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C++Programming

Assignment -4

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1. Write a C++ program that accepts the user's first and last name and prints them in reverse order with a space between them.

Sample Output:

Print the name in reverse where last name comes first:

-----

Input First Name: Alexandra

Input Last Name: Abramov

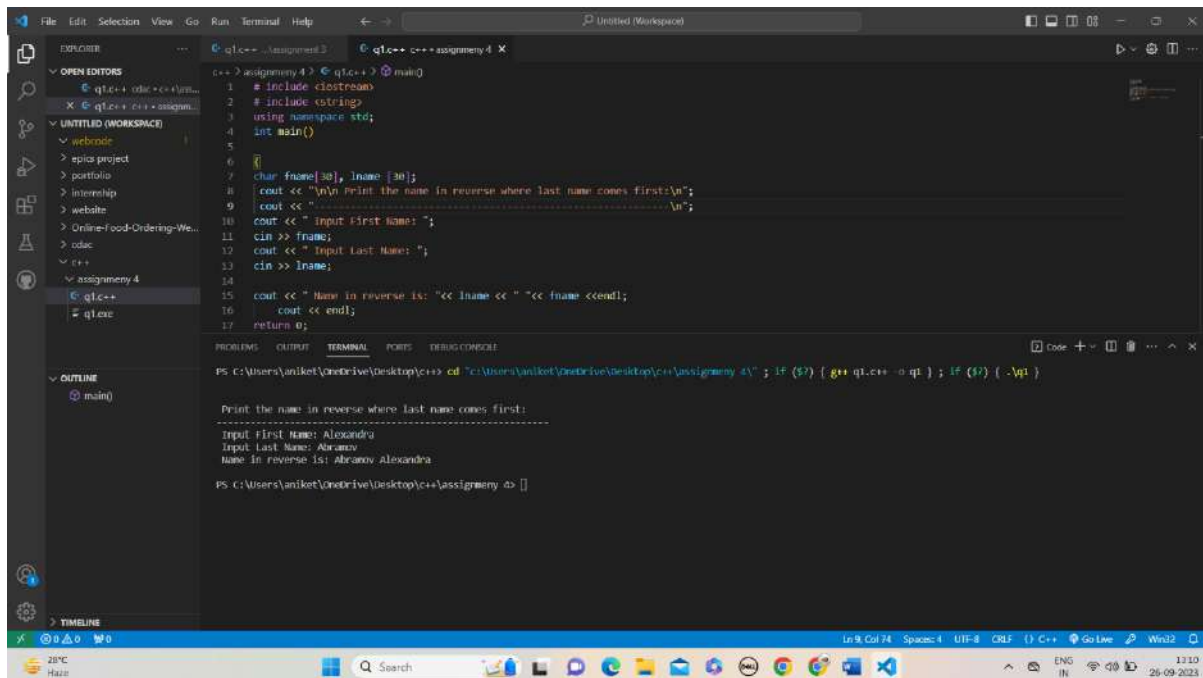
Name in reverse is: Abramov Alexandra

Code:

```
# include <iostream>
# include <string>
using namespace std;
int main()
{
char fname[30], lname [30];
cout << "\n\n Print the name in reverse where last name comes first:\n";
cout << "-----\n";
cout << " Input First Name: ";
cin >> fname;
cout << " Input Last Name: ";
cin >> lname;

cout << " Name in reverse is: "<< lname << " "<< fname <<endl;
    cout << endl;
return 0;
}
```

## Output:



```
1 #include <iostream>
2 #include <string>
3 using namespace std;
4 int main()
5 {
6     char fname[30], lname[30];
7     cout << "Print the name in reverse where last name comes first:\n";
8     cout << "-----\n";
9     cout << "Input first Name: ";
10    cin >> fname;
11    cout << "Input Last Name: ";
12    cin >> lname;
13    cout << "Name in reverse is: " << lname << " " << fname << endl;
14    cout << endl;
15    return 0;
16 }
```

PS C:\Users\aniket\OneDrive\Desktop\c++> cd "C:\Users\aniket\OneDrive\Desktop\c++\assignment 4\" ; if (\$?) { g++ q1.cpp -o q1 } ; if (\$?) { .\q1 }

Print the name in reverse where last name comes first:  
-----  
Input first Name: Alexandra  
Input Last Name: Alexany  
Name in reverse is: Alexany Alexandra

PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4> |

2. Write a C++ program to calculate the sum of all even and odd numbers in an array.

Sample Output:

Original array: 1 2 3 4 5 6 7 8

Sum of all even and odd numbers: 20,16

Code:

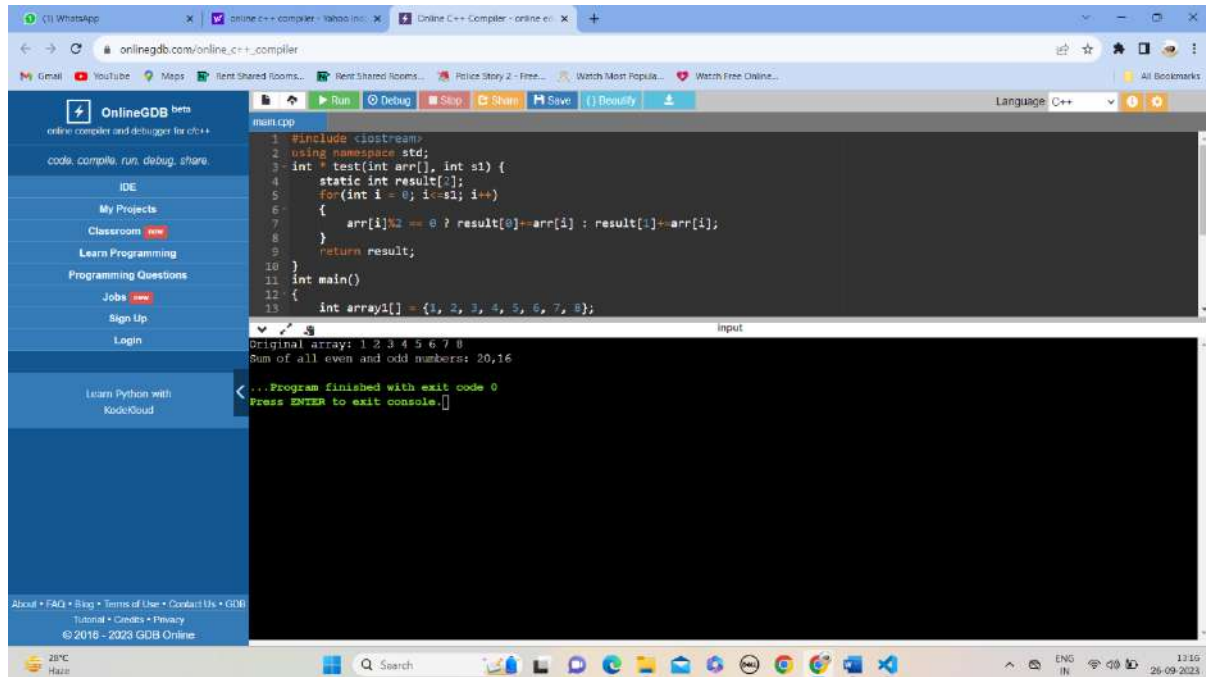
```
#include <iostream>
using namespace std;
int * test(int arr[], int s1) {
    static int result[2];
    for(int i = 0; i<=s1; i++)
    {
        arr[i]%2 == 0 ? result[0]+=arr[i] : result[1]+=arr[i];
    }
    return result;
}
int main()
{
    int array1[] = {1, 2, 3, 4, 5, 6, 7, 8};
    int *eo;
    int s1 = sizeof(array1) / sizeof(array1[0]);
    cout << "Original array: ";
    for (int i=0; i < s1; i++)
        cout << array1[i] <<" ";
    eo = test(array1, s1);
```

```

    cout << "\nSum of all even and odd numbers: " << *(eo+0) << ", " << *(eo+1);
    return 0;
}

```

Output:



3. Write a C++ program to print the code (ASCII code / Unicode code etc.) of a given character.

Sample Output:

Print code (ASCII code / Unicode code etc.) of a given character:

-----

Input a character: a

The ASCII value of a is: 97

The character for the ASCII value 97 is:a

Code:

```

#include <iostream>
using namespace std;
int main()
{
    char sing_ch;
    cout << "\n\n Print code (ASCII code / Unicode code etc.) of a given
character:\n";
}

```

```

    cout << "-----\n";
    cout << " Input a character: ";
    cin >> sing_ch;

    cout << " The ASCII value of "<<sing_ch<<" is: " <<(int)sing_ch << endl;
    cout << " The character for the ASCII value "<<(int)sing_ch <<" is:
"<<(char)((int)sing_ch) << endl<< endl;
    return 0;
}

```

Output:

The screenshot shows a Visual Studio Code editor with a C++ program. The code is as follows:

```

1 #include <iostream>
2 using namespace std;
3 int main()
4 {
5     char sing_ch;
6     cout << "\n\n Print code (ASCII code / Unicode code etc.) of a given character:\n";
7     cout << "-----\n";
8     cout << " Input a character: ";
9     cin >> sing_ch;
10
11     cout << " The ASCII value of "<<sing_ch<<" is: " <<(int)sing_ch << endl;
12     cout << " The character for the ASCII value "<<(int)sing_ch <<" is: "<<(char)((int)sing_ch) << endl<< endl;
13     return 0;
14 }
15

```

The terminal output shows the program's execution:

```

PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4> g++ q3.cpp -o q3 ; if ($?) { g++ q3.exe -o q3 } ; if ($?) { .\q3 }

Print code (ASCII code / Unicode code etc.) of a given character:
Input a character: a
The ASCII value of a is: 97
The character for the ASCII value 97 is: a
PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4>

```

4. Write a C++ program to enter P, T, R and calculate Simple Interest.

Sample Output:

Calculate the Simple Interest :

-----

Input the Principle: 20000

Input the Rate of Interest: 10

Input the Time: 1.5

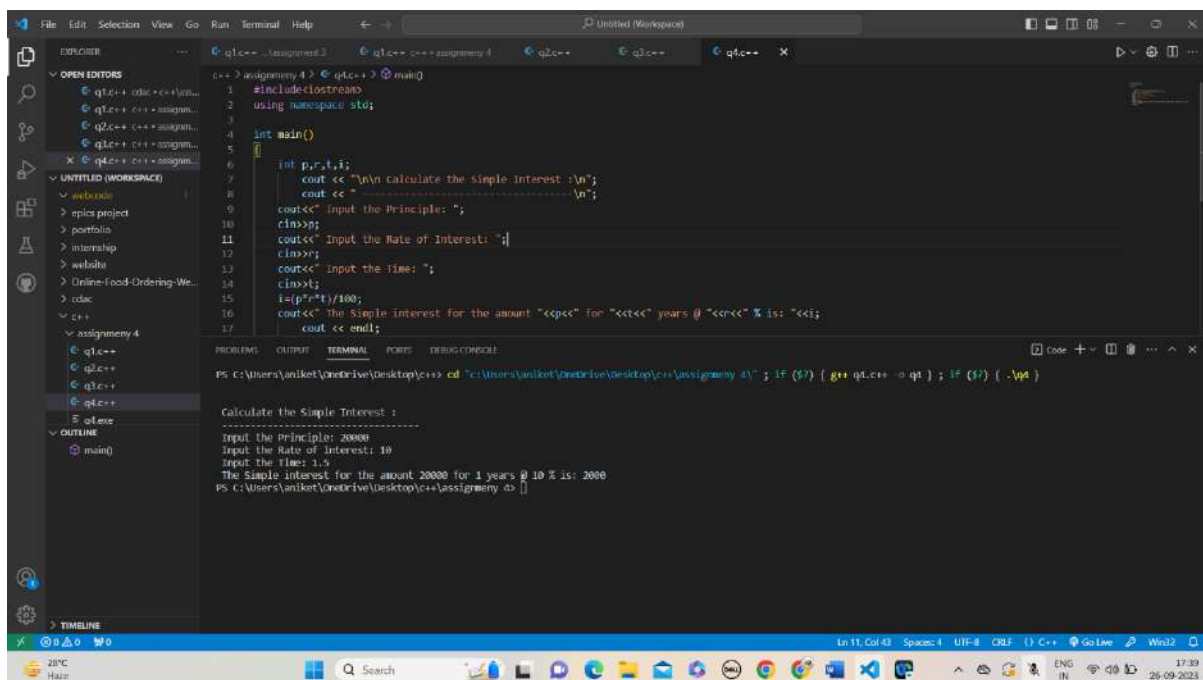
The Simple interest for the amount 20000 for 1 years @ 10 % is: 2000

## Code:

```
#include<iostream>
using namespace std;

int main()
{
    int p,r,t,i;
    cout << "\n\n Calculate the Simple Interest : \n";
    cout << " ----- \n";
    cout<<" Input the Principle: ";
    cin>>p;
    cout<<" Input the Rate of Interest: ";
    cin>>r;
    cout<<" Input the Time: ";
    cin>>t;
    i=(p*r*t)/100;
    cout<<" The Simple interest for the amount "<<p<<" for "<<t<<" years @
"<<r<<" % is: "<<i;
    cout << endl;
    return 0;
}
```

## Output:



The screenshot shows a C++ IDE with the code from the previous block. The output window displays the following text:

```
PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4> g++ q1.cpp -o q1; if ($?) { g++ q1.cpp -o q1; if ($?) { .\q1 }
Calculate the Simple Interest :
-----
Input the Principle: 20000
Input the Rate of Interest: 10
Input the Time: 1
The Simple interest for the amount 20000 for 1 years @ 10 % is: 2000
PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4>
```

5. Write a C++ program to enter P, T, R and calculate compound interest.

Sample Output:

Calculate the Compound Interest :

-----  
Input the Principle: 20000

Input the Rate of Interest: 10

Input the Time: 1.5

The Interest after compounded for the amount 20000  
for 1.5 years @ 10% is: 3073.

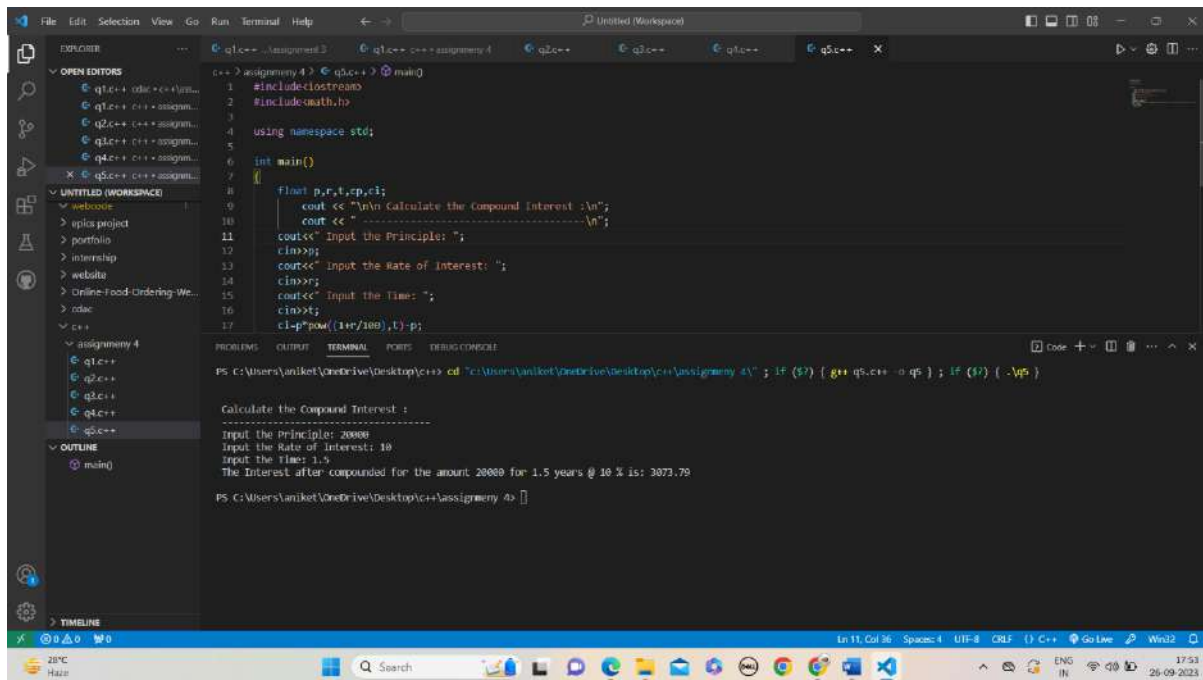
Code:

```
#include<iostream>
#include<math.h>

using namespace std;

int main()
{
    float p,r,t,cp,ci;
    cout << "\n\n Calculate the Compound Interest :\n";
    cout << " ----- \n";
    cout<<" Input the Principle: ";
    cin>>p;
    cout<<" Input the Rate of Interest: ";
    cin>>r;
    cout<<" Input the Time: ";
    cin>>t;
    ci=p*pow((1+r/100),t)-p;
    cp=p*pow((1+r/100),t);
    cout<<" The Interest after compounded for the amount "<<p<<" for "<<t<<"
years @ "<<r<<" % is: "<<ci;
    cout << endl;
    cout << endl;
    return 0;
}
```

Output:



```
1 #include <iostream>
2 #include <math.h>
3
4 using namespace std;
5
6 int main()
7 {
8     float p,r,t,cp,ci;
9     cout << "\n\n Calculate the Compound Interest :\n";
10    cout << "-----\n";
11    cout << "Input the Principle: ";
12    cin >> p;
13    cout << "Input the Rate of Interest: ";
14    cin >> r;
15    cout << "Input the Time: ";
16    cin >> t;
17    ci = p * pow((1+r/100),t) - p;
18
19    cout << "\n\n The Interest after compounded for the amount 20000 for 1.5 years @ 10 % is: 3073.79\n";
20}
```

6. Write a C++ program to add two binary numbers.

Sample Output:

Addition of two binary numbers:

-----

Input the 1st binary number: 1010

Input the 2nd binary number: 0011

The sum of two binary numbers is: 1101

Code:

```
#include <iostream>
#include <math.h>
using namespace std;

int main()
{
    long bn1, bn2;
    int i=0, r=0;
    int sum[20];
    cout << "\n\n Addition of two binary numbers:\n";
    cout << "-----\n";
    cout << " Input the 1st binary number: ";
    cin >> bn1;
    cout << " Input the 2nd binary number: ";
```

```

    cin>> bn2;
while (bn1 != 0 || bn2 != 0)
{
    sum[i++] = (int)((bn1 % 10 + bn2 % 10 + r) % 2);
    r = (int)((bn1 % 10 + bn2 % 10 + r) / 2);
    bn1 = bn1 / 10;
    bn2 = bn2 / 10;
}
if (r != 0) {
    sum[i++] = r;
}
--i;
cout<<" The sum of two binary numbers is: ";
while (i >= 0) {
    cout<<(sum[i--]);
}
cout<<("\n");
}

```

Output:

The screenshot shows a C++ IDE with a file explorer on the left, a code editor in the center, and a terminal at the bottom. The code in the editor is a C++ program that adds two binary numbers. The terminal output shows the program's execution, including the input of two binary numbers (1010 and 0011) and the resulting sum (1101).

```

PS C:\Users\aniket\OneDrive\Desktop\c++> cd "C:\Users\aniket\OneDrive\Desktop\c++\assignment 4\" ; if ($?) { g++ qb.c++ -o qb } ; if ($?) { .\qb }

Addition of two binary numbers:
Input the 1st binary number: 1010
Input the 2nd binary number: 0011
The sum of two binary numbers is: 1101
PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4>

```

7. Write a C++ program to find the largest element of a given array of integers.

Code:

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



```

using namespace std;
int largest(int arr[], int n)
{
    int i;
    int max = arr[0];
    for (i = 1; i < n; i++)
        if (arr[i] > max)
            max = arr[i];

    return max;
}
int main()
{
    int arr[] = { 1, 2, 4, 8, 9 };
    int n = sizeof(arr) / sizeof(arr[0]);
    cout << "Largest in given array is " << largest(arr, n);
    return 0;
}

```

Output:

The screenshot shows a C++ IDE with the following code in the editor:

```

1 #include <iostream>
2 using namespace std;
3 int largest(int arr[], int n)
4 {
5     int i;
6     int max = arr[0];
7     for (i = 1; i < n; i++)
8         if (arr[i] > max)
9             max = arr[i];
10
11     return max;
12 }
13
14 int main()
15 {
16     int arr[] = { 1, 2, 4, 8, 9 };
17     int n = sizeof(arr) / sizeof(arr[0]);

```

The output window shows the following text:

```

PS C:\Users\Aniket\OneDrive\Desktop> cd "C:\Users\Aniket\OneDrive\Desktop\assignment 4" ; if ($?) { g++ q2.cpp -o q2 } ; if ($?) { .\q2 }
Largest in given array is 9
PS C:\Users\Aniket\OneDrive\Desktop\assignment 4>

```

8. Write a C++ program to sort a given unsorted array of integers, in wave form.

Note: An array is in wave form when  $\text{array}[0] \geq \text{array}[1] \leq \text{array}[2] \geq \text{array}[3] \leq \text{array}[4] \geq \dots$

## Code:

```
#include<iostream>
#include<algorithm>
using namespace std;

void swap_elements(int *a, int *b)
{
    int t = *a;
    *a = *b;
    *b = t;
}

void array_wave(int nums[], int n)
{
    sort(nums, nums+n);

    for (int i=0; i<n-1; i += 2)
        swap_elements(&nums[i], &nums[i+1]);
}

int main()
{
    int nums[] = {4, 5, 9, 12, 9, 22, 45, 7};
    int n = sizeof(nums)/sizeof(nums[0]);
    cout << "Original array: ";
    for (int i=0; i < n; i++)
        cout << nums[i] <<" ";
    array_wave(nums, n);
    cout << "\nWave form of the said array: ";
    for (int i=0; i<n; i++)
        cout << nums[i] << " ";
    return 0;
}
```

Output:

```
1 #include<iostream>
2 #include<algorithm>
3 using namespace std;
4
5 void swap_elements(int *a, int *b)
6 {
7     int t = *a;
8     *a = *b;
9     *b = t;
10 }
11
12 void array_wave(int nums[], int n)
13 {
14     sort(nums, nums+n);
15     for (int i=0; i<n-1; i += 2)
16         swap_elements(&nums[i], &nums[i+1]);
17 }
18
19 int main()
20 {
21     int nums[] = {4, 5, 9, 12, 9, 22, 45, 7};
22     int n = sizeof(nums)/sizeof(nums[0]);
23     array_wave(nums, n);
24     for (int i=0; i<n; i++)
25         cout << nums[i] << " ";
26     cout << endl;
27     return 0;
28 }
```

PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4> cd "C:\Users\aniket\OneDrive\Desktop\c++\assignment 4"; if (\$?) { g++ qb.c++ -o qb } ; if (\$?) { .\qb }

Original array: 4 5 9 12 9 22 45 7  
Wave form of the said array: 5 4 9 7 12 9 45 22  
PS C:\Users\aniket\OneDrive\Desktop\c++\assignment 4>

9. Write a C++ program to separate even and odd numbers in an array of integers. Put all even numbers first, and then odd numbers.

Code:

```
#include<iostream>
using namespace std;

void swap(int *x, int *y)
{
    int temp = *x;
    *x = *y;
    *y = temp;
}

void segregateEvenOdd(int nums[], int size)
{
    int left_num = 0, right_num = size-1;
    while (left_num < right_num)
    {
        while (nums[left_num]%2 == 0 && left_num < right_num)
            left_num++;

        while (nums[right_num]%2 == 1 && left_num < right_num)
            right_num--;

        swap(&nums[left_num], &nums[right_num]);
    }
}
```

```

        if (left_num < right_num)
        {
            swap(&nums[left_num], &nums[right_num]);
            left_num++;
            right_num--;
        }
    }
}

int main()
{
    int nums[] = {0, 1, 3, 4, 5, 6, 7, 8, 10};
    int n = sizeof(nums)/sizeof(nums[0]);
    cout << "Original array: ";
    for (int i=0; i < n; i++)
        cout << nums[i] << " ";
    segregateEvenOdd(nums, n);

    printf("\nArray after divided: ");
    for (int i=0; i < n; i++)
        cout << nums[i] << " ";
    return 0;
}

```

Output:

The screenshot shows a C++ IDE with the following components:

- Explorer:** Shows the project structure with files q1.c++ through q8.c++.
- Code Editor:** Displays the implementation of the segregateEvenOdd function, which uses a two-pointer approach to swap even and odd indexed elements.
- Terminal:** Shows the command prompt output:
 

```

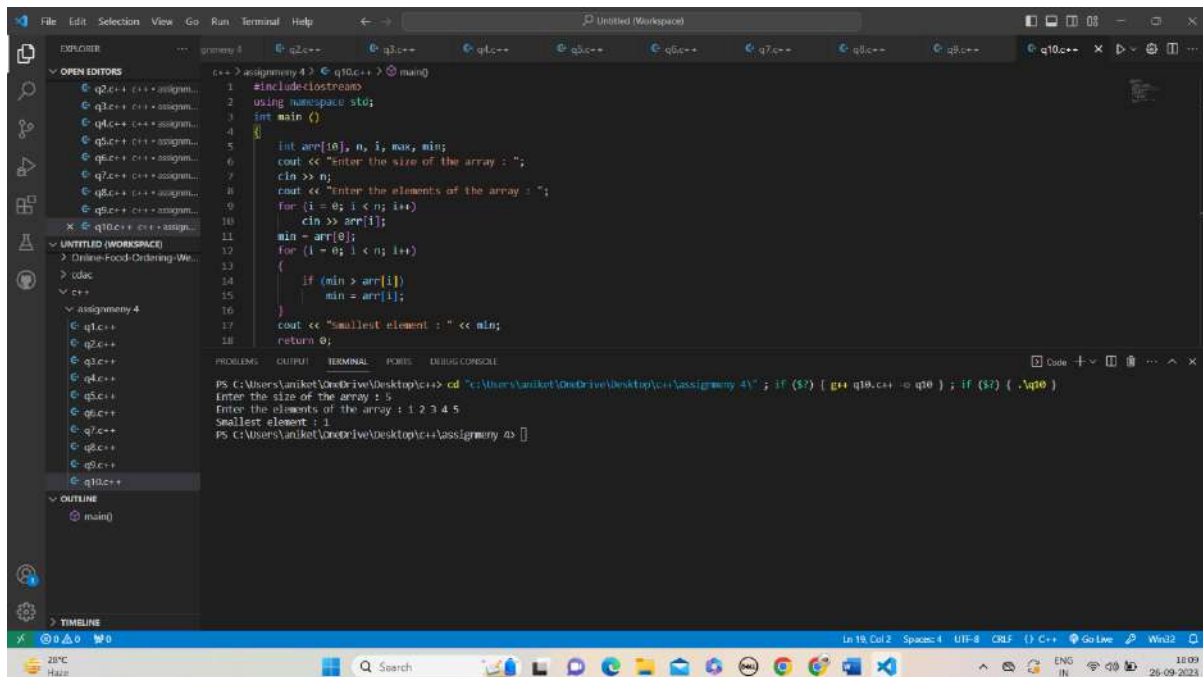
PS C:\Users\aniket\OneDrive\Desktop> cd "C:\Users\aniket\OneDrive\Desktop\assigmentry 4" & if ($?) { g++ q1.c++ -o qp } & if ($?) { .\qp }
Original array: 0 1 3 4 5 6 7 8 10
Array after divided: 0 10 8 4 5 6 7 3 1
PS C:\Users\aniket\OneDrive\Desktop>
      
```
- Outline:** Lists the functions in the program: swap, segregateEvenOdd, and main.
- Taskbar:** Shows the Windows taskbar with various application icons and the system clock indicating 18:06 on 26-09-2023.

10. Write a C++ program to find the smallest element of a given array of integers

Code:

```
#include<iostream>
using namespace std;
int main ()
{
    int arr[10], n, i, max, min;
    cout << "Enter the size of the array : ";
    cin >> n;
    cout << "Enter the elements of the array : ";
    for (i = 0; i < n; i++)
        cin >> arr[i];
    min = arr[0];
    for (i = 0; i < n; i++)
    {
        if (min > arr[i])
            min = arr[i];
    }
    cout << "Smallest element : " << min;
    return 0;
}
```

Output:



The screenshot shows a C++ IDE with the following components:

- Editor:** Displays the C++ code for finding the smallest element in an array. The code is identical to the one provided in the previous block.
- Terminal:** Shows the execution output:

```
PS C:\Users\aniket\OneDrive\Desktop> cd "C:\Users\aniket\OneDrive\Desktop\assignment 4\" ; if ($?) { g++ q10.cpp -o q10 } ; if ($?) { .\q10 }
Enter the size of the array : 5
Enter the elements of the array : 1 2 3 4 5
Smallest element : 1
PS C:\Users\aniket\OneDrive\Desktop\assignment 4>
```
- File Explorer:** Shows the project structure with files like q1.cpp, q2.cpp, ..., q10.cpp.
- Output:** Shows the output of the program, which is "Smallest element : 1".