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Contest Code: SNCK1B21 Problem Code: HLPUTKRSH



### Read problem statements in Mandarin Chinese Vietnamese, and Russian

Utkarsh is a cool guy and had fun throughout the year. Now his exams are approaching and he hasn't studied for them at all!

Utkarsh has to read several chapters for his exams, but he is smart and realized that he doesn't actually need to read each and every one of them thoroughly. Several chapters share the same content, so he can skip some parts of some chapters to save time.

Each chapter is a non-empty string of lowercase characters. Utkarsh has to read N distinct chapters for the exam, denoted by the set  $S=\{S_1,S_2,\ldots,S_N\}$  . He will read all N chapters in some order.

For each chapter  $S_i$ , he can skip reading some part of it by considering at most two other chapters that he has read already.

Formally, he has 3 options for the chapter  $S_i$ :

- Suppose there exist two chapters  $S_j, S_k \in S$  (j can be equal to k) that he has previously read, and three (possibly empty) strings of lowercase alphabets A, B, and C such that  $S_i = A + S_j + B + S_k + C$  (where + denotes string concatenation). Then he has to read only |A| + |B| + |C| characters.
- Suppose there exists a chapter  $S_j \in S$  that he has previously read, along with two (possibly empty) strings A and B of lowercase alphabets such that  $S_i = A + S_j + B$ . Then he has to read only |A| + |B| characters.
- ullet Finally, he can also choose to read chapter  $S_i$  completely, requiring  $|S_i|$  characters.

Note that there is no forced hierarchy among the options, i.e, Utkarsh is free to choose how he reads  $S_i$  chapter among all choices available to him.

Find the minimum amount of characters Utkarsh has to read in total if he chooses an optimal ordering of the chapters.

### **Input Format**

- The first line of input contains a single integer T, the number of test cases. The description of T test cases follows.
- ullet Each test case consists of N+1 lines.
- The first line contains a single integer N, the number of chapters.
- ullet Each of the following N lines contains a non-empty lowercase string.

#### **Output Format**

For each test case, print a single line containing one integer denoting the minimum number of characters Utkarsh has to read over all chapters.

## Constraints

- $1 \le T \le 10^3$
- $1 \le N \le 10^5$
- $1 \le |S_i| \le 3 \cdot 10^5$

Sum of  $|S_i|$  over all test cases doesn't exceed  $2\cdot 10^6$  . Sample Input 1 🖆 3 aba aabc bc 2 aaa bb 3 ZZZ Sample Output 1 🖆 1 Explanation Test case 1: Ukarsh reads the chapters in the following order: a (reads 1 character) c (reads 1 character) aba = a + b + a (first and last a already read, reads 1 character) bc = b + c (c already read, reads 1 character) aabc = a + a + bc (first a and bc already read, reads 1 character) Thus, 5 characters are read in total. Test case 2: Ukarsh reads the chapters in the following order: aaa (reads 3 characters) bb (reads 2 characters) Thus 5 characters are read in total. Test case 3: Ukarsh reads the chapters in the following order : • z (reads 1 character) zz = z + z (first and last z already read, reads 0 characters) • zzz = z + zz (z and zz are already read, reads 0 characters) Thus 1 character is read in total. PYTH 3.6 (Python 3.6) Code gets autosaved every second

# cook your dish here

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