# Banana Lounge

| | |
|---|---|
| Input file: | `standard input` |
| Output file: | `standard output` |
| Time limit: | 3 seconds |
| Memory limit: | 512 megabytes |

Busy Beaver loves spending his afternoons at MIT's Banana Lounge. He decides to help out by stacking banana boxes! He needs to collect the inventory across $N$ consecutive rooms, arranged in a single row and numbered 1 to $N$ from left to right. Due to the quirky architecture of MIT's buildings, each room $i$ has a specific ceiling clearance height, $h_i$.

Busy Beaver needs to select one room $k$ ($1 \le k \le N$) to serve as the Main Hub. Then, $N$ of his friends, one from each room, each carry a vertical stack of banana boxes from their starting room $i$ directly to the hub room $k$. Since they must walk in a straight line, the maximum number of boxes they can carry is limited by the minimum clearance on their path.

Formally, the number of banana boxes delivered by the friend starting at room $i$ to the hub room $k$ is:

- $\min(h_i, h_{i+1}, \ldots, h_k)$ if $i \le k$.
- $\min(h_k, h_{k+1}, \ldots, h_i)$ if $i > k$.

The total number of banana boxes gathered at the hub is the sum of the boxes delivered by all $N$ friends, which is:

$$\sum_{i=1}^{k-1} \min(h_i, \ldots, h_k) + h_k + \sum_{i=k+1}^{N} \min(h_k, \ldots, h_i)$$

Fortunately, Busy Beaver has a friend in MIT Facilities. Before the friends start carrying the boxes, he can request to renovate **at most one** room (which cannot be the chosen hub room $k$) to change its clearance height $h_i$ to any value.

What is the maximum total number of banana boxes Busy Beaver can gather at the Main Hub after choosing the optimal hub location $k$ and performing at most one ceiling renovation?

## Input

The first line contains a single integer $T$ ($1 \le T \le 10^5$) — the number of test cases.

The first line of each test case contains a single integer $N$ ($2 \le N \le 10^6$).

The next line of each test case contains $N$ space-separated integers $h_1, h_2, \ldots, h_N$ ($1 \le h_i \le 10^9$).

The sum of $N$ across all test cases does not exceed $10^6$.

## Output

For each test case, output one line containing one integer: the answer for the test case.

## Scoring

There are two subtasks for this problem.

- (30 points): The sum of $N$ across all test cases does not exceed $3 \cdot 10^3$.
- (70 points): No additional constraints.

## Example

| standard input | standard output |
|---|---|
| 2<br>5<br>1 10 1 10 1<br>5<br>10 10 10 10 10 | 32<br>50 |

## Note

In the first sample case, the best option is to choose hub $k = 2$ and renovate $h_3$ to at least 10, allowing the middle three friends to all carry 10, for a total of 32.

In the second sample case, no renovation can increase the number of banana boxes, so the answer is 50.