

# PigeonG's Encoded Sequences

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            5 seconds  
Memory limit:         1024 megabytes

PigeonG is a **prodigious** PhD student at the School of Software Engineering, South China University of Technology, working on AI-for-medicine research. In one of his projects, biological fragments are transformed into symbolic **encoded sequences** for downstream computational analysis. He is currently investigating the **Linguistic Complexity** of fused encoded fragments.

PigeonG has a database of  $n$  encoded fragments, denoted as  $S_1, S_2, \dots, S_n$ . Each fragment is represented as a string over  $\{\text{A, B, } \dots, \text{Z}\}$ . He needs to evaluate the complexity of various fusion combinations. The complexity is defined as the number of **distinct substrings** in the fused sequence.

Due to the massive size of the dataset, his current Python script is too slow to handle the workload. **He asks for your help** to design an efficient algorithm to speed up the research.

Task: PigeonG will provide you with  $q$  queries. In each query, he gives you two indices  $id_1$  and  $id_2$ . Your task is to calculate the number of distinct substrings in the concatenated string

$$T = S_{id_1} \circ S_{id_2}$$

where  $\circ$  denotes string concatenation.

Definitions:

- **Substring:** a non-empty contiguous segment of a string.
- **Distinct:** two substrings are distinct if their string contents are different.

## Input

- The first line contains an integer  $n$  ( $1 \leq n \leq 2 \times 10^5$ ).
- The next  $n$  lines each contain a string over  $\{\text{A, B, } \dots, \text{Z}\}$ , denoting  $S_i$ , with  $1 \leq |S_i| \leq 2 \times 10^5$ .
- It is guaranteed that  $\sum_{i=1}^n |S_i| \leq 2 \times 10^5$ .
- The next line contains an integer  $q$  ( $1 \leq q \leq 2 \times 10^5$ ).
- The next  $q$  lines each contain two integers  $id_1, id_2$  ( $1 \leq id_1, id_2 \leq n$ ).
- **It is guaranteed that each character of  $S_i$  is chosen uniformly at random from  $\{\text{A, B, } \dots, \text{Z}\}$ .**

## Output

For each query, output one integer on a separate line: the number of distinct substrings in the corresponding concatenated string.

## Example

standard input	standard output
3	51
SCUT	103
SCUTSKY	65
PIGEONG	26
5	76
1 2	
2 3	
3 1	
1 1	
2 2	