



# Trader Profit



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Problem

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Mike is a stock trader and makes a profit by buying and selling stocks. He buys a stock at a lower price and sells it at a higher price to book a profit. He has come to know the stock prices of a particular stock for  $n$  upcoming days in future and wants to calculate the maximum profit by doing the right transactions (*single transaction = buying + selling*). Can you help him maximize his profit?

**Note:** A transaction starts after the previous transaction has ended. Two transactions can't overlap or run in parallel.

The stock prices are given in the form of an array  $A$  for  $n$  days.

Given the stock prices and a positive integer  $k$ , find and print the maximum profit Mike can make in at most  $k$  transactions.

For example, **5** — *day* stock prices are given as **12, 5, 10, 7, 17**, and  $k = 1$ . For one transaction, maximum profit is **12** when stock is purchased on day **2** and sold on day **5**.

## Input Format

The first line of input contains an integer  $q$  denoting the number of queries.

The first line of each test case contains a positive integer  $k$ , denoting the number of transactions.

The second line of each test case contains a positive integer  $n$ , denoting the length of the array  $A$ .

The third line of each test case contains  $n$  space-separated positive integers, denoting the prices of each day in the array  $A$ .

## Constraints

- $1 \leq q \leq 100$
- $0 < k < 10$
- $2 \leq n \leq 30$
- $0 \leq \text{elements of array } A \leq 1000$

## Output Format

For each query print the maximum profit earned by Mike on a new line.

## Sample Input 0

```
3
2
6
10 22 5 75 65 80
3
4
20 580 420 900
1
5
100 90 80 50 25
```

## Sample Output 0

87  
1040  
0

### Explanation 0

**Output 1:** Mike earns **87** as sum of **12** and **75** i.e. Buy at price **10**, sell at **22**, buy at **5** and sell at **80**

**Output 2:** Mike earns **1040** as sum of **560** and **480** i.e. Buy at price **20**, sell at **580**, buy at **420** and sell at **900**

**Output 3:** Mike cannot make any profit as selling price is decreasing day by day. Hence, it is not possible to earn anything.

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Contest ends in **9 hours**

Submissions: [3333](#)



Max Score: 35




Difficulty: Medium

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