String Construction

Amanda has a string, s, of m lowercase letters that she wants to copy into a new string, p. She can perform the following operations any number of times to construct string p:

- Append a character to the end of string p at a cost of 1 dollar.
- Choose any substring of p and append it to the end of p at no charge.

Given n strings (i.e., $s_0, s_1, \ldots, s_{n-1}$), find and print the *minimum* cost of copying each s_i to p_i on a new line.

Input Format

The first line contains a single integer, n, denoting the number of strings.
Each line i of the n subsequent lines contains a single string, s_i.

Constraints

- $1 \leq n \leq 5$
- $1 \leq m \leq 10^5$

Subtasks

- $1 \leq m \leq 10^3$ for 45% of the maximum score.

Output Format

For each string s_i (where $0 \leq i < n$), print the minimum cost of constructing string p_i on a new line.

Sample Input

```
2
abcd
abab
```

Sample Output

```
4
2
```

Explanation

Query 0: We start with $s =$ **"abcd"** and $p =$ **""**.

1. Append character **'a'** to p at a cost of 1 dollar, $p =$ **"a"**.
2. Append character **'b'** to p at a cost of 1 dollar, $p =$ **"ab"**.
3. Append character **'c'** to p at a cost of 1 dollar, $p =$ **"abc"**.
4. Append character **'d'** to p at a cost of 1 dollar, $p =$ **"abcd"**.

Because the total cost of all operations is $1 + 1 + 1 + 1 = 4$ dollars, we print 4 on a new line.

1. Append character **'a'** to p at a cost of 1 dollar, $p =$ **"a"**.
2. Append character **'b'** to p at a cost of 1 dollar, $p =$ **"ab"**.
3. Append substring **"ab"** to p at no cost, $p =$ **"abab"**.

Because the total cost of all operations is $1 + 1 = 2$ dollars, we print 2 on a new line.

Note

A substring of a string S is another string S' that occurs "in" S (Wikipedia). For example, the substrings of the string "abc" are "a", "b" ,"c", "ab", "bc", and "abc".