

Profit Maximization - Extended

Emilia can now use multiple buy and sell operations over a given period of time.

Given a sequence of predicted share prices, she wants to find the maximum possible profit while using the smallest number of trading operations throughout the given time.

Constraints

- Short selling is not allowed.
- All of the predicted share prices are positive integers.
- You can only execute one buy or one sell operation of a share on a given day.
- Only one share can be bought or sold at a time.
- You are not required to execute a buy or sell operation every day.

Input format

The first integer input is the number of predicted days.

The subsequent integer input is a sequence of positive integers. The element at position i refers to the predicted share price of a given stock on the i th day.

Output format

An integer that is the maximum profit using the smallest number of trading operations throughout the given time.

Examples

Examples 1

Input

```
14 5 1 6 3 2 5 6 1 3 6 2 5 5 10
```

Number of predicted days = 14

A sequence of predicted share prices = [5,1,6,3,2,5,6,1,3,6,2,5,5,10]

Output

22

i.e. The smallest operation required is 8. Emilia can achieve this by buying at $i = 1$ when the price is \$1 and selling at $i = 2$ when the price is \$6 for a profit of \$5. She can then buy at $i = 4$ when the price is \$2 and sell at $i = 6$ when the price is \$6 for a profit of \$4. She can then buy at $i = 7$ when the price is \$1 and sell at $i = 9$ when the price is \$6 for a profit of \$5. Then buy at $i = 10$ when the price is \$2 and sell at $i = 13$ when the price is \$10 for a profit of \$8. If you add up all of the profits from these buy and sell orders ($5 + 4 + 5 + 8$) the output is 22.

Examples 2

Input

```
8 100 10 12 5 6 14 5 6
```

Number of predicted days = 8

A sequence of predicted share prices = [100, 10, 12, 5, 6, 14, 5, 6]

Output

12

i.e. The smallest operation required is 6. Emilia can achieve this by buying at $i = 1$ when the price is \$10 and selling at $i = 2$ when the price is \$12 for a profit of \$2. Then she can buy at $i = 3$ when the price is \$5 and sell at $i = 5$ when the price is \$14 for a profit of \$9. Then buy at $i = 6$ when the price is \$5 and sell at $i = 7$ when the price is \$6 for a profit of \$1. If you add up all of the profits from these buy and sell orders ($2 + 9 + 1$) the output is 12.