

# Stock Trading

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            2 seconds  
Memory limit:         1024 megabytes

Alice is a quantitative trader. She is backtesting a high-frequency trading strategy now. Given a stock's price sequence at  $n$  time points, denoted as  $v_1, v_2, \dots, v_n$ .

The trading bot Alice has set up is controlled by two parameters: a buy threshold  $a$  and a sell threshold  $b$  ( $a < b$ ), and strictly follows the following rules:

- If the price of the stock at a given time  $v_i \leq a$ , the bot will buy exactly 1 share;
- If the price of the stock at a given time  $v_i \geq b$ , and the bot currently holds at least 1 share, the bot will immediately sell 1 share;
- At each time point, the bot can buy or sell at most 1 share;
- After the transaction at the  $n$ -th time point is completed, if the robot still holds unsold shares, a forced liquidation mechanism is triggered, selling all remaining shares at the price  $v_n$ .

Given a fixed buy threshold  $a$ , there are  $m$  independent queries, each specifying a sell threshold  $b$ . For each query, please help Alice calculate the total profit under this strategy (total proceeds from sales minus total costs from purchases).

## Input

The first line contains a positive integer  $T$  ( $1 \leq T \leq 10^4$ ), the number of test cases.

For each test case, the first line contains two positive integers  $n, a$  ( $1 \leq n \leq 2 \times 10^5$ ,  $1 \leq a < 10^9$ ), representing the number of time points and the buy threshold.

The second line contains  $n$  integers  $v_1, v_2, \dots, v_n$  ( $1 \leq v_i \leq 10^9$ ), giving the historical stock prices at each time point in chronological order.

The third line contains an integer  $m$  ( $1 \leq m \leq 2 \times 10^5$ ), representing the number of queries.

The next line contains  $m$  integers  $b_1, b_2, \dots, b_m$  ( $a < b_i \leq 10^9$ ), representing the sell threshold for each query.

It is guaranteed that over all test cases, the sum of  $n$  and the sum of  $m$  do not exceed  $2 \times 10^5$ .

## Output

For each test case, output one line containing  $m$  integers separated by spaces, representing the final profit of the trading strategy for each query.

## Example

standard input	standard output
2	14 3 -11
5 10	17 25 21
5 8 15 12 1	
3	
11 13 16	
6 10	
5 5 15 12 20 11	
3	
11 13 16	

## Note

For the first query on the first test case ( $a = 10, b = 11$ ), the trading process is as follows:

1.  $v_1 = 5 < a$ : Buy 1 share, cumulative profit  $-5$ , holding 1 share;
2.  $v_2 = 8 < a$ : Buy 1 share, cumulative profit  $-13$ , holding 2 shares;
3.  $v_3 = 15 > b$ : Sell 1 share, cumulative profit  $2$ , holding 1 share;
4.  $v_4 = 12 > b$ : Sell 1 share, cumulative profit  $14$ , holding 0 shares;
5.  $v_5 = 1 < a$ : Buy 1 share, cumulative profit  $13$ , holding 1 share;
6. Liquidation: Sell the remaining 1 share at  $v_5 = 1$ , final profit  $14$ .