# Qualification Round 2022 - Code Jam 2022 d1000000

#### **Problem**

While the most typical type of dice have 6 sides, each of which shows a different integer 1 through 6, there are many games that use other types. In particular, a dk is a die with k sides, each of which shows a different integer 1 through k. A d6 is a typical die, a d4 has four sides, and a d1000000 has one million sides.



In this problem, we start with a collection of  ${\bf N}$  dice. The i-th die is a  $d{\bf S_i}$ , that is, it has  ${\bf S_i}$  sides showing integers 1 through  ${\bf S_i}$ . A straight of length  $\ell$  starting at x is the list of integers  $x, x+1, \ldots, x+(\ell-1)$ . We want to choose some of the dice (possibly all) and pick one number from each to form a straight. What is the longest straight we can form in this way?

## Input

The first line of the input gives the number of test cases,  $\mathbf{T}$ .  $\mathbf{T}$  test cases follow. Each test case is described in two lines. The first line of a test case contains a single integer  $\mathbf{N}$ , the number of dice in the game. The second line contains  $\mathbf{N}$  integers  $\mathbf{S_1}, \mathbf{S_2}, \ldots, \mathbf{S_N}$ , each representing the number of sides of a different die.

#### Output

For each test case, output one line containing Case #x: y, where x is the test case number (starting from 1) and y is the maximum number of input dice that can be put in a straight.

## Limits

Memory limit: 1 GB.

 $1 \le \mathbf{T} \le 100$ .

# Test Set 1 (Visible Verdict)

Time limit: 5 seconds.

 $1 \leq \mathbf{N} \leq 10$ .

 $4 \leq \mathbf{S_i} \leq 20$  , for all i.

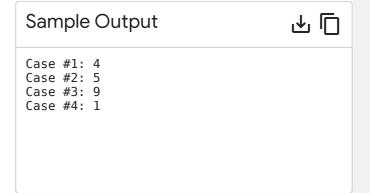
### Test Set 2 (Visible Verdict)

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Time limit: 15 seconds. 1 \leq \mathbf{N} \leq 10^5 . 4 \leq \mathbf{S_i} \leq 10^6 , for all i.
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# Sample

```
Sample Input

4
6 10 12 8
6
5 4 5 4 4 4
10
10 10 7 6 7 4 4 5 7 4
1
10
```



In Sample Case #1, there are multiple ways to form a straight using all 4 dice. One possible way is shown in the image above.

In Sample Case #2, since none of the dice can show an integer greater than 5, there is no way to have a straight with more than 5 dice. There are multiple ways to form a straight with exactly 5 dice. For example, pick the integers 4 and 5 for both d5's and then integers 1, 2, and 3 for three of the d4's to form 1, 2, 3, 4, 5.

In Sample Case #3, it is possible to form the straight 1, 2, 3, 4, 5, 6, 7, 8, 9 by discarding one d4 and using the d4's, d5, and d6 to get 1 through 4; the d7's to get 5 through 7; and the d10's to get 8 and 9. There is no way to form a straight of length 10, so this is the best that can be done.

In Sample Case #4, we can only form a straight of length 1, but we can do so by picking any integer for the d10 we are given.

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