

DSA SORTING:-

You have already solved this challenge ! Though you can run the code with different logic !

Course	DS	Session	Sorting	Question Information
				Level 1 Challenge 11

Problem Description:

In **mathematics**, a **permutation of a set** is, loosely speaking, an arrangement of its members into a **sequence or linear order**, or if the set is already ordered, a rearrangement of its elements. The word "permutation" also refers to the act or process of changing the linear order of an ordered set.

Mariappa(M) is alone too and has a permutation p_1, p_2, \dots, p_n of numbers from 1 to n.

M thinks that a permutation p_1, p_2, \dots, p_n beautyfulness is defined as value of $\sum |p_i|, 1 \leq i \leq n$.

M can swap two elements of the permutation at most once.

Constraints:

- $1 \leq n \leq 10^5$
- $1 \leq p_i \leq n$ all p_i are distinct

Input Format:

First line contains only 'n'.
Second line contains the permutation p_1, p_2, \dots, p_n separated by space.

Output Format:

Print the output in a single line contains maximum beautyfulness that M can get

Logical Test Cases

Test Case 1	Test Case 2
INPUT (STDIN)	INPUT (STDIN)

```
#include<bits/stdc++.h>
```

```
using namespace std;
```

```
int main(){
```

```
    int n,i,sum=0;
```

```
    cin>>n;
```

```
    int arr[n];
```

```
    for(i=0;i<n;i++)
```

```
    cin>>arr[i];
```

```
    sort(arr,arr+n);
```

```
    for(i=0;i<n;i++)
```

```
    {
```

```
        int z= arr[n-i-1]-(i+1);
```

```
        //cout<<z<<" ";
```

```
        //cout<<abs(z);
```

```
        sum=sum+abs(z);
```

```
    }
```

```
    cout<<sum;
```

```
    return 0;
```

```
    cout<<"swap(l,r);";
```

```
}
```

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Course	DS	Session	Sorting	Question Information
				Level 1 Challenge 13

Problem

Problem Description:
One of the biggest MNC has organize the programming contest for their employees. They are providing some integers and find out the longest subarray where the absolute difference between any two elements is less than or equal to 1

Constraints:
 $2 \leq n \leq 100$
 $0 < a[i] < 100$

Input Format:
 The first line contains a single integer 'n', the size of the array 'a'.
 The second line contains 'n' space-separated integers, each an $a[i]$.

Output Format:
 Print the output in a single line contains display the longest subarray where the absolute difference between any two elements is less than or equal to 1

Logical Test Cases

Test Case 1

INPUT (STDIN)

6
4 6 5 3 3 1

EXPECTED OUTPUT

3

Test Case 2

INPUT (STDIN)

10
2 5 7 8 4 6 5 4 4 1

EXPECTED OUTPUT

5

```
#include <bits/stdc++.h>

#define f(i,a,n) for(i=a;i<n;i++)

using namespace std;

int computeLongestSubarray(int arr[], int k, int n)
{
    int j,i, maxLength = 1;

    f(i,0,n)
    {
        int minOfSub = arr[i];
        int maxOfSub = arr[i];

        f(j,i+1,n)
        {
            if (arr[j] > maxOfSub)
                maxOfSub = arr[j];

            if (arr[j] < minOfSub)
                minOfSub = arr[j];

            if ((maxOfSub - minOfSub) <= k)
            {
                int currLength = j - i + 1;

                if (maxLength < currLength)
                    maxLength = currLength;
            }
        }
    }
}
```

```

    }

    }

}

return maxLength;

}

int main()
{
    int n,i;

    cin>>n;

    int arr[n];

    f(i,0,n)

    cin>>arr[i];

    int k = 1;

    sort(arr,arr+n);

    int maxLength = computeLongestSubarray(arr, k, n);

    cout << (maxLength);

    return 0;

    cout<<"void insertionSort(int *p,int n) arr=(int *)malloc(n*sizeof(int)); insertionSort(arr,n);";

}

```

The screenshot shows a web browser window with the URL `care.srmup.in/srmncretelab/#/srmncretelab/student/home`. The page content includes a notification bar, a navigation menu, and a detailed problem description for a challenge titled "Level 1 Challenge 15".

Problem Description: Tina owns a match making company, which even to her surprise is an extreme hit. She says that her success rate cannot be matched (Yes, letterplay!) in the entire match-making industry. She follows an extremely simple algorithm to determine if two people are matches for each other. Her algorithm is not at all complex, and makes no sense - not even to her. But she uses it anyway.

Let's say say that on a given day she decides to select n people - that is, n boys and n girls. She gets the list of n boys and n girls in a random order initially. Then, she arranges the list of girls in ascending order on the basis of their height and boys in descending order of their heights. A girl Ai can be matched to a boy on the same index only, that is, Bi and no one else. Likewise, a girl standing on Ak can be only matched to a boy on the same index Bk and no one else.

Now to determine if the pair would make an ideal pair, she checks if the modulo of their heights is 0, i.e., $A_i \% B_i == 0$ or $B_i \% A_i == 0$. Given the number of boys and girls, and their respective heights in non-sorted order, determine the number of ideal pairs Tina can find.

Problem Constraints:

- $1 \leq \text{Test Cases} \leq 10^2$
- $1 \leq N \leq 10^4$
- $1 \leq A_i, B_i \leq 10^5$

Input Format:
The first line contains number of test cases. Then, the next line contains an integer, n, saying the number of boys and girls. The next line contains the height of girls, followed by the height of boys.

Output Format:
Print the number of ideal pairs in a separate lines

Logical Test Cases:

Test Case 1	Test Case 2
INPUT (STDIN)	INPUT (STDIN)

```
#include<bits/stdc++.h>
```

```
using namespace std;
```

```
int main()
```

```

{
    int t,n,i;
    cin>>t;
    while(t--){
        cin>>n;
        int a[n],b[n],sum=0;
        for(i=0;i<n;i++)
            cin>>a[i];
        for(i=0;i<n;i++)
            cin>>b[i];
        sort(a,a+n);
        sort(b,b+n);
        for(i=0;i<n;i++){
            if(a[i]%b[n-i-1]==0 || b[n-i-1]%a[i]==0)
                sum++;
        }
        cout<<sum<<endl;
    }

    return 0;
}

```

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Course	DS	Session	Sorting	Question Information	Level 1	Challenge 16
<p>Question description</p> <p>Selvan studies, engineering as per his father's wishes, while Aaron, whose family is poor, studies engineering to improve his family's financial situation. sumanth, however, studies engineering of his simple passion for developing data structure applications.</p> <p>sumanth is participating in a hackathon for data structure application development.</p> <p>sumanth task is to use Insertion Sort to sort the supplied set of numbers.</p> <p>As a result, The input provides the number of components on the first line and the numbers to be sorted on the second line. Print the array's state at the third iteration and the final sorted array in the supplied format in the output.</p> <p>Judge will determine whether the outcome is correct or not.</p> <p>Can you help him ?</p> <p>Constraints</p> <p>$1 \leq N \leq 10^5$</p> <p>$1 \leq A_i \leq 10^9$</p> <p>Input Format:</p> <p>The first line of the input contains the number of elements</p> <p>the second line of the input contains the numbers to be sorted.</p> <p>Output Format:</p> <p>First line indicates print the status of the array at the 3rd iteration</p> <p>second line print the final sorted array in the given format.</p>						

```

#include <iostream>

#define f(i,a,n) for(i=a;i<n;i++)

using namespace std;

void insertionSort(int arr[],int n)
{
    for(int i=1;i<n;i++){
        int curr = arr[i];
        for(int j=i-1;j>=0;j--){
            if(arr[j]>curr){
                arr[j+1]=arr[j];
                if(j==0)
                    arr[j]=curr;
            }
            else{
                arr[j+1]=curr;
                j=-1;
            }
        }
        int k;
        if(i==2){
            f(k,0,n)
            cout<<arr[k]<<" ";
            cout<<endl;
        }
    }
}

```

```

void printArray(int arr[],int n)
{
    int i;
    f(i,0,n)
        cout << arr[i] <<" ";
}

```

```

int main()
{
    int n;
    cin>>n;

```

```

int arr[n];

for(int i=0;i<n;i++)

cin>>arr[i];

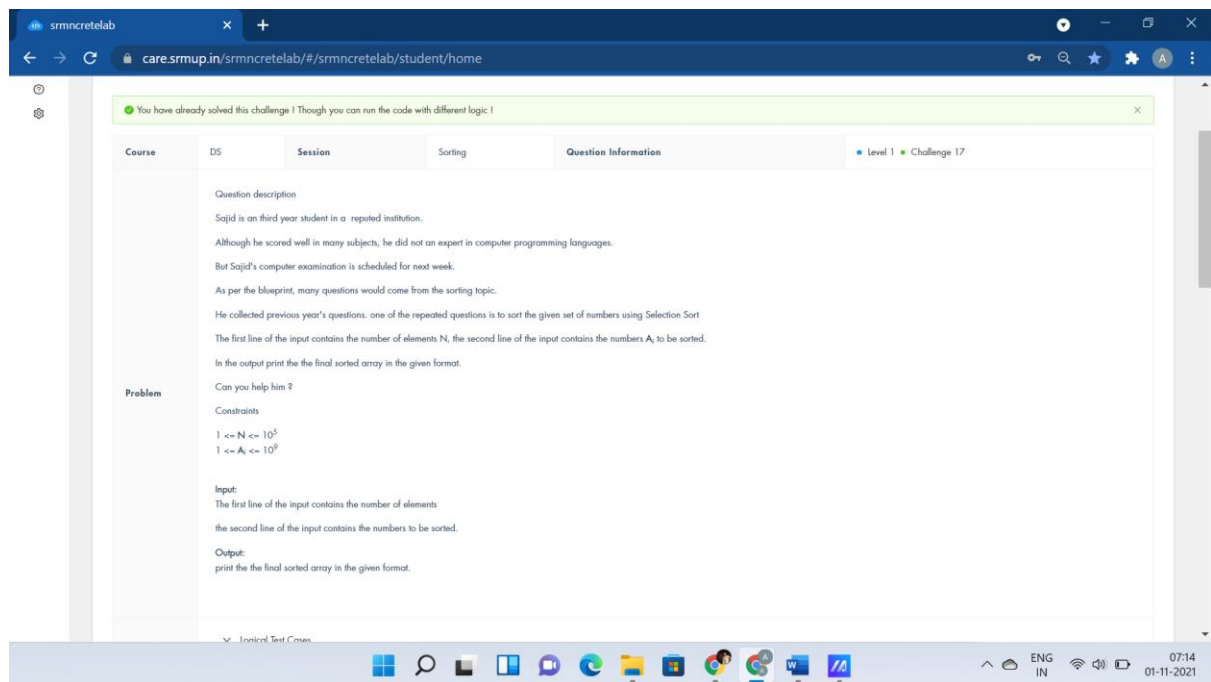
insertionSort(arr, n);

printArray(arr, n);


return 0;

}

```



```

#include <stdio.h>

void swap(int *xp,int *yp)

{

    int temp = *xp;

    *xp = *yp;

    *yp = temp;

}

void selectionSort(int arr[],int n)

{

    int i, j, min_idx;

    for (i = 0; i < n-1; i++)

    {

        min_idx = i;

```

```
        for (j = i+1; j < n; j++)
            if (arr[j] < arr[min_idx])
                min_idx = j;
        swap(&arr[min_idx], &arr[i]);
    }
}

void printArray(int arr[],int size)
{
    int i;
    for (i=0; i < size; i++)
        printf("%d ", arr[i]);
    printf("\n");
}

int main()
{
    int n,i;
    scanf("%d",&n);
    int arr[n];
    for(i=0;i<n;i++)
        scanf("%d",&arr[i]);
    selectionSort(arr, n);
    printArray(arr, n);
    return 0;
}
```

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Course	DS	Session	Sorting	Question Information	Level 1	Challenge 18
<p>Question description</p> <p>Nancy, Simon, and Swati were all attending campus interviews. they got selected for the second round. Nancy failed to clear the second round and others to selected for the next round of interviews. Nancy discussed with her friend the question which came in the interview. one of the questions have given an array of n distinct elements, the task is to find all elements in array which have atleast two greater elements than themselves. But it's in the syllabus of his exam. So can you help to create a program in the specified concept to get an offer in the next interview ?</p> <p>Constraints</p> <p>$1 \leq N \leq 1000$</p> <p>Examples:</p> <p>Input : A[] = [2, 8, 7, 1, 5]; Output : 1 2 5 The output three elements have two or more greater elements</p> <p>Input : A[] = [7, -2, 3, 4, 9, -1]; Output : -2 -1 3 4</p> <p>Input:</p> <p>The first line of input contains an integer T denoting the no of test cases. Each test case contains two lines . The first line of input contains an integer n denoting the size of the array. Then in the next are n space separated values of the array.</p>						

```
#include <bits/stdc++.h>
```

```
using namespace std;
```

```
void swap(int *xp, int *yp)
```

```
{
```

```
    int temp = *xp;
```

```
    *xp = *yp;
```

```
    *yp = temp;
```

```
}
```

```
void sort(int a[],int n){
```

```
    int i, j;
```

```
    for(i=0;i<n-1;i++)
```

```
        for(j=0;j<n-i-1;j++)
```

```
            if (a[j] > a[j+1])
```

```
                swap(&a[j], &a[j+1]);
```

```
}
```

```
int main()
```

```
{
```

```
    int t,n;
```

```
    cin>>t;
```

```
    while(t--){
```

```
        cin>>n;
```

```
        int a[n];
```

```
        for(int i=0;i<n;i++)
```



```

        cin>>a[i];

        sort(a,n);

        for(int i=0;i<n-2;i++)

        cout<<a[i]<<" ";

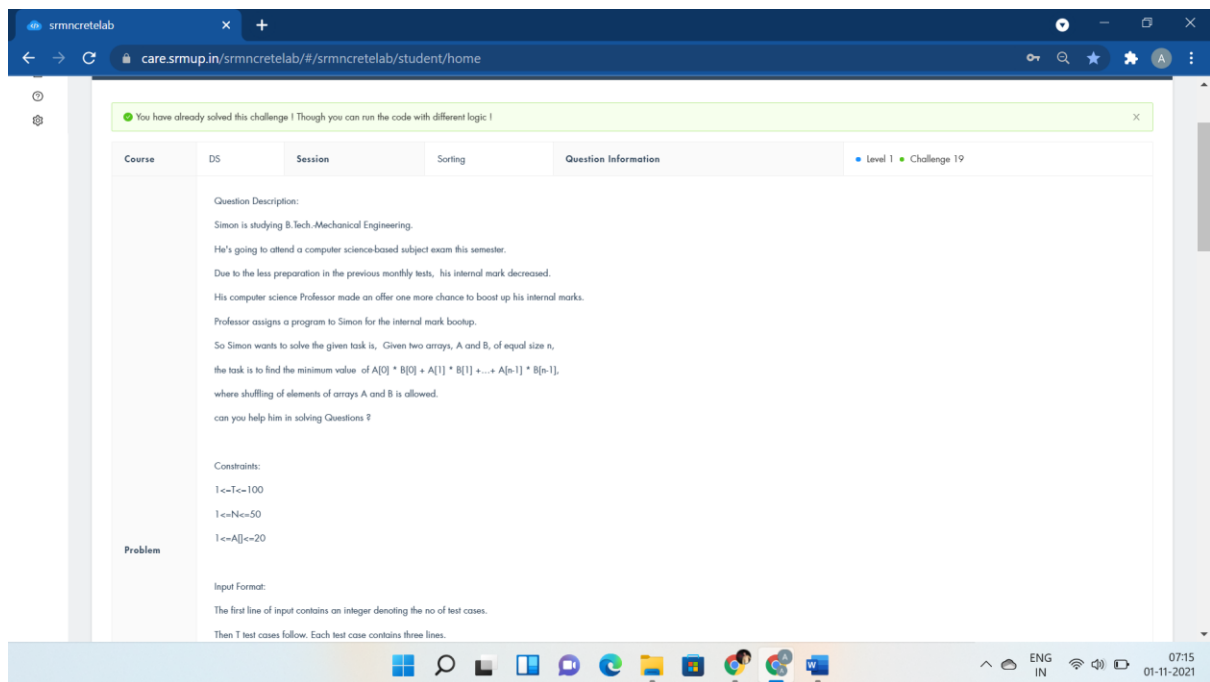
        cout<<endl;

    }

    return 0;

}

```



```

#include <bits/stdc++.h>

using namespace std;

class sor{

public:

    int a[100],b[100];

    int n;

    void getn(){

        cin>>n;

    }

    void geta(){

        for(int i=0;i<n;i++)

        cin>>a[i];

        sort(a,a+n);

```

```

    }

    void getb(){
        for(int i=0;i<n;i++)

            cin>>b[i];

            sort(b,b+n);
    }

    void display(){
        int sum=0;

        for(int i=0;i<n;i++)

            sum+=a[i]*b[n-i-1];

            cout<<sum<<endl;
    }

};

int main()

{
    if(0)

        cout<<"void sort(int a[],int n,int flag)";

        int n;

        cin>>n;

        while(n--){

            sor t;

            t.getn();

            t.geta();

            t.getb();

            t.display();

        }

            return 0;

}

```