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ROLL: 55

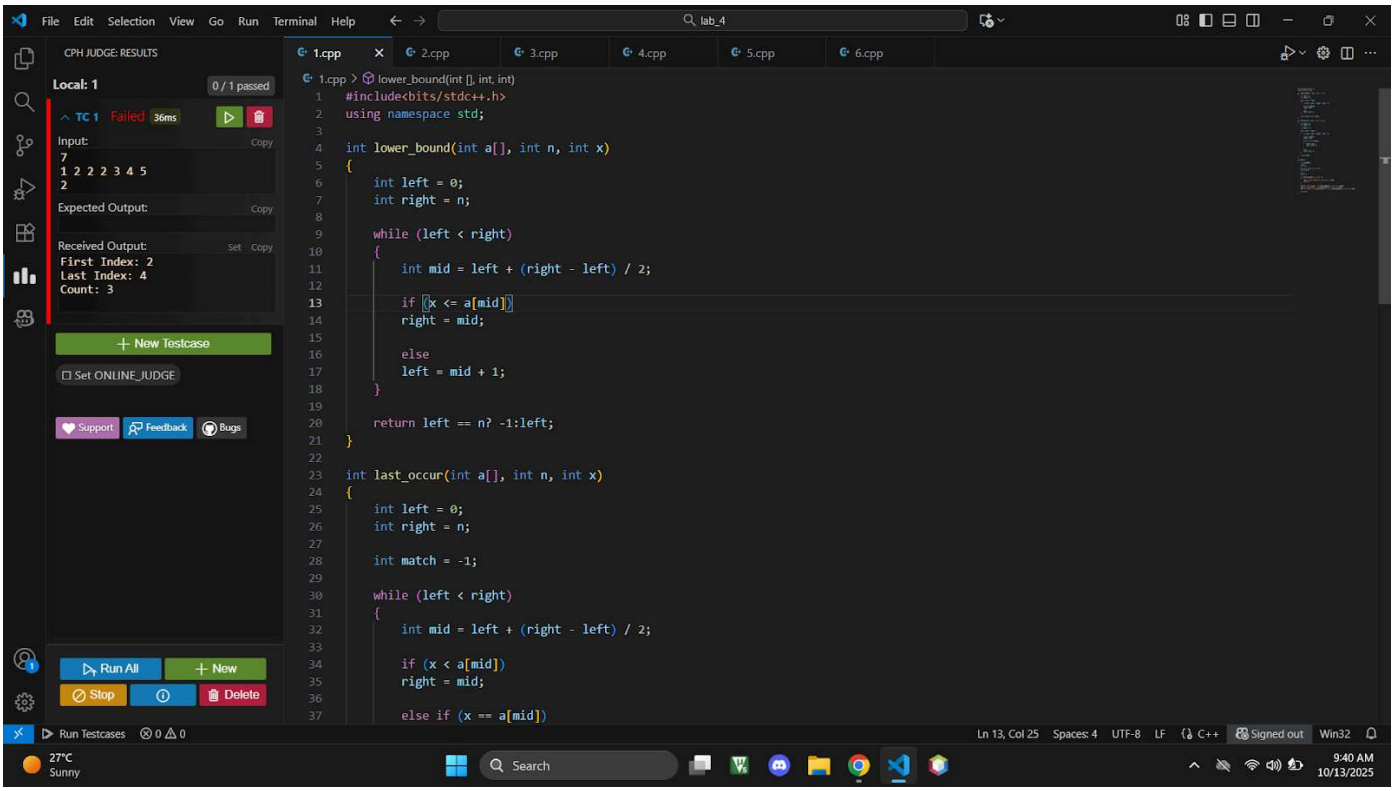
TASK 1:
FIRST AND LAST OCCURRENCE IN AN ARRAY

CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

int lower_bound(int a[], int n, int x)
{
    int left = 0;
    int right = n;

    while (left < right)
    {
        int mid = left + (right - left) / 2;

        if (x <= a[mid])
        right = mid;

        else
        left = mid + 1;
    }

    return left == n? -1:left;
}

int last_occur(int a[], int n, int x)
{
    int left = 0;
    int right = n;

    int match = -1;

    while (left < right)
    {
```

```
        int mid = left + (right - left) / 2;

        if (x < a[mid])
        right = mid;

        else if (x == a[mid])
        {
            match = mid;
            left = mid + 1;
        }

        else
        left = mid + 1;
    }

    return match;
}

int main()
{
    int a[200005];
    int n;
    cin >> n;

    for (int i = 0; i < n; i++)
    cin >> a[i];

    int x;
    cin >> x;

    if (lower_bound(a, n, x) == -1)
    {
        cout << "Not present in the array" << endl;
        return 0;
    }

    cout << "First Index: " << lower_bound(a, n, x) + 1 << endl;
    cout << "Last Index: " << last_occur(a, n, x) + 1 << endl;
    cout << "Count: " << last_occur(a, n, x) - lower_bound(a, n, x) + 1
<< endl;

    return 0;
}
```

IMAGE:


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 1
0 / 1 passed
TC 1 Failed 36ms
Input:
7
1 2 2 2 3 4 5
2
Expected Output:
Received Output:
First Index: 2
Last Index: 4
Count: 3
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
1.cpp > lower_bound(int [], int, int)
#include<bits/stdc++.h>
using namespace std;
int lower_bound(int a[], int n, int x)
{
int left = 0;
int right = n;
while (left < right)
{
int mid = left + (right - left) / 2;
if (x <= a[mid])
right = mid;
else
left = mid + 1;
}
return left == n? -1:left;
}
int last_occur(int a[], int n, int x)
{
int left = 0;
int right = n;
int match = -1;
while (left < right)
{
int mid = left + (right - left) / 2;
if (x < a[mid])
right = mid;
else if (x == a[mid])
Run Testcases
Ln 13, Col 25
Spaces: 4
UTF-8
LF
C++
Signed out
Win32
27°C
Sunny
Search
9:40 AM
10/13/2025

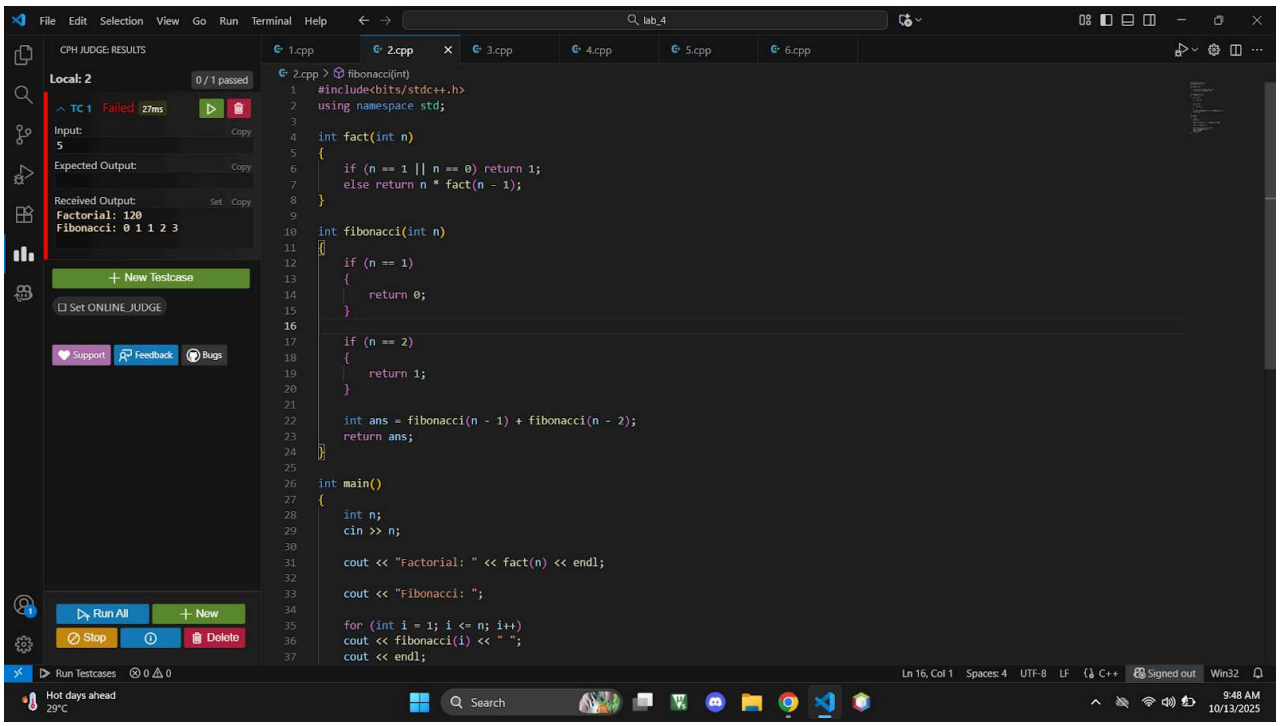
TASK 2:

Factorial and Fibonacci

CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

int fact(int n)
{
    if (n == 1 || n == 0) return 1;
    else return n * fact(n - 1);
}

int fibonacci(int n)
{
    if (n == 1)
    {
        return 0;
    }

    if (n == 2)
    {
        return 1;
    }

    int ans = fibonacci(n - 1) + fibonacci(n - 2);
    return ans;
}

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

    cout << "Factorial: " << fact(n) << endl;

    cout << "Fibonacci: ";

    for (int i = 1; i <= n; i++)
    cout << fibonacci(i) << " ";
    cout << endl;
    return 0;
}
```

IMAGE:


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 2
0 / 1 passed
TC 1 Failed 27ms
Input:
5
Expected Output:
Received Output:
Factorial: 120
Fibonacci: 0 1 1 2 3
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
2.cpp > fibonacci(int)
#include<bits/stdc++.h>
using namespace std;
int fact(int n)
{
if (n == 1 || n == 0) return 1;
else return n * fact(n - 1);
}
int fibonacci(int n)
{
if (n == 1)
{
return 0;
}
if (n == 2)
{
return 1;
}
int ans = fibonacci(n - 1) + fibonacci(n - 2);
return ans;
}
int main()
{
int n;
cin >> n;
cout << "Factorial: " << fact(n) << endl;
cout << "Fibonacci: ";
for (int i = 1; i <= n; i++)
cout << fibonacci(i) << " ";
cout << endl;
Run Testcases
Ln 16, Col 1
Spaces: 4
UTF-8
LF
C++
Signed out
Win32
Hot days ahead
29°C
Search
9:48 AM
10/13/2025

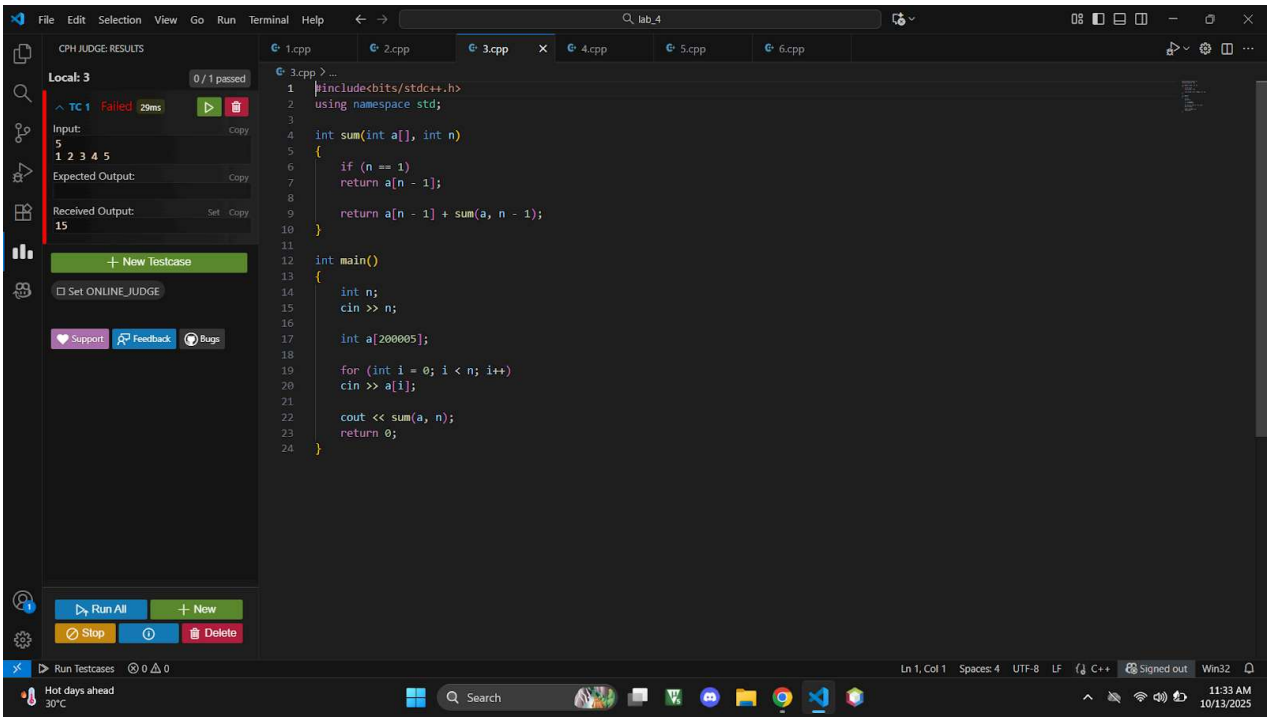
TASK 3:

Recursive Sum of Array Elements

CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

int sum(int a[], int n)
{
    if (n == 1)
    return a[n - 1];

    return a[n - 1] + sum(a, n - 1);
}

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

    int a[200005];

    for (int i = 0; i < n; i++)
    cin >> a[i];

    cout << sum(a, n);
    return 0;
}
```

IMAGE:


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 3
0 / 1 passed
TC 1 Failed 29ms
Input:
5
1 2 3 4 5
Expected Output:
Received Output:
15
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
#include<bits/stdc++.h>
using namespace std;
int sum(int a[], int n)
{
if (n == 1)
return a[n - 1];
return a[n - 1] + sum(a, n - 1);
}
int main()
{
int n;
cin >> n;
int a[200005];
for (int i = 0; i < n; i++)
cin >> a[i];
cout << sum(a, n);
return 0;
}
Run Testcases
Ln 1, Col 1
Spaces: 4
UTF-8
LF
C++
Signed out
Win32
Hot days ahead
30°C
Search
11:33 AM
10/13/2025

TASK 4:

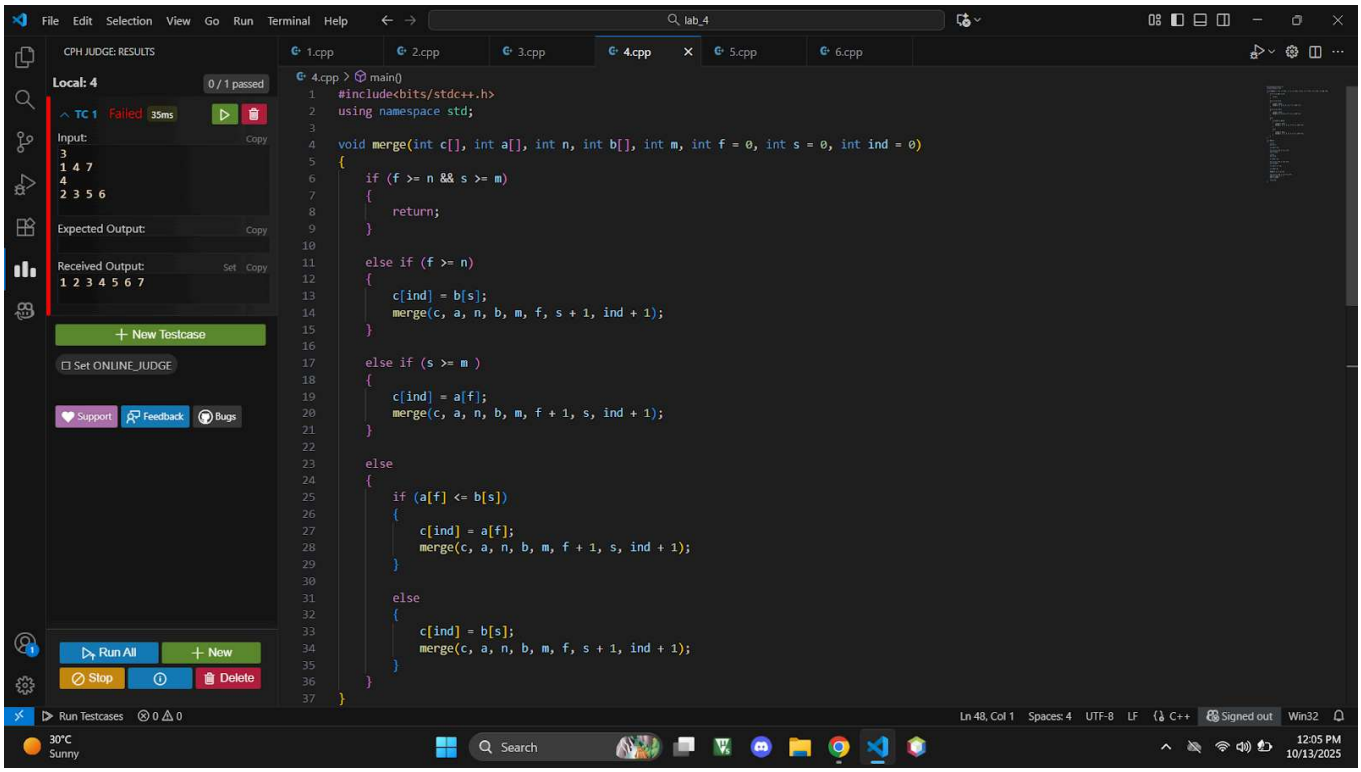
Recursive Merge of Two Sorted Arrays

CODE:

```cpp
#include<bits/stdc++.h>
using namespace std;

void merge(int c[], int a[], int n, int b[], int m, int f = 0, int s =
0, int ind = 0)
{
    if (f >= n && s >= m)
    {
        return;
    }

    else if (f >= n)
    {
        c[ind] = b[s];
        merge(c, a, n, b, m, f, s + 1, ind + 1);
    }

    else if (s >= m )
    {
        c[ind] = a[f];
        merge(c, a, n, b, m, f + 1, s, ind + 1);
    }

    else
    {
        if (a[f] <= b[s])
        {
            c[ind] = a[f];
            merge(c, a, n, b, m, f + 1, s, ind + 1);
        }

        else
        {
            c[ind] = b[s];
            merge(c, a, n, b, m, f, s + 1, ind + 1);
        }
    }
}
```

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

    int a[n + 1];

    for (int i = 0; i < n; i++)
    cin >> a[i];

    int m;
    cin >> m;

    int b[n + 1];

    for (int i = 0; i < m; i++)
    cin >> b[i];

    int c[n + m + 1];

    int ind = 0;

    merge(c, a, n, b, m);

    for (int i = 0; i < n + m; i++)
    cout << c[i] << " ";
    cout << endl;

    return 0;
}
```

IMAGE:


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 4
0 / 1 passed
TC 1 Failed 35ms
Input:
3
1 4 7
4
2 3 5 6
Expected Output:
Received Output:
1 2 3 4 5 6 7
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
4.cpp > main()
#include<bits/stdc++.h>
using namespace std;
void merge(int c[], int a[], int n, int b[], int m, int f = 0, int s = 0, int ind = 0)
{
if (f >= n && s >= m)
{
return;
}
else if (f >= n)
{
c[ind] = b[s];
merge(c, a, n, b, m, f, s + 1, ind + 1);
}
else if (s >= m)
{
c[ind] = a[f];
merge(c, a, n, b, m, f + 1, s, ind + 1);
}
else
{
if (a[f] <= b[s])
{
c[ind] = a[f];
merge(c, a, n, b, m, f + 1, s, ind + 1);
}
else
{
c[ind] = b[s];
merge(c, a, n, b, m, f, s + 1, ind + 1);
}
}
}
Run Testcases
Ln 48, Col 1
Spaces: 4
UTF-8
LF
C++
Signed out
Win32
30°C
Sunny
Search
12:05 PM
10/13/2025

TASK 5:

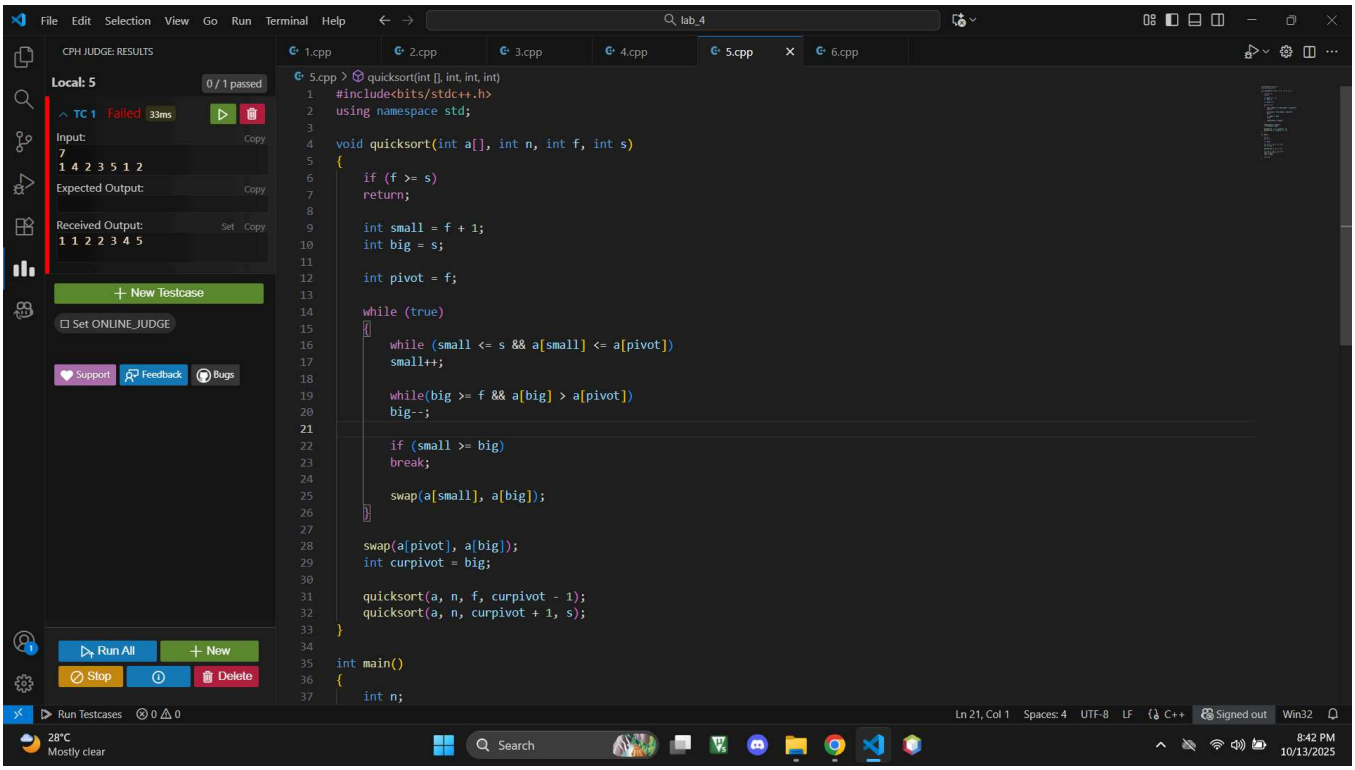
QUICK SORT

CODE:

```
#include<bits/stdc++.h>
using namespace std;

void quicksort(int a[], int n, int f, int s)
{
    if (f >= s)
    return;

    int small = f + 1;
    int big = s;

    int pivot = f;

    while (true)
    {
        while (small <= s && a[small] <= a[pivot])
        small++;

        while(big >= f && a[big] > a[pivot])
        big--;

        if (small >= big)
        break;

        swap(a[small], a[big]);
    }

    swap(a[pivot], a[big]);
    int curpivot = big;

    quicksort(a, n, f, curpivot - 1);
    quicksort(a, n, curpivot + 1, s);
}

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

```
    int a[n];

    for (int i = 0; i < n; i++)
    cin >> a[i];

    quicksort(a, n, 0, n - 1);

    for (int i = 0; i < n; i++)
    cout << a[i] << " ";
    cout << endl;

    return 0;
}
```

IMAGE:


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 5
0 / 1 passed
TC 1 Failed 33ms
Input:
7
1 4 2 3 5 1 2
Expected Output:
Received Output:
1 1 2 2 3 4 5
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
5.cpp > quicksort(int [], int, int, int)
#include<bits/stdc++.h>
using namespace std;
void quicksort(int a[], int n, int f, int s)
{
if (f >= s)
return;
int small = f + 1;
int big = s;
int pivot = f;
while (true)
{
while (small <= s && a[small] <= a[pivot])
small++;
while(big >= f && a[big] > a[pivot])
big--;
if (small >= big)
break;
swap(a[small], a[big]);
}
swap(a[pivot], a[big]);
int curpivot = big;
quicksort(a, n, f, curpivot - 1);
quicksort(a, n, curpivot + 1, s);
}
int main()
{
int n;
Run Testcases
Ln 21, Col 1
Spaces: 4
UTF-8
LF
C++
Signed out
Win32
28°C
Mostly clear
Search
8:42 PM
10/13/2025

TASK 6:

Compare Sorting Algorithms

CODE:

```
#include<bits/stdc++.h>
using namespace std;

int count1 = 0;
int count2 = 0;
int count3 = 0;
int count4 = 0;
int count5 = 0;

void merge(int c[], int a[], int n, int b[], int m, int f = 0, int s =
0, int ind = 0)
{
    count4++;

    if (f >= n && s >= m)
        return;

    else if (f >= n)
    {
        c[ind] = b[s];
        merge(c, a, n, b, m, f, s + 1, ind + 1);
    }

    else if (s >= m)
    {
        c[ind] = a[f];
        merge(c, a, n, b, m, f + 1, s, ind + 1);
    }

    else
    {
        if (a[f] <= b[s])
        {
            c[ind] = a[f];
            merge(c, a, n, b, m, f + 1, s, ind + 1);
        }
        else
```

```
        {
            c[ind] = b[s];
            merge(c, a, n, b, m, f, s + 1, ind + 1);
        }
    }
}

void merging(int a[], int n, int l, int mid, int r)
{
    int siz1 = mid - l + 1;
    int siz2 = r - mid;

    int c[200005];
    int left[siz1], right[siz2];

    for (int i = 0; i < siz1; i++)
        left[i] = a[l + i];
    for (int i = 0; i < siz2; i++)
        right[i] = a[mid + 1 + i];

    merge(c, left, siz1, right, siz2);
    for (int i = 0; i < siz1 + siz2; i++)
        a[l + i] = c[i];
}

void mergesort(int a[], int n, int l, int r)
{
    if (l >= r)
        return;

    int mid = l + (r - l) / 2;

    mergesort(a, n, l, mid);
    mergesort(a, n, mid + 1, r);
    merging(a, n, l, mid, r);
}

void quicksort(int a[], int n, int f, int s)
{
    if (f >= s)
    return;

    int small = f + 1;
```

```
    int big = s;

    int pivot = f;

    while (true)
    {
        while (small <= s && a[small] <= a[pivot])
        {
            count5++;
            small++;
        }

        while(big >= f && a[big] > a[pivot])
        {
            count5++;
            big--;
        }

        if (small >= big)
        {
            count5++;
            break;
        }

        count5++;
        swap(a[small], a[big]);
    }

    count5++;
    swap(a[pivot], a[big]);
    int curpivot = big;

    quicksort(a, n, f, curpivot - 1);
    quicksort(a, n, curpivot + 1, s);
}

void bubblesort(int a[], int n)
{
    for (int i = 0; i < n; i++)
    {
        for (int j = i + 1; j < n; j++)
        {
            count1++;
```

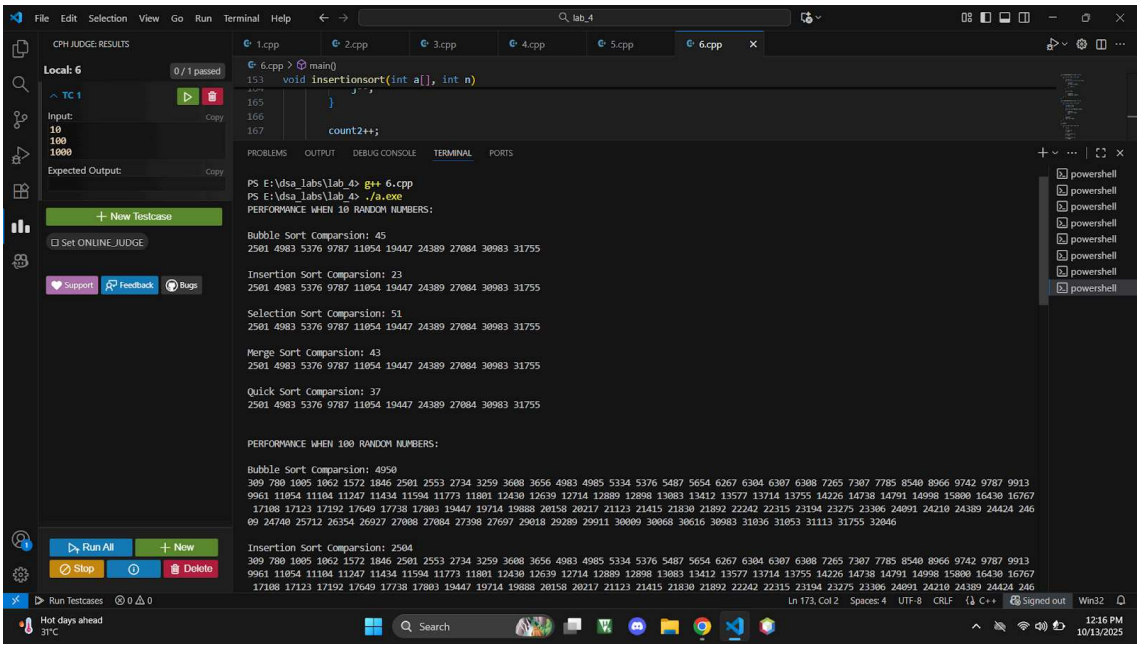
```
            if (a[i] > a[j])
            {
                swap(a[i], a[j]);
            }
        }
    }
}

void selectionsort(int a[], int n)
{
    for (int i = 0; i < n; i++)
    {
        int ch = i;
        for (int j = i + 1; j < n; j++)
        {
            count3++;
            if (a[j] < a[ch])
            {
                ch = j;
            }
        }

        if (i != ch)
        {
            count3++;
            swap(a[i], a[ch]);
        }
    }
}

void insertionsort(int a[], int n)
{
    for (int i = 1; i < n; i++)
    {
        int key = a[i];
        int j = i - 1;

        while (j >= 0 && key < a[j])
        {
            count2++;
            a[j + 1] = a[j];
            j--;
        }
```

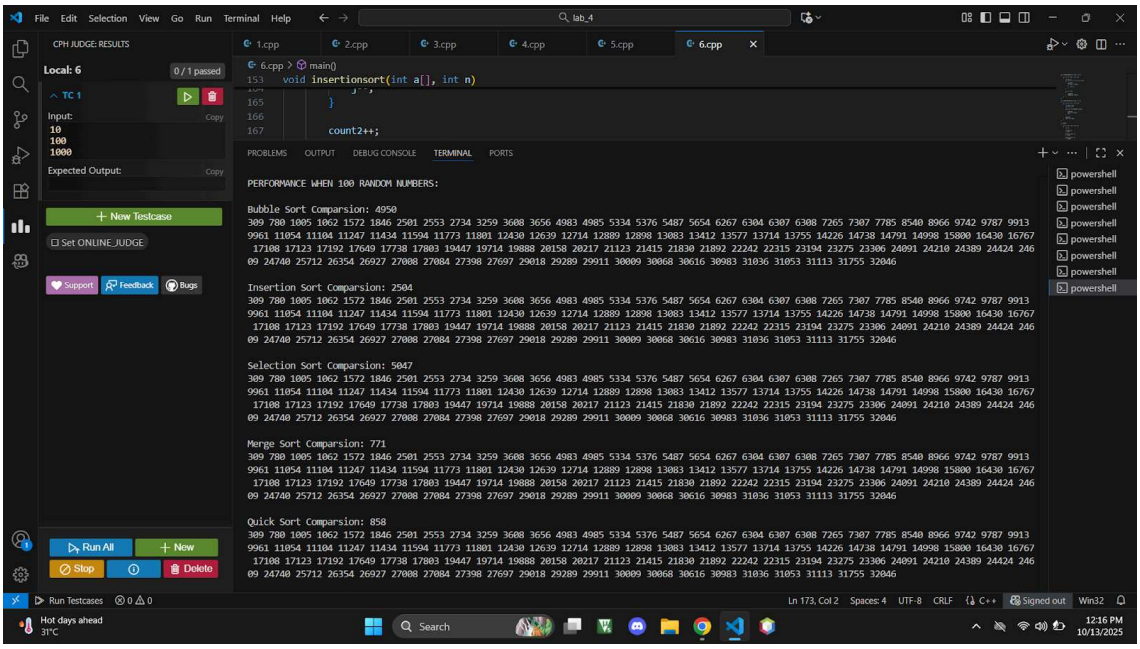
```
        count2++;
        a[j + 1] = key;
    }
}

int main()
{
    for (int q = 3; q > 0; q--)
    {
        int n;

        if (q == 3)
        n = 10;

        else if (q == 2)
        n = 100;

        else if (q == 1)
        n = 1000;

        int a[n];

        srand(time(0));

        for (int i = 0; i < n; i++)
        {
            a[i] = rand();
        }

        int bub[n], ins[n], sel[n], mer[n], qck[n];

        for (int i = 0; i < n; i++)
        {
            bub[i] = ins[i] = sel[i] = mer[i] = qck[i] = a[i];
        }

        bubblesort(bub, n);
        insertionsort(ins, n);
        selectionsort(sel, n);
        mergesort(mer, n, 0, n - 1);
        quicksort(qck, n, 0, n - 1);
```

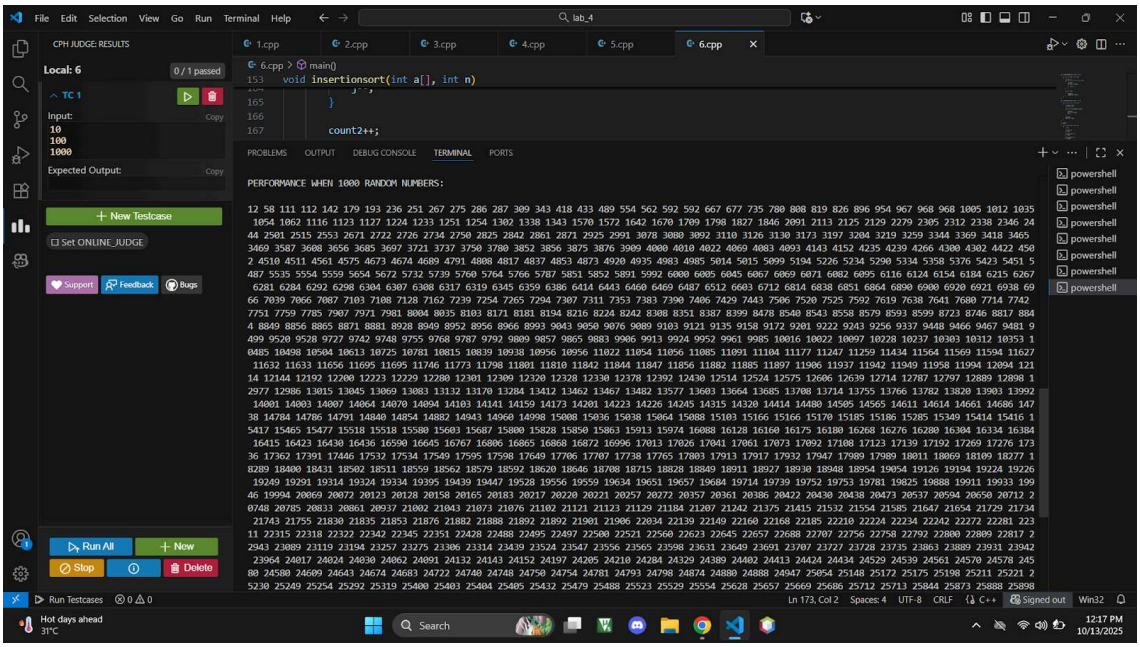
```
        cout << "PERFORMANCE WHEN " << n << " RANDOM NUMBERS:" << endl
<< endl;

        if (n == 1000)
        {
            for (int i = 0; i < n; i++)
            cout << bub[i] << " ";
            cout << endl << endl;

            cout << "Bubble Sort Comparsion: " << count1 << endl;
            cout << "Insertion Sort Comparsion: " << count2 << endl;
            cout << "Selection Sort Comparsion: " << count3 << endl;
            cout << "Merge Sort Comparsion: " << count4 << endl;
            cout << "Quick Sort Comparsion: " << count5 << endl;
        }

        else
        {
            cout << "Bubble Sort Comparsion: " << count1 << endl;
            for (int i = 0; i < n; i++)
            cout << bub[i] << " ";
            cout << endl << endl;

            cout << "Insertion Sort Comparsion: " << count2 << endl;
            for (int i = 0; i < n; i++)
            cout << ins[i] << " ";
            cout << endl << endl;;

            cout << "Selection Sort Comparsion: " << count3 << endl;
            for (int i = 0; i < n; i++)
            cout << sel[i] << " ";
            cout << endl << endl;;

            cout << "Merge Sort Comparsion: " << count4 << endl;
            for (int i = 0; i < n; i++)
            cout << mer[i] << " ";
            cout << endl << endl;;

            cout << "Quick Sort Comparsion: " << count5 << endl;
            for (int i = 0; i < n; i++)
            cout << qck[i] << " ";
            cout << endl << endl;;
        }
```

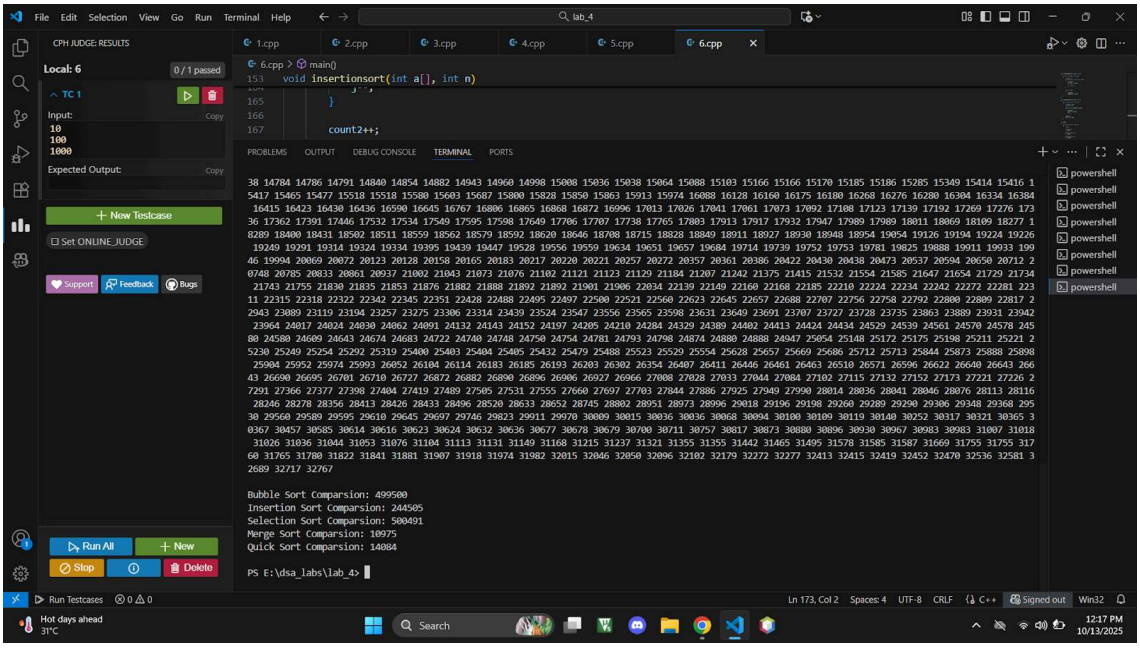
```
        cout << endl;

        count1 = count2 = count3 = count4 = count5 = 0;
    }
}
```

IMAGE:


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 6
0 / 1 passed
TC 1
Input:
10
100
1000
Expected Output:
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
6.cpp > main()
153 void insertionsort(int a[], int n)
165 }
166
167 count2++;
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
PS E:\dsa_labs\lab_4> g++ 6.cpp
PS E:\dsa_labs\lab_4> ./a.exe
PERFORMANCE WHEN 10 RANDOM NUMBERS:
Bubble Sort Comparsion: 45
2501 4983 5376 9787 11054 19447 24389 27084 30983 31755
Insertion Sort Comparsion: 23
2501 4983 5376 9787 11054 19447 24389 27084 30983 31755
Selection Sort Comparsion: 51
2501 4983 5376 9787 11054 19447 24389 27084 30983 31755
Merge Sort Comparsion: 43
2501 4983 5376 9787 11054 19447 24389 27084 30983 31755
Quick Sort Comparsion: 37
2501 4983 5376 9787 11054 19447 24389 27084 30983 31755
PERFORMANCE WHEN 100 RANDOM NUMBERS:
Bubble Sort Comparsion: 4950
309 780 1005 1062 1572 1846 2501 2553 2734 3259 3608 3656 4983 4985 5334 5376 5487 5654 6267 6304 6307 6308 7265 7307 7785 8540 8966 9742 9787 9913
9961 11054 11104 11247 11434 11594 11773 11801 12430 12639 12714 12889 12898 13083 13412 13577 13714 13755 14226 14738 14791 14998 15800 16430 16767
17108 17123 17192 17649 17738 17803 19447 19714 19888 20158 20217 21123 21415 21830 21892 22242 22315 23194 23275 23306 24091 24210 24389 24424 246
09 24740 25712 26354 26927 27008 27084 27398 27697 29018 29289 29911 30009 30068 30616 30983 31036 31053 31113 31755 32046
Insertion Sort Comparsion: 2504
309 780 1005 1062 1572 1846 2501 2553 2734 3259 3608 3656 4983 4985 5334 5376 5487 5654 6267 6304 6307 6308 7265 7307 7785 8540 8966 9742 9787 9913
9961 11054 11104 11247 11434 11594 11773 11801 12430 12639 12714 12889 12898 13083 13412 13577 13714 13755 14226 14738 14791 14998 15800 16430 16767
17108 17123 17192 17649 17738 17803 19447 19714 19888 20158 20217 21123 21415 21830 21892 22242 22315 23194 23275 23306 24091 24210 24389 24424 246
09 24740 25712 26354 26927 27008 27084 27398 27697 29018 29289 29911 30009 30068 30616 30983 31036 31053 31113 31755 32046
Run Testcases
Ln 173, Col 2
Spaces: 4
UTF-8
CRLF
C++
Signed out
Win32
Hot days ahead
31°C
Search
12:16 PM
10/13/2025


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 6
0 / 1 passed
TC 1
Input:
10
100
1000
Expected Output:
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
6.cpp > main()
153 void insertionsort(int a[], int n)
165 }
166
167 count2++;
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
PERFORMANCE WHEN 100 RANDOM NUMBERS:
Bubble Sort Comparsion: 4950
309 780 1005 1062 1572 1846 2501 2553 2734 3259 3608 3656 4983 4985 5334 5376 5487 5654 6267 6304 6307 6308 7265 7307 7785 8540 8966 9742 9787 9913
9961 11054 11104 11247 11434 11594 11773 11801 12430 12639 12714 12889 12898 13083 13412 13577 13714 13755 14226 14738 14791 14998 15800 16430 16767
17108 17123 17192 17649 17738 17803 19447 19714 19888 20158 20217 21123 21415 21830 21892 22242 22315 23194 23275 23306 24091 24210 24389 24424 246
09 24740 25712 26354 26927 27008 27084 27398 27697 29018 29289 29911 30009 30068 30616 30983 31036 31053 31113 31755 32046
Insertion Sort Comparsion: 2504
309 780 1005 1062 1572 1846 2501 2553 2734 3259 3608 3656 4983 4985 5334 5376 5487 5654 6267 6304 6307 6308 7265 7307 7785 8540 8966 9742 9787 9913
9961 11054 11104 11247 11434 11594 11773 11801 12430 12639 12714 12889 12898 13083 13412 13577 13714 13755 14226 14738 14791 14998 15800 16430 16767
17108 17123 17192 17649 17738 17803 19447 19714 19888 20158 20217 21123 21415 21830 21892 22242 22315 23194 23275 23306 24091 24210 24389 24424 246
09 24740 25712 26354 26927 27008 27084 27398 27697 29018 29289 29911 30009 30068 30616 30983 31036 31053 31113 31755 32046
Selection Sort Comparsion: 5047
309 780 1005 1062 1572 1846 2501 2553 2734 3259 3608 3656 4983 4985 5334 5376 5487 5654 6267 6304 6307 6308 7265 7307 7785 8540 8966 9742 9787 9913
9961 11054 11104 11247 11434 11594 11773 11801 12430 12639 12714 12889 12898 13083 13412 13577 13714 13755 14226 14738 14791 14998 15800 16430 16767
17108 17123 17192 17649 17738 17803 19447 19714 19888 20158 20217 21123 21415 21830 21892 22242 22315 23194 23275 23306 24091 24210 24389 24424 246
09 24740 25712 26354 26927 27008 27084 27398 27697 29018 29289 29911 30009 30068 30616 30983 31036 31053 31113 31755 32046
Merge Sort Comparsion: 771
309 780 1005 1062 1572 1846 2501 2553 2734 3259 3608 3656 4983 4985 5334 5376 5487 5654 6267 6304 6307 6308 7265 7307 7785 8540 8966 9742 9787 9913
9961 11054 11104 11247 11434 11594 11773 11801 12430 12639 12714 12889 12898 13083 13412 13577 13714 13755 14226 14738 14791 14998 15800 16430 16767
17108 17123 17192 17649 17738 17803 19447 19714 19888 20158 20217 21123 21415 21830 21892 22242 22315 23194 23275 23306 24091 24210 24389 24424 246
09 24740 25712 26354 26927 27008 27084 27398 27697 29018 29289 29911 30009 30068 30616 30983 31036 31053 31113 31755 32046
Quick Sort Comparsion: 858
309 780 1005 1062 1572 1846 2501 2553 2734 3259 3608 3656 4983 4985 5334 5376 5487 5654 6267 6304 6307 6308 7265 7307 7785 8540 8966 9742 9787 9913
9961 11054 11104 11247 11434 11594 11773 11801 12430 12639 12714 12889 12898 13083 13412 13577 13714 13755 14226 14738 14791 14998 15800 16430 16767
17108 17123 17192 17649 17738 17803 19447 19714 19888 20158 20217 21123 21415 21830 21892 22242 22315 23194 23275 23306 24091 24210 24389 24424 246
09 24740 25712 26354 26927 27008 27084 27398 27697 29018 29289 29911 30009 30068 30616 30983 31036 31053 31113 31755 32046
Run Testcases
Ln 173, Col 2
Spaces: 4
UTF-8
CRLF
C++
Signed out
Win32
Hot days ahead
31°C
Search
12:16 PM
10/13/2025


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 6
0 / 1 passed
TC 1
Input:
10
100
1000
Expected Output:
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
6.cpp > main()
153 void insertionsort(int a[], int n)
165 }
166
167 count2++;
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
PERFORMANCE WHEN 1000 RANDOM NUMBERS:
12 58 111 112 142 179 193 236 251 267 275 286 287 309 343 418 433 489 554 562 592 592 667 677 735 780 808 819 826 896 954 967 968 968 1005 1012 1035
1054 1062 1116 1123 1127 1224 1233 1251 1254 1302 1338 1343 1570 1572 1642 1670 1709 1798 1827 1846 2091 2113 2125 2129 2279 2305 2312 2338 2346 24
44 2501 2515 2553 2671 2722 2726 2734 2750 2825 2842 2861 2871 2925 2991 3078 3080 3092 3110 3126 3130 3173 3197 3204 3219 3259 3344 3369 3418 3465
3469 3587 3608 3656 3685 3697 3721 3737 3750 3780 3852 3856 3875 3876 3909 4000 4010 4022 4069 4083 4093 4143 4152 4235 4239 4266 4300 4302 4422 450
2 4510 4511 4561 4575 4673 4674 4689 4791 4808 4817 4837 4853 4873 4920 4935 4983 4985 5014 5015 5099 5194 5226 5234 5290 5334 5358 5376 5423 5451 5
487 5535 5554 5559 5654 5672 5732 5739 5760 5764 5766 5787 5851 5852 5891 5992 6000 6005 6045 6067 6069 6071 6082 6095 6116 6124 6154 6184 6215 6267
6281 6284 6292 6298 6304 6307 6308 6317 6319 6345 6359 6386 6414 6443 6460 6469 6487 6512 6603 6712 6814 6838 6851 6864 6890 6900 6920 6921 6938 69
66 7039 7066 7087 7103 7108 7128 7162 7239 7254 7265 7294 7307 7311 7353 7383 7390 7406 7429 7443 7506 7520 7525 7592 7619 7638 7641 7680 7714 7742
7751 7759 7785 7907 7971 7981 8004 8035 8103 8171 8181 8194 8216 8224 8242 8308 8351 8387 8399 8478 8540 8543 8558 8579 8593 8599 8723 8746 8817 884
4 8849 8856 8865 8871 8881 8928 8949 8952 8956 8966 8993 9043 9050 9076 9089 9103 9121 9135 9158 9172 9201 9222 9243 9256 9337 9448 9466 9467 9481 9
499 9520 9528 9727 9742 9748 9755 9768 9787 9792 9809 9857 9865 9883 9906 9913 9924 9952 9961 9985 10016 10022 10097 10228 10237 10303 10312 10353 1
0485 10498 10504 10613 10725 10781 10815 10839 10938 10956 10956 11022 11054 11056 11085 11091 11104 11177 11247 11259 11434 11564 11569 11594 11627
11632 11633 11656 11695 11695 11746 11773 11798 11801 11810 11842 11844 11847 11856 11882 11885 11897 11906 11937 11942 11949 11958 11994 12094 121
14 12144 12192 12200 12223 12229 12280 12301 12309 12320 12328 12330 12378 12392 12430 12514 12524 12575 12606 12639 12714 12787 12797 12889 12898 1
2977 12986 13015 13045 13069 13083 13132 13170 13284 13412 13462 13467 13482 13577 13603 13664 13685 13708 13714 13755 13766 13782 13820 13903 13992
14001 14003 14007 14064 14070 14094 14103 14141 14159 14173 14201 14223 14226 14245 14315 14320 14414 14480 14505 14565 14611 14614 14661 14686 147
38 14784 14786 14791 14840 14854 14882 14943 14960 14998 15008 15036 15038 15064 15088 15103 15166 15166 15170 15185 15186 15285 15349 15414 15416 1
5417 15465 15477 15518 15518 15580 15603 15687 15800 15828 15850 15863 15913 15974 16088 16128 16160 16175 16180 16268 16276 16280 16304 16334 16384
16415 16423 16430 16436 16590 16645 16767 16806 16865 16868 16872 16996 17013 17026 17041 17061 17073 17092 17108 17123 17139 17192 17269 17276 173
36 17362 17391 17446 17532 17534 17549 17595 17598 17649 17706 17707 17738 17765 17803 17913 17917 17932 17947 17989 17989 18011 18069 18109 18277 1
8289 18400 18431 18502 18511 18559 18562 18579 18592 18620 18646 18708 18715 18828 18849 18911 18927 18930 18948 18954 19054 19126 19194 19224 19226
19249 19291 19314 19324 19334 19395 19439 19447 19528 19556 19559 19634 19651 19657 19684 19714 19739 19752 19753 19781 19825 19888 19911 19933 199
46 19994 20069 20072 20123 20128 20158 20165 20183 20217 20220 20221 20257 20272 20357 20361 20386 20422 20430 20438 20473 20537 20594 20650 20712 2
0748 20785 20833 20861 20937 21002 21043 21073 21076 21102 21121 21123 21129 21184 21207 21242 21375 21415 21532 21554 21585 21647 21654 21729 21734
21743 21755 21830 21835 21853 21876 21882 21888 21892 21892 21901 21906 22034 22139 22149 22160 22168 22185 22210 22224 22234 22242 22272 22281 223
11 22315 22318 22322 22342 22345 22351 22428 22488 22495 22497 22500 22521 22560 22623 22645 22657 22688 22707 22756 22758 22792 22800 22809 22817 2
2943 23089 23119 23194 23257 23275 23306 23314 23439 23524 23547 23556 23565 23598 23631 23649 23691 23707 23727 23728 23735 23863 23889 23931 23942
23964 24017 24024 24030 24062 24091 24132 24143 24152 24197 24205 24210 24284 24329 24389 24402 24413 24424 24434 24529 24539 24561 24570 24578 245
80 24580 24609 24643 24674 24683 24722 24740 24748 24750 24754 24781 24793 24798 24874 24880 24888 24947 25054 25148 25172 25175 25198 25211 25221 2
5230 25249 25254 25292 25319 25400 25403 25404 25405 25432 25479 25488 25523 25529 25554 25628 25657 25669 25686 25712 25713 25844 25873 25888 25898
Run Testcases
Ln 173, Col 2
Spaces: 4
UTF-8
CRLF
C++
Signed out
Win32
Hot days ahead
31°C
Search
12:17 PM
10/13/2025


File Edit Selection View Go Run Terminal Help
lab_4
CPH JUDGE: RESULTS
Local: 6
0 / 1 passed
TC 1
Input:
10
100
1000
Expected Output:
New Testcase
Set ONLINE_JUDGE
Support
Feedback
Bugs
Run All
New
Stop
Delete
1.cpp
2.cpp
3.cpp
4.cpp
5.cpp
6.cpp
6.cpp > main()
153 void insertionsort(int a[], int n)
165 }
166
167 count2++;
PROBLEMS
OUTPUT
DEBUG CONSOLE
TERMINAL
PORTS
38 14784 14786 14791 14840 14854 14882 14943 14960 14998 15008 15036 15038 15064 15088 15103 15166 15166 15170 15185 15186 15285 15349 15414 15416 1
5417 15465 15477 15518 15518 15580 15603 15687 15800 15828 15850 15863 15913 15974 16088 16128 16160 16175 16180 16268 16276 16280 16304 16334 16384
16415 16423 16430 16436 16590 16645 16767 16806 16865 16868 16872 16996 17013 17026 17041 17061 17073 17092 17108 17123 17139 17192 17269 17276 173
36 17362 17391 17446 17532 17534 17549 17595 17598 17649 17706 17707 17738 17765 17803 17913 17917 17932 17947 17989 17989 18011 18069 18109 18277 1
8289 18400 18431 18502 18511 18559 18562 18579 18592 18620 18646 18708 18715 18828 18849 18911 18927 18930 18948 18954 19054 19126 19194 19224 19226
19249 19291 19314 19324 19334 19395 19439 19447 19528 19556 19559 19634 19651 19657 19684 19714 19739 19752 19753 19781 19825 19888 19911 19933 199
46 19994 20069 20072 20123 20128 20158 20165 20183 20217 20220 20221 20257 20272 20357 20361 20386 20422 20430 20438 20473 20537 20594 20650 20712 2
0748 20785 20833 20861 20937 21002 21043 21073 21076 21102 21121 21123 21129 21184 21207 21242 21375 21415 21532 21554 21585 21647 21654 21729 21734
21743 21755 21830 21835 21853 21876 21882 21888 21892 21892 21901 21906 22034 22139 22149 22160 22168 22185 22210 22224 22234 22242 22272 22281 223
11 22315 22318 22322 22342 22345 22351 22428 22488 22495 22497 22500 22521 22560 22623 22645 22657 22688 22707 22756 22758 22792 22800 22809 22817 2
2943 23089 23119 23194 23257 23275 23306 23314 23439 23524 23547 23556 23565 23598 23631 23649 23691 23707 23727 23728 23735 23863 23889 23931 23942
23964 24017 24024 24030 24062 24091 24132 24143 24152 24197 24205 24210 24284 24329 24389 24402 24413 24424 24434 24529 24539 24561 24570 24578 245
80 24580 24609 24643 24674 24683 24722 24740 24748 24750 24754 24781 24793 24798 24874 24880 24888 24947 25054 25148 25172 25175 25198 25211 25221 2
5230 25249 25254 25292 25319 25400 25403 25404 25405 25432 25479 25488 25523 25529 25554 25628 25657 25669 25686 25712 25713 25844 25873 25888 25898
25904 25952 25974 25993 26052 26104 26114 26183 26185 26193 26203 26302 26354 26407 26411 26446 26461 26463 26510 26571 26596 26622 26640 26643 266
43 26690 26695 26701 26710 26727 26872 26882 26890 26896 26906 26927 26966 27008 27028 27033 27044 27084 27102 27115 27132 27152 27173 27221 27226 2
7291 27366 27377 27398 27404 27419 27489 27505 27531 27555 27660 27697 27703 27844 27886 27925 27949 27990 28014 28036 28041 28046 28076 28113 28116
28246 28278 28356 28413 28426 28433 28496 28520 28633 28652 28745 28802 28951 28973 28996 29018 29196 29198 29260 29289 29290 29306 29348 29368 295
30 29560 29589 29595 29610 29645 29697 29746 29823 29911 29970 30009 30015 30036 30036 30068 30094 30100 30109 30119 30140 30252 30317 30321 30365 3
0367 30457 30585 30614 30616 30623 30624 30632 30636 30677 30678 30679 30700 30711 30757 30817 30873 30880 30896 30930 30967 30983 30983 31007 31018
31026 31036 31044 31053 31076 31104 31113 31131 31149 31168 31215 31237 31321 31355 31355 31442 31465 31495 31578 31585 31587 31669 31755 31755 317
60 31765 31780 31822 31841 31881 31907 31918 31974 31982 32015 32046 32050 32096 32102 32179 32272 32277 32413 32415 32419 32452 32470 32536 32581 3
2689 32717 32767
Bubble Sort Comparsion: 499500
Insertion Sort Comparsion: 244505
Selection Sort Comparsion: 500491
Merge Sort Comparsion: 10975
Quick Sort Comparsion: 14084
PS E:\dsa_labs\lab_4>
Run Testcases
Ln 173, Col 2
Spaces: 4
UTF-8
CRLF
C++
Signed out
Win32
Hot days ahead
31°C
Search
12:17 PM
10/13/2025