

International Islamic University Chittagong

Department of Computer Science & Engineering



CSE-2430
Competitive Programming 2

Set B

*Allah grant me the serenity
To accept the problems that I cannot solve
The persistence to solve the problems that I can
And the wisdom to know the difference*

CSE-2430 Final Term Examination Spring-2024

Set B

A	Eith Prime	
	Input: standard input	Time Limit: 1 second
	Output: standard output	Memory Limit: 32 megabytes
	Marks: 7.5	

Eith is a prime number which can be obtained by adding two distinct prime numbers. For example both 2 and 3 are prime numbers and if we add them, we get 5, which is also a prime number. So 5 is **Eith** Prime. In fact it is the first **Eith** prime. But if we add 3 and 5 we get 8 which is not a prime number. So 8 is not a **Eith** Prime. Your task is to find N -th Eith prime number.

Note: You can assume that the largest Eith prime in the given range is not larger than **10000000**.

Input

Input will consist of several lines each consist of a number N .

$$0 < N \leq 58150$$

Output

For each line in the input, output the corresponding N -th **Eith prime**.

Sample Input	Sample Output
1	5
2	7
3	13

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B	Rating Bounds	
	Input: standard input	Time Limit: 1 second
	Output: standard output	Memory Limit: 32megabytes
	Marks: 7.5	

You are working for an e-commerce company that collects customer ratings for products. Each product has a list of sorted ratings given by different customers. Your task is to analyse the ratings to determine the range in which a particular rating appears. Specifically, you need to find the first and last occurrence of a given rating.

Input

The first line contains an integer $N(1 < N \leq 10^6)$, the total number of ratings. The second line contains N space-separated integers representing the ratings. The third line contains an integer Q , the number of queries. The next Q lines each contain an integer $X(1 < X \leq 5)$, representing the rating you are searching for.

Output

For each query, output two integers. **The index of the first occurrence of X in the ratings list.**

The index right after the last occurrence of X in the ratings list. If X is not present in the list, return -1.

Input	Output
7	2 5
1 2 3 3 3 4 5	5 6
2	
3	
4	

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C	John and the Delivery Route Efficiency	
	Input: standard input	Time Limit: 1 second
	Output: standard output	Memory Limit: 256 megabytes
	Marks: 7.5	

John works for a logistics company that specialises in delivering packages across a city. The company uses a sophisticated route planning algorithm to optimise delivery routes based on the distances between delivery stops. Recently, there have been discussions among the management about the effectiveness of the route planning algorithm, especially in terms of its ability to minimise unnecessary backtracking and cover distance.

To assess the efficiency of the route planning algorithm, John is tasked with counting the number of inversions in his delivery route for the day. An inversion in this context would mean that John encounters two delivery stops that are out of order in terms of their distance from the warehouse. Each inversion indicates a potential inefficiency in the route, as it suggests that John may have to backtrack or take a less optimal path to complete his deliveries.

Input

The first line contains a single integer N -the number of delivery stops.

The next line contains an array of integers N

where each integer represents the distance of a delivery stop from the warehouse, arranged in the order of John's delivery route for the day.

- John can have up to 10^5 delivery stops in a single day.
- Each distance value is an integer within the range 1 to 10^9 .

Output

The number of inversions in the array.

Sample Input 1	Sample Output 1
3 1 2 3	0

Sample Input 2	Sample Output 1
5 3 1 4 2 5	3

Note

Test Case 1: There are no inversions in the array as all distances are in ascending order.

Test Case 2: Explanation: The inversions are (3, 1), (3, 2) and (4, 2).

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D	Number of Island	
	Input: standard input	Time Limit: 2 seconds
	Output: standard output	Memory Limit: 32 MB
	Marks: 7.5	

Given a $n \times m$ 2D grid which represents a map of **L(land)** and **W(water)**, return the number of islands. An island is surrounded by water and is formed by connecting adjacent lands horizontally or vertically.

Input

First line contains a number n ($1 \leq n \leq 100$) & m ($1 \leq m \leq 100$).

The next n lines each contain m characters. It is guaranteed that each character is either **L** or **W**.

Output

Output the number of islands given grid.

Sample Input	Sample Output
4 6 WLWLWL LLLLWW LLWWLL WWWLLW	3

Sample Input	Sample Output
3 3 LLL LLL LLL	1

Sample Input	Sample Output
3 3 WWW WWW WWW	0