Competitive Programming
Saarland University — Summer Semester 2022

Markus Bläser, Karl Bringmann, Martin Bromberger, Christoph Weidenbach
Julian Baldus, Yasmine Briefs, Simon Schwarz, Dominic Zimmer

Assignments Week 1
Deadline: **April 21, 2022 at 16:00 sharp**

Please submit solutions to the problems in our judge system, available at
`https://compro.mpi-inf.mpg.de/`.
You can find your credentials on your personal status page in our CMS.

Problem	`helloworld`	`lineup`	`outoforder`	`theanswer`
Points	3	3	3	3
Difficulty	🌶	🌶🌶	🌶🌶	🌶🌶🌶
Memory Limit	2 GB	2 GB	2 GB	2 GB

Please note:

- Your solution will be judged immediately after submitting. This may take some time, depending on the current server load.

- You can submit as many times as you want. However, don't abuse the server or try to extract the secret test cases.

- If your solution is **accepted**, you will receive the points specified in the table above.

- If you get **another verdict**, you will receive 0 points.

Hello World!

Problem ID: helloworld
Time limit: 1 second

This problem is intended to familiarize you with the contest system. Solve it before attempting any other problem.

Every programmer's first challenge is to write a Hello World program in their favorite language. Let's celebrate the tradition by greeting those friendly programmers back!

You will read their names from `stdin`, and write the output to `stdout`. Note that the output is case-sensitive, i.e. do not print `hello`. Before submitting, you should check that your output for the *sample input* exactly matches the *sample output*.

Input

The first line of the input contains an integer t. The following t lines each contain a name s.

Output

For each name s in the input, print a line containing "Hello s!". Each line of the output should end with a line break.

Constraints

- $1 \le t \le 20$

- The names s consist of 1 to 100 lower or upper case english letters.

Sample Input 1

```
2
Dieter
Lea
```

Sample Output 1

```
Hello Dieter!
Hello Lea!
```

Line up for Wine

Problem ID: lineup
Time limit: 8 seconds

Among Dieter Schlau's friends, there is a group of eleven wine enthusiasts. They are much more knowledgeable about wine than Dieter, and he sometimes feels left out. In order to impress his friends, Dieter wants to host a big wine tasting. To keep the cost low – and due to lack of knowledge in buying wine – Dieter decides to buy "11 Wines you and your Friends will love" from the internet. Only after arrival he came to find that there is only enough wine for every guest to try one glass. Dieter will serve everyone.

It is hard to fully satisfy everyone, since they all have different taste and the wine supply is so limited. But since they drink together on a regular basis, Dieter can precisely judge how well each of his friends would enjoy a certain wine.

To consider the event a success, Dieter wants to maximize the overall joy of the wine tasting. The overall joy is the sum of the joy caused by the wine served to each guest. Your job is to calculate, which guest to serve which wine and output the maximum overall joy.

Input

The input consists of 11 lines, one for each of his friends, where the i-th line contains 11 integer numbers e_{ij} between 0 and 100. e_{ij} determines how much the i-th guests would enjoy the j-th wine.

Output

Print x, the maximum overall joy Dieter's wine tasting can achieve.

Constraints

- $0 \le e_{ij} \le 100$ for all $1 \le i, j \le 11$.

Sample Input 1

```
100 0 0 0 0 0 0 0 0 0 0
0 80 70 70 60 0 0 0 0 0 0
0 40 90 90 40 0 0 0 0 0 0
0 40 85 85 33 0 0 0 0 0 0
0 70 60 60 85 0 0 0 0 0 0
0 0 0 0 0 95 70 60 60 0 0
0 45 0 0 0 80 90 50 70 0 0
0 0 0 0 0 40 90 90 40 70 0
0 0 0 0 0 0 50 70 85 50 0
0 0 0 0 0 0 66 60 0 80 80
0 0 0 0 0 0 50 50 0 90 88
```

Sample Output 1

```
970
```

Out of order

There is nothing more sacred to you than your prized stamp collection. Many days off you spend buying new stamps from all over the world, making sure your collection is well maintained. Most notably, your collection is ordered increasingly in the value of the stamps. That makes them easy to find, in case you were to look for a particular one.

Your collection is remarkable and you have all the reason to be proud of it. That was, until your niece visited last weekend and you got to spend some quality time with your family. After they left, you checked back on your collection and came to find the chaos that she created: New stamps were put into your collection and old stamps were rearranged. Most importantly however, they are no longer arranged in order!
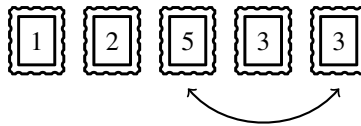

Figure 1: Depiction of Sample 1

Stamps are notoriously delicate to handle and prefer not to be removed from the pages they were initially glued to. In your frenzy, you begin to undo the damage done and start removing the first misplaced stamp. Only then you ponder: Could you restore the entire collection to a sorted state by swapping exactly two stamps?

Input

The first line of the input contains an integer n. The second line contains n integers s_i, $1 \leq i \leq n$, describing the values of the stamps in your collection. It is guaranteed that the collection is not sorted in increasing order, i.e. there is at least one position i with $s_i > s_{i+1}$.

Output

If there are two stamps such that swapping them yields a sorted collection, print their two positions in any order. Otherwise, print `impossible`.

Constraints

- $1 \leq n \leq 100000$

- $1 \leq s_i \leq 1000$ for all $1 \leq i \leq n$

Sample Input 1	Sample Output 1
5 1 2 5 3 3	3 5

Sample Input 2	Sample Output 2
5 5 4 3 2 1	impossible

The Answer to everything

Given the task to find the "Answer to The Ultimate Question of Life, the Universe, and Everything", the super computer Deep Thought took seven and a half million years to finally come up with the answer.

The people got very upset with the answer, said it was not helpful at all. That is, because noone knew the question – to which 42 would be the answer.

Now is the time that its successor, Deep Thought 2.0, is constantly working on finding the question to the "Answer to The Ultimate Question of Life, the Universe, and Everything". During its many years of computation so far, it came up with several other interesting and related questions. A particular one of them is:

The Answer to the Ultimate Question of Life, the Universe, and Everything is 42.

> *If you have n integer numbers,*
> *are there any three of them that sum up to* 42*?*

Input

The first line of input contains an integer n such that $3 \leq n \leq 5000$.

The next line contains n integers between -10^{15} and 10^{15}, separated by spaces. The integers are pairwise distinct.

Output

If, among the n given numbers, there are three that sum to 42, print them in any order. The three numbers must be distinct. If there are multiple solutions, print any of them. If there are no such three integers, print `impossible`.

Sample Input 1
```
4
21 15 10 11
```

Sample Output 1
```
21 10 11
```

Sample Input 2
```
5
1 2 3 4 5
```

Sample Output 2
```
impossible
```

Sample Input 3
```
5
47 -1 -2 -3 -4
```

Sample Output 3
```
47 -1 -4
```