1. You are a professional robber planning to rob houses along a street. Each house has a certain amount of money stashed, the only constraint stopping you from robbing each of them is that adjacent houses have security systems connected and it will automatically contact the police if two adjacent houses were broken into on the same night. Given a list of non-negative integers representing the amount of money of each house, determine the maximum amount of money you can rob tonight without alerting the police.

Sample Input

4

11 12 13 11

Sample Output

24

Explanation

Rob house 1 (money = 11) and then rob house 3 (money = 13).

Total amount you can rob = 11 + 13 = 24.

Input Format

The first line consists of size of an array

The second line consists of array of elements separated by space

Constraints

$1 <= n <= 1000$

$1 <= Ai <= 10000$

Output Format

The output consists of maximum amount stolen

Sample Input 1

4

11 12 13 11

Sample Output 1

24

2. **Swap two bits at given position**

Given an integer, write a program to swap two bits at given positions in the binary representation of it.

Sample Input:

31

2 6

Sample Output:

91

00011111

The first line of input consists of a number n

The second line of input consists of the given positions x and y

3. Josepheus Problem

There are n people standing in a circle waiting to be executed. The counting out begins at some point in the circle and proceeds around the circle in a fixed direction. In each step, a certain number of people are skipped and the next person is executed. The elimination proceeds around the circle (which is becoming smaller and smaller as the executed people are removed), until only the last person remains, who is given freedom. Given the total number of persons n and a number k which indicates that k-1 persons are skipped and kth person is killed in a circle. The task is to choose the place in the initial circle so that you are the last one remaining and so survive.

Sample Input:

    100
    2

Sample Output:

    73

Input Format

The first line consists of an integer value which is total number of people.

The second line consists of kth person to be killed in a circle.

Constraints

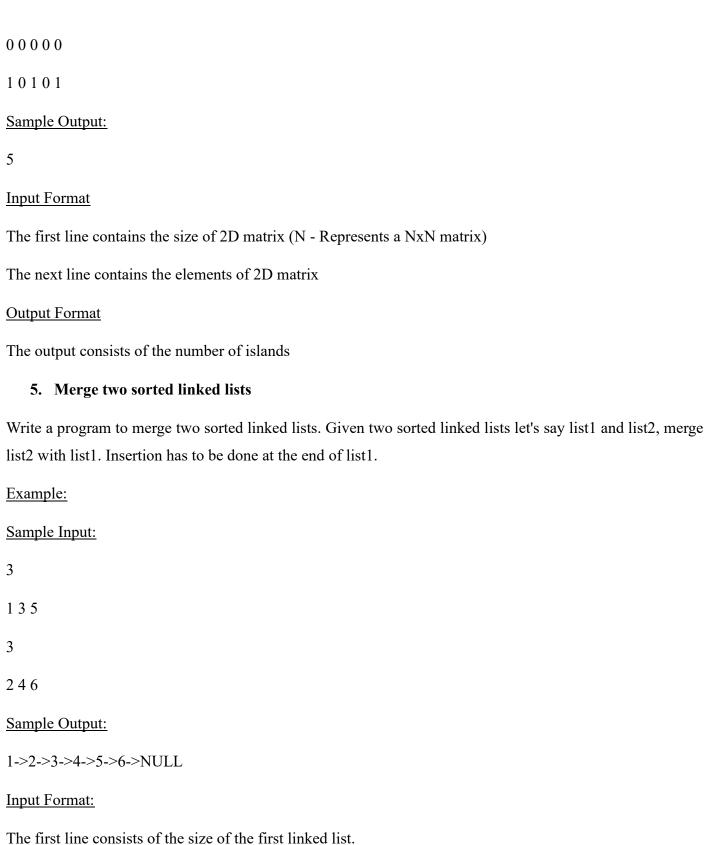1 <= N <= 100000

1 <= k <= 500

4. Number of Islands

Given a matrix that consists of 1's and 0's where 1 represents land and 0 represents water. Connected lands surrounded by water is an island. Land can be connected in all 8 directions. Find the number of islands.

Sample Input:

5 5

1 1 0 0 0

0 1 0 0 1

1 0 0 1 1

0 0 0 0 0

1 0 1 0 1

Sample Output:

5

Input Format

The first line contains the size of 2D matrix (N - Represents a NxN matrix)

The next line contains the elements of 2D matrix

Output Format

The output consists of the number of islands

5. Merge two sorted linked lists

Write a program to merge two sorted linked lists. Given two sorted linked lists let's say list1 and list2, merge list2 with list1. Insertion has to be done at the end of list1.

Example:

Sample Input:

3

1 3 5

3

2 4 6

Sample Output:

1->2->3->4->5->6->NULL

Input Format:

The first line consists of the size of the first linked list.

The second line consists of a sorted linked list separated by space.

The third line consists of the size of the second linked list.

The fourth line consists of a sorted linked list separated by space.

6. Reverse a Linked List Recursively

Given a linked list of N nodes. The task is to reverse this list.

User Task:

The task is to complete the function reverseList() with head reference as the only argument and should return a new head after reversing the list.

Expected Time Complexity: O (N).

Expected Auxiliary Space: O (1)

Input:

2

6

1 2 3 4 5 6

5

2 7 8 9 10

Output:

6 5 4 3 2 1

10 9 8 7 2

Explanation:

Testcase 1: After reversing the list, elements are 6->5->4->3->2->1.

Testcase 2: After reversing the list, elements are 10->9->8->7->2.

Constraints:

1 <= T <= 100 //denotes number of cases

1 <= N <= 104

7. **Policemen - Thieves**

Given an array of size N. Which has the following specifications: Each element in the array contains either a policeman or a thief. Each policeman can catch only one thief. A policeman cannot catch a thief who is more than K units away from him. We need to find the maximum number of thieves that can be caught.

Input:

6

P

T

P

T

T

P

3

<u>Output:</u>

Maximum thieves caught: 3

8. Longest Increasing Subsequence

Given an integer array 'A'. Find the length of its Longest Increasing Subsequence of a sub-array from the given integer array. The elements are sorted in monotonic increasing order. You need to create a function that takes two inputs - integer 'n' and an integer array containing 'n' integers. To return the length of its LIS.

<u>Input:</u>

3

1, 3, 2

<u>Output:</u>

2

<u>Input Format</u>

<u>Input:</u>

The integer input is 'n'. And Integer array 'A' input, contains 'n' integers.

<u>Constraints</u>

1 <= input1 <= 1000

<u>Output:</u>

Return the length of its LIS.

9. N meetings in one room

In a firm, we have only one meeting room. And there are N meetings in the form of (S[i], F[i]). Where S[i] is the start time of meeting i and F[i] is the finish time of meeting i. What is the maximum number of meetings that can be accommodated in this meeting room?

<u>Input:</u>

2

6

1 3 0 5 8 5

2 4 6 7 9 9

8

75250 50074 43659 8931 11273 27545 50879 77924

112960 114515 81825 93424 54316 35533 73383 160252

Output:

1 2 4 5

6 7 1

Explanation:

Testcase 1: Four meetings can be held with the given start and end timings.

Input Format

The first line of the input consists of a number denoting the test cases. The description of T test cases is as follows: The first line consists of the size of an array. The second line has an array that consists of starting time of all the meetings each separated by a space, that is S[i]. And the third line has the array that consists of the end time of all the meetings each separated by a space, that is F[i].

Constraints:

1 ≤ T ≤ 70

1 ≤ N ≤ 100

1 ≤ S[i], F[i] ≤ 100000

Output Format

In each separate line. Print the order in which the meetings take place, separated by space.

10. Binary search tree - kth smallest element

Write a program to find the kth smallest element of a binary search tree.

Example:

Input:

50

30

20

40

70

60

80

-1

4

Output:

Enter the kth value: 6

Smallest kth value 50