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time limit per test: 2 seconds
memory limit per test: 256 megabytes

You are given a binary string $s_1 s_2 \ldots s_n$ of length n. A string s is called binary if it consists only of zeros and ones.

For a string p, we define the function $f(p)$ as the maximum number of occurrences of any character in the string p. For example, $f(00110) = 3$, $f(01) = 1$.

You need to find the sum $f(s_l s_{l+1} \ldots s_r)$ for all pairs $1 \le l \le r \le n$.

Input

Each test consists of multiple test cases. The first line contains a single integer t ($1 \le t \le 10^4$) — the number of test cases. Then follows their descriptions.

The first line of each test case contains a single integer n ($1 \le n \le 2 \cdot 10^5$) — the length of the binary string.

The second line of each test case contains a string of length n, consisting of 0s and 1s — the binary string s.

It is guaranteed that the sum of n across all test cases does not exceed $2 \cdot 10^5$.

Output

For each test case, output the sum $f(s_l s_{l+1} \ldots s_r)$ for all pairs $1 \le l \le r \le n$.

Example

input Copy

```
6
1
0
2
01
4
0110
6
110001
8
10011100
11
01011011100
```

output Copy

```
1
3
14
40
78
190
```

Note

In the first test case, the string s has one substring, and the value $f(0) = 1$.

In the second test case, all substrings of the string s are 0, 01, 1. And the answer is $1 + 1 + 1 = 3$, respectively.

In the third test case, all substrings of the string s are 0, 01, 011, 0110, 1, 11, 110, 1, 10, 0. And the answer is $1 + 1 + 2 + 2 + 1 + 2 + 2 + 1 + 1 + 1 = 14$, respectively.