NOI '16 P1 - Good Partitions

Time limit: 1.5s **Memory limit:** 512M

If a string can be written in the form of $\mathtt{AABB}$ where $\mathtt{A}$ and $\mathtt{B}$ are arbitrary **non-empty** strings, then we say this is a *good partition*. For example, it is possible to write the string $\mathtt{aabaabaa}$ in the form of $\mathtt{AABB}$ by letting $\mathtt{A} = \mathtt{aab}$ and $\mathtt{B} = \mathtt{a}$.

Some strings do not admit a good partition, while some strings admit multiple good partitions. For example, for the above string $\mathtt{aabaabaa}$, it is also possible to write it in the form of $\mathtt{AABB}$ by letting $\mathtt{A} = a$ and $\mathtt{B} = \mathtt{baa}$. The string $\mathtt{abaabaa}$ does not admit good partitions.

Given a string S of length n, compute the sum, over all its substrings, of the number of good partitions of those substrings. Here, *substring* refers to a contiguous part of the string.

Please pay attention to the following details:

- The same string appearing at different locations are considered distinct. All good partitions corresponding to the same string should count towards the answer.
- It is possible to have $\mathtt{A} = \mathtt{B}$ in a good partition. For example, the string $\mathtt{cccc}$ admits good partition $\mathtt{A} = \mathtt{B} = \mathtt{c}$.
- The string S itself is one of its substrings.

Input Specification

Each input file has several test cases.

The first line of the input file contains one integer T denoting the number of test cases in the file.

In the following T lines, each line contains a string S consisting of lower-case English letters.

Output Specification

Output T lines: each line consists of an integer denoting the total number of good partitions among all possible partitions of substrings of S.

Sample Input 1

```
4
aabbbb
cccccc
aabaabaabaa
bbaabaababaaba
```

Sample Output 1

```
3
5
4
7
```

Explanation for Sample 1

Let $S[i, j]$ denote the substring of S consisting of the i-th character to the j-th character of S, with index starting from 1.

In the first test case, there are three substrings admitting good partitions: $S[1, 4] = \texttt{aabb}$ with $\texttt{A} = \texttt{a}, \texttt{B} = \texttt{b}$, $S[3, 6] = \texttt{bbbb}$ with $\texttt{A} = \texttt{b}, \texttt{B} = \texttt{b}$, and $S[1, 6] = \texttt{aabbbb}$ with $\texttt{A} = \texttt{a}, \texttt{B} = \texttt{bb}$. Other substrings of S do not admit good partitions, so the answer shall be 3.

In the second test case, $S[1, 4] = S[2, 5] = S[3, 6] = \texttt{cccc}$ admit good partition $\texttt{A} = \texttt{c}, \texttt{B} = \texttt{c}$, so the total contribution to the final answer is 3. For string $S[1, 6] = \texttt{cccccc}$, it admits two good partitions ($\texttt{A} = \texttt{c}, \texttt{B} = \texttt{cc}$ or $\texttt{A} = \texttt{cc}, \texttt{B} = \texttt{c}$). The different good partitions corresponding to the same substring should all count towards the final answer, so the final answer to the second test case is $3 + 2 = 5$.

In the third test case, $S[1, 8]$ and $S[4, 11]$ admit two good partitions respectively. $S[1, 8]$ is the example described in the problem description. The answer should be $2 + 2 = 4$.

In the fourth test case, each of $S[1, 4], S[6, 11], S[7, 12], S[2, 11], S[1, 8]$ admits one good partition, and $S[3, 14]$ admits two good partitions, so the answer should be $5 + 2 = 7$.

Attachment Package

The samples are available here.

Sample 2

See `ex_excellent2.in` and `ex_excellent2.ans`.

Sample 3

See `ex_excellent3.in` and `ex_excellent3.ans`.

Constraints

For all test cases, $1 \le T \le 10$, $n \le 30\,000$.

Test case	$n \le$	Special properties

1,2	300	All characters of S are same.
3,4	$2\,000$	
5,6	10	No additional constraints.
7,8	20	
9,10	30	
11,12	50	
13,14	100	
15	200	
16	300	
17	500	
18	$1\,000$	
19	$2\,000$	
20	$30\,000$	