Codeforces Round #452 (Div. 2)

A. Splitting in Teams

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

There were n groups of students which came to write a training contest. A group is either one person who can write the contest with anyone else, or two people who want to write the contest in the same team.

The coach decided to form teams of exactly three people for this training. Determine the maximum number of teams of three people he can form. It is possible that he can't use all groups to form teams. For groups of two, either both students should write the contest, or both should not. If two students from a group of two will write the contest, they should be in the same team.

Input

The first line contains single integer n ($2 \le n \le 2 \cdot 10^5$) — the number of groups.

The second line contains a sequence of integers $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 2$), where a_i is the number of people in group i.

Output

Print the maximum number of teams of three people the coach can form.

Examples

input
4 1 1 2 1
output
1

input
2 2 2
output
0

input
7 2 2 2 1 1 1 1
output
3

input
3 1 1 1
output
1

Note

In the first example the coach can form one team. For example, he can take students from the first, second and fourth groups.

In the second example he can't make a single team.

In the third example the coach can form three teams. For example, he can do this in the following way:

- The first group (of two people) and the seventh group (of one person),
- The second group (of two people) and the sixth group (of one person),
- The third group (of two people) and the fourth group (of one person).

B. Months and Years

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Everybody in Russia uses Gregorian calendar. In this calendar there are 31 days in January, 28 or 29 days in February (depending on whether the year is leap or not), 31 days in March, 30 days in April, 31 days in May, 30 in June, 31 in July, 31 in August, 30 in September, 31 in October, 30 in November, 31 in December.

A year is leap in one of two cases: either its number is divisible by 4, but not divisible by 100, or is divisible by 400. For example, the following years are leap: 2000, 2004, but years 1900 and 2018 are not leap.

In this problem you are given n ($1 \le n \le 24$) integers a_1, a_2, ..., a_n, and you have to check if these integers could be durations in days of n consecutive months, according to Gregorian calendar. Note that these months could belong to several consecutive years. In other words, check if there is a month in some year, such that its duration is a_1 days, duration of the next month is a_2 days, and so on.

Input

The first line contains single integer n ($1 \le n \le 24$) — the number of integers.

The second line contains n integers a_1, a_2, ..., a_n ($28 \le a_i \le 31$) — the numbers you are to check.

Output

If there are several consecutive months that fit the sequence, print "YES" (without quotes). Otherwise, print "NO" (without quotes).

You can print each letter in arbitrary case (small or large).

Examples

input
4 31 31 30 31
output
Yes

input
2 30 30
output
No

input
5 29 31 30 31 30
output
Yes

input
3 31 28 30
output
No

input
3 31 31 28
output
Yes

Note

In the first example the integers can denote months July, August, September and October.

In the second example the answer is no, because there are no two consecutive months each having 30 days.

In the third example the months are: February (leap year) — March — April – May — June.

In the fourth example the number of days in the second month is 28, so this is February. March follows February and has 31 days, but not 30, so the answer is NO.

In the fifth example the months are: December — January — February (non-leap year).

C. Dividing the numbers

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Petya has n integers: $1, 2, 3, \ldots, n$. He wants to split these integers in **two non-empty** groups in such a way that the absolute difference of sums of integers in each group is as small as possible.

Help Petya to split the integers. Each of n integers should be exactly in one group.

Input

The first line contains a single integer n $(2 \leq n \leq 60\,000)$ — the number of integers Petya has.

Output

Print the smallest possible absolute difference in the first line.

In the second line print the size of the first group, followed by the integers in that group. You can print these integers in arbitrary order. If there are multiple answers, print any of them.

Examples

input
4
output
0 2 1 4

input
2
output
1 1 1

Note

In the first example you have to put integers 1 and 4 in the first group, and 2 and 3 in the second. This way the sum in each group is 5, and the absolute difference is 0.

In the second example there are only two integers, and since both groups should be non-empty, you have to put one integer in the first group and one in the second. This way the absolute difference of sums of integers in each group is 1.

D. Shovel Sale

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

There are n shovels in Polycarp's shop. The i-th shovel costs i burles, that is, the first shovel costs 1 burle, the second shovel costs 2 burles, the third shovel costs 3 burles, and so on. Polycarps wants to sell shovels in pairs.

Visitors are more likely to buy a pair of shovels if their total cost ends with several 9s. Because of this, Polycarp wants to choose a pair of shovels to sell in such a way that the sum of their costs ends with maximum possible number of nines. For example, if he chooses shovels with costs 12345 and 37454, their total cost is 49799, it ends with two nines.

You are to compute the number of pairs of shovels such that their total cost ends with maximum possible number of nines. Two pairs are considered different if there is a shovel presented in one pair, but not in the other.

Input

The first line contains a single integer n ($2 \le n \le 10^9$) — the number of shovels in Polycarp's shop.

Output

Print the number of pairs of shovels such that their total cost ends with maximum possible number of nines.

Note that it is possible that the largest number of 9s at the end is 0, then you should count all such ways.

It is guaranteed that for every $n \le 10^9$ the answer doesn't exceed $2 \cdot 10^9$.

Examples

input
7
output
3

input
14
output
9

input
50
output
1

Note

In the first example the maximum possible number of nines at the end is one. Polycarp cah choose the following pairs of shovels for that purpose:

- 2 and 7;
- 3 and 6;
- 4 and 5.

In the second example the maximum number of nines at the end of total cost of two shovels is one. The following pairs of shovels suit Polycarp:

- 1 and 8;
- 2 and 7;
- 3 and 6;
- 4 and 5;
- 5 and 14;
- 6 and 13;
- 7 and 12;
- 8 and 11;
- 9 and 10.

In the third example it is necessary to choose shovels 49 and 50, because the sum of their cost is 99, that means that the total number of nines is equal to two, which is maximum possible for $n = 50$.

E. Segments Removal

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Vasya has an array of integers of length n.

Vasya performs the following operations on the array: on each step he finds the longest segment of consecutive equal integers (the leftmost, if there are several such segments) and removes it. For example, if Vasya's array is $[13, 13, 7, 7, 7, 2, 2, 2]$, then after one operation it becomes $[13, 13, 2, 2, 2]$.

Compute the number of operations Vasya should make until the array becomes empty, i.e. Vasya removes all elements from it.

Input

The first line contains a single integer n ($1 \le n \le 200\,000$) — the length of the array.

The second line contains a sequence $a_1, a_2, \ldots, a_n$ ($1 \le a_i \le 10^9$) — Vasya's array.

Output

Print the number of operations Vasya should make to remove all elements from the array.

Examples

input
4 2 5 5 2
output
2

input
5 6 3 4 1 5
output
5

input
8 4 4 4 2 2 100 100 100
output
3

input
6 10 10 50 10 50 50
output
4

Note

In the first example, at first Vasya removes two fives at the second and third positions. The array becomes $[2, 2]$. In the second operation Vasya removes two twos at the first and second positions. After that the array becomes empty.

In the second example Vasya has to perform five operations to make the array empty. In each of them he removes the first element from the array.

In the third example Vasya needs three operations. In the first operation he removes all integers 4, in the second — all integers 100, in the third — all integers 2.

In the fourth example in the first operation Vasya removes the first two integers 10. After that the array becomes $[50, 10, 50, 50]$. Then in the second operation Vasya removes the two rightmost integers 50, so that the array becomes $[50, 10]$. In the third operation he removes the remaining 50, and the array becomes $[10]$ after that. In the last, fourth operation he removes the only remaining 10. The array is empty after that.

F. Letters Removing

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Petya has a string of length n consisting of small and large English letters and digits.

He performs m operations. Each operation is described with two integers l and r and a character c: Petya removes from the string all characters c on positions between l and r, inclusive. It's obvious that the length of the string remains the same or decreases after each operation.

Find how the string will look like after Petya performs all m operations.

Input

The first string contains two integers n and m ($1 \le n, m \le 2 \cdot 10^5$) — the length of the string and the number of operations.

The second line contains the string of length n, consisting of small and large English letters and digits. Positions in the string are enumerated from 1.

Each of the next m lines contains two integers l and r ($1 \le l \le r$), followed by a character c, which is a small or large English letter or a digit. This line describes one operation. It is guaranteed that r doesn't exceed the length of the string s before current operation.

Output

Print the string Petya will obtain after performing all m operations. If the strings becomes empty after all operations, print an empty line.

Examples

input
4 2 abac 1 3 a 2 2 c
output
b

input
3 2 A0z 1 3 0 1 1 z
output
Az

input
10 4 agtFrgF4aF 2 5 g 4 9 F 1 5 4 1 7 a
output
tFrg4

input
9 5 aAAaBBccD 1 4 a 5 6 c 2 3 B 4 4 D 2 3 A
output
AB

Note

In the first example during the first operation both letters '`a`' are removed, so the string becomes "`bc`". During the second operation the letter '`c`' (on the second position) is removed, and the string becomes "`b`".

In the second example during the first operation Petya removes '`0`' from the second position. After that the string becomes "`Az`". During the second operations the string doesn't change.