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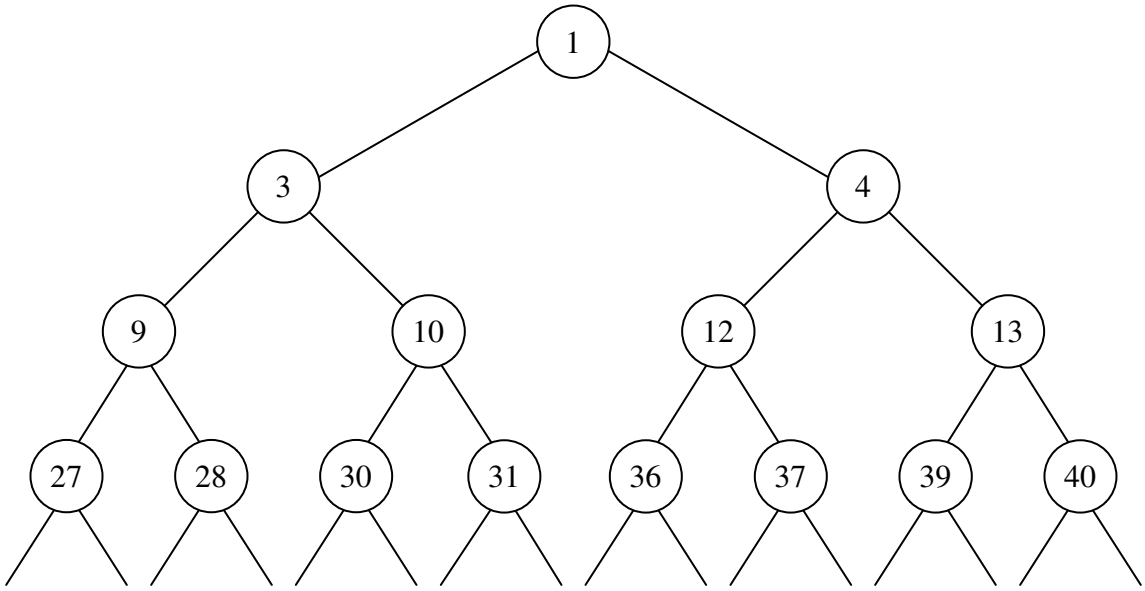
Task B1. BINARY TREE

Let p be an integer, bigger than 2. Integers are written in the vertices of the infinity binary tree in the following way:

- in the root of the tree it is written 1;
- if in any vertex of the tree it is written x, therefore its left child contains $p.x$ and its right child contains $p.x+1$.

For example, if $p=3,$ then the beginning of the tree looks in the following way:



A number is called *pretty* if it can be presented in a single way as a sum of two different numbers, which appear in the tree vertices. Write a program **`btree`**, which determines whether the given numbers n_1, n_2, n_3 and n_4 are *pretty*.

Input

On a single line of the standard input the integers p, n_1, n_2, n_3 and n_4 are given ($2 < p < 50,\ 0 < n_1 < 10^{18},\ 0 < n_2 < 10^{18},\ 0 < n_3 < 10^{18},\ 0 < n_4 < 10^{18}$).

Output

On a single line of the standard output for every number n_1, n_2, n_3 and n_4 the program must write 1 if the number is *pretty* and 0 if it is not.

Example

Input

```
3 7 28 13 9
```

Output

```
1 1 0 0
```

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Task B2. CALCULATOR GAME

Using a pocket calculator, enter a positive integer K and press "+". The calculator still shows the number K. Then again enter the number K. After pressing the "+" key for the second time, the result is: $K + K$. The game goal is to obtain a number, consisting of equal digits only, by repeating this operation many (possibly 0) times. Write a program **`calcgame`** that determines whether it is possible to reach the goal.

If possible, what is the first number, which consists of equal digits only and is obtained by multiple summing?

Input

On the standard input, a positive integer K is given.

Output

If reaching the goal is impossible, print "`Impossible`". If possible, a line of the standard output should contain two integers separated by a space: the first is the digit itself and the secong is the amount of digits of the obtained number.

Constrains

$1 \leq K \leq 999$

Examples

Input	Output
`37`	`1 3`

Explanation:

```
37 + 37 + 37 = 111
```

Input	Output
`25`	`Impossible`

Input	Output
`999`	`9 3`

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Task B2. ZERO SUM

Elly unexpectedly started teaching a programming contest preparation class. Some of the contests there are ACM style, i.e. the contestants must form teams of exactly three persons. After some training it is time for her students to shine – the national student Olympiad has come. Elly must decide which three students will represent her class in the contest. Unfortunately, her students have the following property: the better at coding they are, the worse are their team skills; on the other hand, the better their team skills are, the worse they code. And ACM is a type of contest, where both good coding and team skills are needed.
After the training and some local contests, Elly has a list of the coding skills of all her students. Each of the N contestants has a number between -10000 and 10000, denoting his or her skill. She wants to form the team in such a way, that the sum of the three contestants is zero. This would mean that the team is relatively balanced both for coding and team skills. Given the results of the students, find in how many ways she can choose the team for the contest.

We can summarize the problem in the following way: For given N integers between -10000 and 10000 write a program **`zerosum`**, which finds how many (unordered) triples with zero sum there are.

Input

On the first line of the standard input the integer N – the number of students will be given. On the second line N integers between -10000 and 10000 – the coding skill of each student will be given.

Output

On the standard output print a single integer – the number of possible teams she can choose from.

Constraints

$1 \leq N \leq 10000$
$-10000 \leq A_i \leq 10000$
In 30% of the tests N will be less than or equal to 1000.
In 70% of the tests N will be less than or equal to 5000.

Example:

Input

```
10
2 -5 2 3 -4 7 -4 0 1 -6
```

Output

```
6
```

Clarification:

The possible triples are: (2, -5, 3), (2, 2, -4), (2, 2, -4), (-5, 2, 3), (3, -4, 1), (3, -4, 1). Note that the two -4 numbers denote different contestants. Thus, the repeated triple (2, 2, -4) gives two different teams.