3 Questions Total Marks: 300.0

3 Programming Questions

1. String Game + 100.0
2. Max Power + 100.0
3. Thief and Warehouses + 100.0

Question 2 Max. Marks 100.00

Max Power

Given an array A having N **distinct** integers.

The power of the array is defined as:

- $max(A[i] - A[j])\ where\ 2 \leq i \leq N$
- for each i, j is the largest index less than i such that $A[j] < A[i]$.

Let's say the array is {1,2,5}, then the power of the array is $max((2-1),(5-2))$, which simplifies to $max(1,3)$ which is equal to 3.

Operation Allowed:

If you are allowed to choose any two indices x and y and swap $A[x]$ and $A[y]$, find out the maximum power that can be achieved.

Note: You are allowed to perform the above operation at most once.

Input:

First line consists of a single integer, T, denoting the number of test cases.

First line of each test case consists of a single integer, denoting N.

Second line of each test case consists of N space separated integers denoting the array A.

Output:

For each test case, print the maximum achievable power on a new line.

Constraints:

$1 \leq T \leq 10$

$2 \leq N \leq 10^5$

$1 \leq A[i] \leq 10^9$

Sample Input

```
2
2
9 10
4
2 3 4 1
```

Sample Output

```
1
3
```

Explanation

In the first test case, we don't need to do any swaps, the max achievable power is 1.
In second test case we can swap $A[3]$ and $A[4]$ so the array will be 2 3 1 4 and the power will be 3.