

# Profit Maximization - Extended

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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

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- 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

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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

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

## Examples

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### 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.