**1.** Consider an algorithm that takes as input a positive integer n. If n is even, the algorithm divides it by two, and if n is odd, the algorithm multiplies it by three and adds one. The algorithm repeats this, until n is one. For example, the sequence for n=3n=3n=3 is as follows: 3→10→5→16→8→4→2→1

Your task is to simulate the execution of the algorithm for a given value of n.

Input

The only input line contains an integer n.

Output

Print a line that contains all values of n during the algorithm.

Constraints

* 1≤n≤10^6

Example

Input:

3

Output:

3 10 5 16 8 4 2 1

**Code:**

import java.util.\*;

public class Main {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

long n = sc.nextLong();

System.out.print(n+" ");

while (n != 1) {

if (n % 2 == 0) {

n = n / 2;

System.out.print(n + " ");

} else {

n = 3 \* n + 1;

System.out.print(n + " ");

}

}

sc.close();

}

}

**2.** You are given all numbers between 1,2,…n except one. Your task is to find the missing number.

**Input**

The first input line contains an integer n.

The second line contains n−1 numbers. Each number is distinct and between 1 and n (inclusive).

**Output**

Print the missing number.

**Constraints**

* 2≤n≤2⋅10^5

**Example**

Input:

5

2 3 1 5

Output:

4

**Code:**

import java.util.\*;

public class Main {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

long n = sc.nextLong();

long sum = 0;

for (int i = 0; i < n - 1; i++) {

sum += sc.nextLong();

long ts = n \* (n + 1) / 2;

System.out.println(ts - sum);

sc.close();

}

}

**3**. You are given a DNA sequence: a string consisting of characters A, C, G, and T. Your task is to find the longest repetition in the sequence. This is a maximum-length substring containing only one type of character.

Input

The only input line contains a string of n characters.

Output

Print one integer: the length of the longest repetition.

Constraints

* 1≤n≤10^6

Example

Input:

ATTCGGGA

Output:

3

**Code:**

import java.io.\*;

import java.util.\*;

public class Main {

public static void main(String[] args) {

Scanner sc = new Scanner(System.in);

String str = sc.nextLine();

sc.close();

if (str.length() == 0) {

System.out.println(0);

return;

}

int m = 1;

int c = 1;

for (int i = 1; i < str.length(); i++) {

if (str.charAt(i) == str.charAt(i-1)) {

c++;

} else {

m = Math.max(m, c);

c = 1;

}

}

m = Math.max(m, c);

System.out.println(m);

}

}