Subset Of Sequences

Limits: 1s, 512 MB

You will be given a set of sequences. Each sequence is a list of numbers. Two sequences are K-similar if the first K or more numbers from the both sequences are same and appear in same order in both set(K must be less than or equal to the size of the smaller sequence). That is the K length prefix of both sequence is same. So [1, 3, 5, 7, 9, 11] and [1, 3, 5, 7, 8, 11] sequences can be said 4-similar, 3-similar, 2-similar, 1-similar or 0-similar. [2, 4] and [2, 4, 6] are 2-similar, 1-similar or 0-similar. And [1, 2] and [2, 1] are only 0-similar.

Now you will be given Q values for K. For each given K, you have to tell how many ways we can take a non empty subset* from the set of sequences so that any two sequence from the subset are K-similar.

* Set **A** is a subset of set **B** if **A** is “contained” inside **B**, that is, all elements of **A** are also elements of **B** regardless of order.

Input

First line of the input is an integer N (2 <= N <= 10000), the number of sequence in this case. Than for each next N lines, first number of the line i is Mi(1<=Mi<=1000000) which is the number of members in this sequence. Then there will be Mi integers, each j of those integers Wij(1<=Wij<=10^9) is jth element of ith sequence. Number of elements from all the sequences (sum of all Mi) is less than or equal to 10^6.

In next line, there will a integer Q(Q<=100000), number of queries. Next line will have Q integers, each will be a different value of K(0<=K<=1000000).

Output

For each K in Q queries, print “Case I: R” where I is query number and R is how many ways we can take a non empty subset from the set of sequences so that any two sequence from the subset are K-similar. As the results can be very large, output it’s mod by 1000000007.

Samples

Input	Output
4 5 1 3 5 7 9 5 1 3 5 7 11 2 2 4 3 2 4 6 5 5 4 3 2 1	Case 1: 2 Case 2: 3 Case 3: 4 Case 4: 6 Case 5: 6

Explanation, for k=3, the subsets are {1st sequence}, {2nd sequence}, {4th sequence}, {1st and 2nd sequence} so result is 4.