

4677 Interleaved Periodic String

An interleaved periodic string S can be written down using the following procedure:

1. Write down any two strings s_1 and s_2 of lengths p_1 and p_2 respectively. The strings must consist of only 0s and 1s, and can possibly be empty.
2. Concatenate some copies of the string s_1 to obtain string S_1 .
3. Concatenate some copies of the string s_2 to obtain string S_2 .
4. Interleave the strings S_1 and S_2 to obtain S .

To interleave two strings, merge their characters arbitrarily, maintaining the relative order in which they occur in both strings. For example, the strings “101” and “011” can be interleaved to get “011011” or “101011”, however they cannot be interleaved to form “110110”. Given S , find the minimum possible value of $(p_1 + p_2)$.

Input

The input consists of multiple test cases. The first line contains the number of test cases T . Each of the next T lines contain a string S consisting of only ‘0’s and ‘1’s.

Constraints:

- $1 \leq T \leq 20$
- $1 \leq \text{length of } S \leq 16$

Output

Output T lines, one corresponding to each test case, containing the minimum value of $(p_1 + p_2)$ for the corresponding test case.

Sample Input

```
1
0101
```

Sample Output

```
2
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