Problem B: Bars

Time limit: 6s, memory limit: 1GB.

Being the mayor of the village of Straightlineham is a real challenge. Admittedly, the expenditure on road infrastructure is minimal - houses of all n inhabitants, numbered from 1 to n, lie in order along one straight road that runs through the entire village. Still, sometimes you have to make difficult decisions, such as issuing permits to open a bar.

It turns out that all Straightlineham residents dream of opening their own bar. There have been n permit forms submitted, one per inhabitant. Each of the residents presented their business plan, from which you are most interested in the proposed tax amount if the bar gets opened: i-th resident promises to pay the village p_i gold coins from each customer.

You plan to grant permission to open bars to a certain (non-empty) subset of the inhabitants (maybe even everyone). Each resident, regardless of receiving permission to open their own bar, will become a client of two others: the nearest one strictly to the left of his house and the nearest one strictly to the right (as long as such bars exist – otherwise a given person will be a customer of fewer bars). When determining the nearest bars, we do not take into account the one that is run by the resident in question – after all, even the best bartender should not serve themselves. After deciding which of the bars get opened, each one will start to generate income to the village budget of p_i gold coins for each client. For example, if $n = 5$ and the third and fifth bar get opened, the first one will have 4 clients and the other 2 clients, generating total tax revenue of $4 \cdot p_3 + 2 \cdot p_5$.

Knowing the promised amount of tax to be paid for each of the hypothetical bars, determine the maximum profit that can be achieved by issuing permits in an optimal way.

Input

The first line of input contains the number of test cases z ($1 \leqslant z \leqslant 10\,000$). The descriptions of the test cases follow.

The first line of a test case contains one integer n ($2 \leqslant n \leqslant 500\,000$) - the number of inhabitants of Straightlineham.

The second line of a test case contains n integers p_i ($1 \leqslant p_i \leqslant 10^9$) - the proposed amount of the customer tax for each of n hypothetical bars.

The total number of inhabitants in all test cases will not exceed $3 \cdot 10^6$.

Output

For each test case, output one integer representing the maximum total profit you can make by issuing permits optimally.

Example

For an example input:	The correct output is:
2 4 5 2 2 6 5 1 5 4 4 1	33 29

Explanation

In the first example test, the optimal solution is to allow opening the first and the last bar. Each of them will have 3 clients, which generates total revenue of $3 \cdot 5 + 3 \cdot 6 = 33$ coins.

In the second sample test, it is optimal to allow opening all the bars except the third. In this case, the profit is $1 \cdot 1 + 3 \cdot 5 + 3 \cdot 4 + 1 \cdot 1 = 29$. If instead all the bars were allowed to open, the profit would be smaller: 28 coins.