F - Concat (2nd)

Editorial (/contests/abc434/tasks/abc434_f/editorial)

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 575 points

Problem Statement

You are given N strings S_i consisting of lowercase English letters.

For all possible permutations $P = (P_1, P_2, \ldots, P_N)$ of $(1, 2, \ldots, N)$, write down the string generated as follows:

- Concatenate $S_{P_1}, S_{P_2}, \ldots, S_{P_N}$ in this order.

Let $A_1, A_2, \ldots, A_{N!}$ be the sequence of the $N!$ written strings sorted in lexicographical order.
Output A_2.

You are given T test cases; solve each of them.

Constraints

- $1 \leq T \leq 1.5 \times 10^5$
- $2 \leq N \leq 3 \times 10^5$
- T, N are integers.
- S_i is a string consisting of lowercase English letters with length between 1 and $10^6 - 1$, inclusive.
- For a single input, the sum of N does not exceed 3×10^5.
- For a single input, the sum of $|S_i|$ does not exceed 10^6.

Input

The input is given from Standard Input in the following format:

$$
\begin{aligned}
&T \\
&\mathrm{case}_1 \\
&\mathrm{case}_2 \\
&\vdots \\
&\mathrm{case}_T
\end{aligned}
$$

Each test case is given in the following format:

$$
\begin{aligned}
&N \\
&S_1 \\
&S_2 \\
&\vdots \\
&S_N
\end{aligned}
$$

Output

Output T lines.

The i-th line should contain the answer for the i-th test case.

Sample Input 1 Copy

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```
3
3
abc
ac
ahc
4
aaa
a
aaaa
a
15
ks
sy
k
ysk
yks
ky
ksy
sk
syk
s
kys
sky
ys
yk
y
```

Sample Output 1 Copy

```
abcahcac
aaaaaaaaa
kksksykykysskskyssyksyyksykyskyys
```

Copy

This input contains three test cases.

For the first test case, $S = (\,\mathtt{abc}, \mathtt{ac}, \mathtt{ahc}\,)$.
We have $A = (\,\mathtt{abcacahc}, \mathtt{abcahcac}, \mathtt{acabcahc}, \mathtt{acahcabc}, \mathtt{ahcabcac}, \mathtt{ahcacabc}\,)$, so output $A_2 = \mathtt{abcahcac}$.

/#telegram)

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