ϕ(3) + ϕ(4).ϕ(4)) % (109+7 *).*
- F(4) *= 23.*

Function description

Complete the *solve* function provided in the editor. This function takes the following single parameter and returns the value of the function *F*:

- *N*: Represents the value of a number.

Input format

Note: This is the input format that you must use to provide custom input (available above the Compile and Test button).

- The first line contains a single integer *T*, which denotes the number of test cases. *T* also specifies the number of times you have to run the *solve* function on a different set of inputs.
- For each test case:
  - First line contains a single integer denoting the value of *N*.

Output format

For each test case, print in a new line, a single integer denoting the value of *F(N)* mod 109+7.

Code snippets (also called starter code/boilerplate code)

DSA PROBLEMS

This question has code snippets for C, CPP, Java, and Python.

85. Absent?

Problem statement

John is attending a workshop for *N* days. He gets into trouble if he misses the workshop for two consecutive days.

Task

Determine the probability of him getting into trouble if he misses the workshop organized on the last day.

It can be shown that the probability can be represented as PQ where *P* and *Q* are coprime integers. Print the value of $P*Q^{-1}$ modulo 10^9+7.

Note: There is an equal probability of John getting absent or present on any day.

Example

Assumption

- *N = 2*

Approach

- All possible combinations are *(A,A)* and *(P,A)* where *P* = Present , *A* = Absent.
- Out of these, only *(A, A)* gets john into trouble.
- The probability of this is *1/2*. Thus the value of *(1/2)* modulo (10^9+7) is *500000004*.

Therefore the answer is *500000004*.

Function description

Complete the *absent* function provided in the editor. This function takes the following parameter and returns the probability of John getting into trouble:

- *N*: Represents the number of days of the workshop

Input format

Note: This is the input format you must use to provide custom input (available above the Compile and Test button).

- The first line contains *T* denoting the number of test cases. *T* also specifies the number of times you have to run the *absent* function on a different set of inputs.
- For each test case:
  - The first line contains *N* denoting the number of days of the workshop

Output format

For each test case in a new line, print the required probability.

Code snippets (also called starter code/boilerplate code)

This question has code snippets for C, CPP, Java, and Python.

86. Odd Xor Subsequences

Problem statement

Problem:

You are given a sequence A of size N and Q queries. For each query:

- You are given an integer K.
- Your task is to count the number of subsequences of A of size K such that Bitwise Xor Sum of elements of the subsequence is odd. Since the answer can be large, compute it modulo 998,244,353.

Note: Bitwise Xor Sum of a sequence is Bitwise XOR of its elements.

Input Format:

- The first line of the input contains a single integer N.
- The second line of the input contains N space-separated integers A1,A2,...,AN.
- The third line of the input contains a single integer Q.
- Q lines follow. Each of these lines contains a single integer K describing a query.

Output Format:

- For each query, print a single line containing one integer — the count of subsequences of A of size K having odd Bitwise Xor Sum modulo 998,244,353.

87. Path Queries

Problem statement

You are given an undirected tree with N nodes and the tree is rooted at node 1. Each node has an integer value A[i] associated with it represented by an array A of size N.
Also, you are given Q queries of the following type:

- u v: Find the value of Minimum + Maximum + Median of all the values present on the simple path between node u and node v.
- Suppose, K nodes are present on the simple path, then Median is defined as ((K+1)/2)th smallest element present on the simple path.

Input format

- The first line contains two space-separated integers N, Q denoting the number of nodes and queries respectively.
- The second line contains N space-separated integers denoting array A.
- Next N−1 lines contain two space-separated integers denoting the edges of the tree.
- Next Q lines contain two space-separated integers denoting the queries.

Output format

Print Q space-separated integers denoting the answer of queries.

88. Maximize Array Function

DSA PROBLEMS

Problem statement
For array A[] of N integers we call a function fA=∑i=1Ni∗AiGiven array of N integers and in one move you can select a position and delete the array element. Then all elements to the right are shifted to the left by 1 position. For example, given array is [5,9,15,25,15,9], if you delete A2 then the array will be [5,15,25,15,9] and then if you delete A2 the array will be [5,25,15,9]. Find the maximum value of fA of modified array by performing the above move any number of times (possibly 0).

Input format

- The first line contains T denoting the number of test cases. The description of each test case is as follows.
  - The first line contains an integer N denoting the number of array elements.
  - The next line contains N space-separated integers.

Output format

For each test case, print the answer in a new line.

89. Query In Hackland

Problem statement
There are N houses H1,H2,....,HN in 2D cardinal plane and given the coordinate of i′th house for each 1≤i≤N. Now you're given Q queries. For each query you're given four integers l,r,x,k. Find the smallest index i such that l≤i≤r and euclidean distance between the position of Hi and (x,0) is greater than or equal to k. If no such index present then answer will be −1.Euclidean distance between two point (xi,yi) and (xj,yj) is (xi−xj)2+(yi−yj)2

Input format

- The first line contains T denoting the number of test cases. The description of each test case is as follows.
  - The first line contains an integer N denoting the number of houeses.
  - Next N lines contain two space-separated integers xi and yi denotes the coordinate of Hi.
  - The next line contains Q denoting number of queries to be performed.
  - Next Q lines contain four space-separated integers l,r,x,k.

Output format

For each query, print the answer in a new line.

90. Avoid Maxima-Minima

Problem statement

You are given an array *A* consisting of *N* integers.

An index of the array i (1<i<N) is called :

- local maximum if the element on the ith index is strictly greater than the two adjacent elements (that is, Ai>Ai−1,Ai>Ai+1)
- local minimum if the element on the ith index is strictly less than the two adjacent elements (that is,Ai<Ai−1,Ai<Ai+1).

You want to obtain an array such that it does not contain any local maximums and local minimums. To do that, you can do the following operation any number of times:

- Choose an index *i* (1≤i≤|A|) and delete the element *A[i]* from the array. Here |A| denotes the current length of array *A*. After each operation, the length of the array decreases by one.

Find the maximum length of the final array *A* which does not contain any local maximums and local minimums.

Input format

- The first line contains *T* denoting the number of test cases. The description of *T* test cases is as follows:
- For each test case:
  - The first line contains *N* denoting the size of array *A*.
  - The second line contains *N* space-separated integers *A[1], A[2], ..., A[N]* - denoting the elements of *A*.

Output formatFor each test case, print the maximum length of the final array *A* which does not contain any local maximums and local minimums.

91. Maximum component

Problem statement

You are given a graph consisting of *N* nodes. Initially, there is no edge in the graph. You have to process *Q* queries of the following two types:

- *1 X Y:* connect nodes *X* and *Y* with an undirected edge.
- *2 K:* Print the size of the largest connected component if *K* extra undirected edges are added between any pair of nodes of the graph.

Note that the edges connected in the type *2* query are not considered in further queries.

Note: Since the size of input-output is large, prefer using fast input-output methods.

Input format

- The first line of input contains *N* denoting the number of nodes and *Q* denoting the number of queries respectively.
- *Q* lines follow. Each of these lines contains an integer *type[i],* denoting the type of the *i*-th query. if *type[i]* is *1*, it contains two more integers *X, Y*, if *type[i] = 2,* it contains an integer *K*.

Output format For each query of type 2, print the size of the largest connected component in a separate line.

DIFFICULTY LEVEL -> MEDIUM

92. Breaking walls

DSA PROBLEMS

Problem statement

Bob is assigned a task to collect the maximum stars possible. He has a hammer that can be used to break only one wall!

You are given a grid of size N×M that contains ., ∗, ##. Here:

- . represents all the points where Bob can move
- ## represents the walls and hence bob cannot pass through it or be on it
- ∗ represents the stars bob needs to collect

Note: If you can reach this cell, you can collect this star.

Bob is allowed to start on any of the non ## cells and he is free to move up, down, left, or right. But, having the hammer, Bob can break only one wall and move through that broken wall. Bob wants to collect the maximum possible stars possible. Help Bob by finding the maximum possible stars he can collect.

Input format

- The first line contains two integers N and M.
- Next N lines contains M characters consisting of ., ∗, ##.

Output format

Print a single line containing a single integer.

93.NUMBER OF RBS

Consider a string $$S$$ of $$n$$ characters '(', ')', and '?'. Your task is to replace each character '?' with either ')' or '('. Determine the number of Regular Bracket Sequences (RBS) that is possible after these replacements.

A bracket sequence is called regular if it is possible to obtain correct arithmetic expressions by inserting characters «+» and «1» into this sequence. For example, sequences «(())()», «()» and «(()(()))» are regular, whereas «)(», «(()» and «(()))(» are not.

Input format

- The first line contains one integer $$T$$ denoting the number of test cases.
- The first line of each test case contains an integer $$n$$ that denotes the length of string $$S$$.
- The second line of each test case contains a string that denotes the string $$S$$.

Output format

For each test case, print the number of RBS modulo \(1e9+7\) in a new line.

94. Permutations

Problem statement

You are given a string S containing only lowercase alphabet characters. You are also given Q queries. In each query, you are given two integers l and r. Consider a substring S′ of string S[l,r]. You are required to print the number of permutations of the substring S′ that are lexicographically smallest among all permutations of S′. Since the number can be very large, print it modulo 1e9+7.

Input format

- The first line contains an integer T denoting the number of test cases.
- The first line of each test case contains an integer n denoting the length of string S.
- The second line of each test case contains a string S.
- The third line of each test case contains an integer Q denoting the number of queries.
- Next Q lines of each test case contain two space-separated integers l and r.

Output format

For each test case, print the number of permutations for each query in the next Q lines.

95. Temporary Tree

Problem statement
You are gifted a tree consisting of N vertices. There are two types of edges each with a weight val and denoted by a type value that is either 0 or 1. A pair (i,j), where i<j is called GOOD if, while traversing from vertex i to vertex j, we never pass through an edge of type 0. Your task is to calculate the sum of the path's weight of all the GOOD pairs present in the tree. Print the final answer modulo 109+7.

Input Format:

- The first line of input contains an integer T, denoting the number of test cases.
- The first line of each test case contains the integer N.
- The next N - 1 line contains four integers A, B, type and val where A and B represents the vertices of the tree, type represent the type of the edge and val define the edge weight.

Output format:

For each test case, print an integer denoting the sum of the path's weight of all the GOOD pairs modulo 109+7.

96. ARITHEMATIC SEQUENCE BY EXACTLY ONE MOVE

You are given a sequence \(a = (a_1, a_2, \dots, a_N)\) consisting of \(N\) integers. You must choose a index \(i\) and replace \(a_i\) by an integer \(k \neq a_i \)exactly once. Determine if you can rearrange \(a\) to form an arithmetic sequence or not. Note that \(a\) is an arithmetic sequence if and only if all differences between any two consecutive elements are the same.

Input Format

- The first line contains a single integer \(T\) — the number of test cases.
- For each testcase:
  - The first line contains one integer \(n\) — the length of the sequence.
  - The second line contains \(n\) integers \(a_1, a_2, ... , a_n\).

Output Format

- For each testcase, output "YES" if the \(a\) can be transformed into an arithmetic sequence. Otherwise, output "NO".

97. Complete Knight Traversals Count

Problem statement

Given two positive integers m and n which are the height and width of a 0-indexed 2D-array board. Find the number of Knight Traversals. A Knight Traversal includes a knight (of a chess game) starts at (0,0) of the board and visits every cell of the board exactly once. The starting cell (0,0) is considered visited and you shouldn't visit it again.

Note that a knight can move from cell (r1, c1) to cell (r2, c2) if 0 <= r2 <= m - 1 and 0 <= c2 <= n - 1 and min(abs(r1 - r2), abs(c1 - c2)) = 1 and max(abs(r1 - r2), abs(c1 - c2)) = 2.

Input constraints:

1 <= m, n <= 5

Input format:

The first line has two integers m and n separated by a space.

Output format:

A number indicating the number of distinct Knight Traversals.

98. Prefix XOR Sum

Problem statement

You are given an array A containing N integers and Q queries. Each query is denoted by two integers L,R. The answer to a query is AL+(AL⊕AL+1)+⋯+(AL⊕AL+1⊕⋯⊕AR), where ⊕ denotes the bitwise XOR operator.

Input format

- The first line contains two integers N denoting the size of array *A* and Q denoting the number of queries:
- The second line contains N space-separated integers A1,A2,…,AN - denoting the elements of *A*.
- Each of the next Q lines contains two integers L,R.

Output format

For each test query, print the answer in a separate line.

99. Count All Factors

Problem statement
You are given an array a of size n having distinct prime integers.
You will be given q queries. In each query, you will be given an integer k and you have to count the sum of Perfect Factors of the factors of this number.
Perfect Factors: Let's suppose an integer k. Suppose z1,z2,...,zt (t = number of factors) are the factors of integer k. Let's consider one of the factor, say zi. We now calculate how many elements in the provided array (a) perfectly divide this number. Suppose ci is the number of elements in the array that are perfectly dividing the factor zi. Therefore, number of *perfect factors* for factor zi = ci. So sum of *perfect factors of all the factors of number* k is c1+c2+...+ct.

Input Format:

- The first line contains one integer n − size of array a.
- The second line contains n space - seperated integers a[1],a[2],...,a[n] − denoting the elements of a.
- The third line contains one integer q − number of queries. Then q queries follow.
- The first and only line of each query contains a single integer k.

Output Format:

For each query, output in a separate line:

The sum of Perfect Factors of the factors of the number..

100. Good strings

Problem statement
Given a string S of length N consisting of only lower case alphabets. Print the total count of good strings. A string is called good if:-- its length is N and consists of only lower case alphabets.- it mismatches with S at exactly K different indexes.- it is lexicographically smaller than S.Since the answer could be large print it with modulo 109+7.

Input format

- The first line contains T denoting the number of test cases.
- The first line of each test case contains integers N and K, denoting the size of the length of the S and mismatch count.
- The next line contains S.

Output format

Print the number of total possible good strings. Since the answer could be large print it with modulo 109+7.