

Problem D. Crazy LCP

Input file: strings.in
Output file: standard output
Balloon Color: Pink

In this problem you are given an array of strings, these strings are given unique indexes from 1 to N (in the same order as in the input). Then you are given Q queries, each query consists of 2 integers L and R , to answer the query you need to find a pair of strings with different indexes in the range from L to R (inclusive), where the length of the longest common prefix for these 2 strings is the maximum among all other possible pairs.

Input

Your program will be tested on one or more test cases. The first line of the input will be a single integer T ($1 \leq T \leq 100$) representing the number of test cases. Followed by T test cases.

Each test case starts with a line containing an integer N ($2 \leq N \leq 10^5$) representing the number of strings followed by a line containing N non-empty strings of lower case English letters separated by a single space, representing the list of strings. The sum of lengths of the strings in each test case is not greater than 200,000.

Followed by a line containing an integer Q ($1 \leq Q \leq 10^5$) representing the number of queries followed by Q lines, each line will contain 2 integers separated by a space, $L R$, which represent a query as described above ($1 \leq L < R \leq N$).

Output

For each query print a single line containing an integer which is the maximum length of a longest common prefix as described above.

Example

strings.in	standard output
1	1
4	2
aab abc aac xba	0
3	
2 3	
1 3	
3 4	

Note

A prefix of string S is the first (from the left) 0 or more characters from S , and a common prefix between 2 strings is a string which is a prefix in both of them.