

# Problem D. a-Good String

**Time limit** 2000 ms

**Mem limit** 262144 kB

You are given a string  $s[1 \dots n]$  consisting of lowercase Latin letters. It is guaranteed that  $n = 2^k$  for some integer  $k \geq 0$ .

The string  $s[1 \dots n]$  is called *c-good* if **at least one** of the following three conditions is satisfied:

- The length of  $s$  is 1, and it consists of the character  $c$  (i.e.  $s_1 = c$ );
- The length of  $s$  is greater than 1, the first half of the string consists of only the character  $c$  (i.e.  $s_1 = s_2 = \dots = s_{\frac{n}{2}} = c$ ) and the second half of the string (i.e. the string  $s_{\frac{n}{2}+1} s_{\frac{n}{2}+2} \dots s_n$ ) is a  $(c + 1)$ -good string;
- The length of  $s$  is greater than 1, the second half of the string consists of only the character  $c$  (i.e.  $s_{\frac{n}{2}+1} = s_{\frac{n}{2}+2} = \dots = s_n = c$ ) and the first half of the string (i.e. the string  $s_1 s_2 \dots s_{\frac{n}{2}}$ ) is a  $(c + 1)$ -good string.

For example: "aabc" is 'a'-good, "ffgheeee" is 'e'-good.

In one move, you can choose one index  $i$  from 1 to  $n$  and replace  $s_i$  with any lowercase Latin letter (any character from 'a' to 'z').

Your task is to find the minimum number of moves required to obtain an 'a'-good string from  $s$  (i.e. *c-good string* for  $c = 'a'$ ). It is guaranteed that the answer always exists.

You have to answer  $t$  independent test cases.

Another example of an 'a'-good string is as follows. Consider the string  $s = "cdbbaaaa"$ . It is an 'a'-good string, because:

- the second half of the string ("aaaa") consists of only the character 'a';
- the first half of the string ("cdbb") is 'b'-good string, because:
  - the second half of the string ("bb") consists of only the character 'b';
  - the first half of the string ("cd") is 'c'-good string, because:
    - the first half of the string ("c") consists of only the character 'c';
    - the second half of the string ("d") is 'd'-good string.

## Input

The first line of the input contains one integer  $t$  ( $1 \leq t \leq 2 \cdot 10^4$ ) — the number of test cases. Then  $t$  test cases follow.

The first line of the test case contains one integer  $n$  ( $1 \leq n \leq 131\,072$ ) — the length of  $s$ . It is guaranteed that  $n = 2^k$  for some integer  $k \geq 0$ . The second line of the test case contains the string  $s$  consisting of  $n$  lowercase Latin letters.

It is guaranteed that the sum of  $n$  does not exceed  $2 \cdot 10^5$  ( $\sum n \leq 2 \cdot 10^5$ ).

**Output**

For each test case, print the answer — the minimum number of moves required to obtain an ' $a$ '-good string from  $s$  (i.e.  $c$ -good string with  $c = 'a'$ ). It is guaranteed that the answer exists.

**Sample 1**

Input	Output
6	0
8	7
bbdcaaaa	4
8	5
asdfghjk	1
8	1
ceaaaabb	
8	
bbaaddcc	
1	
z	
2	
ac	