Problem 167: Find the Missing Sensor

Difficulty: Easy

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Problem Background

Any time anything is manufactured, it must be tested to ensure that all required parts are in place and in working order. This can include diagnostics of electronic components to ensure that they are able to receive input and provide output correctly. If any errors are detected, they must be fixed before the item is shipped to a customer; it's much easier and less costly to fix problems before an item leaves the manufacturing floor!

Problem Description

A materials engineer working at Lockheed Martin Aeronautics is testing flight sensors being installed on an F-35 fighter jet. The diagnostic test he's running sends a signal to each sensor; the sensors must respond with a number representing their unique ID. Unfortunately, the engineer has noticed a problem; one of the sensors is missing! He's asked your team to write a program to quickly identify the missing sensor.

You'll be given the results of the engineer's diagnostic. This will include a randomly sorted list of the integer ID numbers for each sensor. Each number is unique and will range from 1 to the number of sensors the engineer expected to find (N). One of the numbers between 1 and N will be missing and must be reported to the engineer.

Sample Input

The first line of your program's input, received from the standard input channel, will contain a positive integer representing the number of test cases. Each test case will include:

- A line containing a single positive integer, N, representing the expected number of sensors
- A line containing a list of N-1 integers, separated by spaces and ranging from 1 to N inclusive, representing the ID numbers of working sensors.

```
2
9
5 7 3 2 8 1 4 9
10
7 4 1 10 8 2 9 6 3
```

Sample Output

For each test case, your program must print a single line containing an integer representing the ID number of the missing sensor.

```
6
5
```