

# Bear and Steady Gene



A gene is represented as a string of length  $n$  (where  $n$  is divisible by 4), composed of the letters **A**, **C**, **T**, and **G**. It is considered to be *steady* if each of the four letters occurs exactly  $\frac{n}{4}$  times. For example, **GACT** and **AAGTGCCT** are both steady genes.

Bear Limak is a famous biotechnology scientist who specializes in modifying bear DNA to make it steady. Right now, he is examining a gene represented as a string *gene*. It is not necessarily steady. Fortunately, Limak can choose one (maybe empty) substring of *gene* and replace it with any string of the same length.

Modifying a large substring of bear genes can be dangerous. Given a string *gene*, can you help Limak find the length of the smallest possible substring that he can replace to make *gene* a steady gene?

*Note:* A substring of a string *s* is a subsequence made up of zero or more *contiguous* characters of *s*.

As an example, consider *gene* = **ACTGAAAG**. The substring **AA** just before or after **G** can be replaced with **CT** or **TC**. One selection would create **ACTGACTG**.

## Function Description

Complete the *steadyGene* function in the editor below. It should return an integer that represents the length of the smallest substring to replace.

steadyGene has the following parameter:

- gene*: a string

## Input Format

The first line contains an interger  $n$  divisible by 4, that denotes the length of a string *gene*.  
The second line contains a string *gene* of length  $n$ .

## Constraints

- $4 \leq n \leq 500\,000$
- $n$  is divisible by 4
- $gene[i] \in [CGAT]$

## Subtask

- $4 \leq n \leq 2000$  in tests worth 30% points.

## Output Format

Print the length of the minimum length substring that can be replaced to make *gene* stable.

## Sample Input

```
8
GAAATAAA
```

## Sample Output

```
5
```

## Explanation

One optimal solution is to replace **AAATA** with **TTCCG** resulting in **GTTCGAA**.

The replaced substring has length 5.