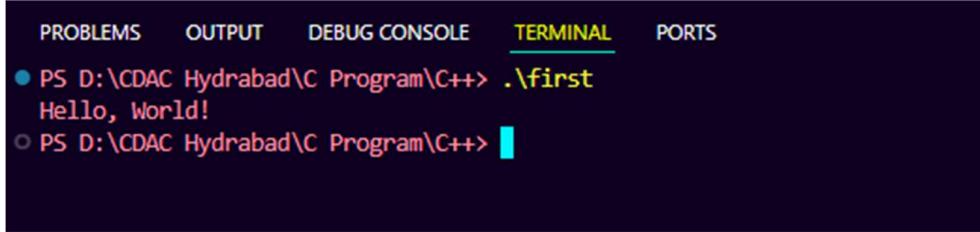


## Assignment - 02(CPP)

1. Write a C++ program that prints “Hello, World!” to the console.

```
first.cpp > ...
1 #include <iostream>
2 using namespace std;
3 int main() {
4     cout << "Hello, World!" << endl;
5     return 0;
6 }
7
```



PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

- PS D:\CDAC Hyderabad\C Program\CPP> .\first  
Hello, World!
- PS D:\CDAC Hyderabad\C Program\CPP>

2. Write a C++ program that takes two integer inputs from the user and prints their sum.

```
c++ sec.cpp > ...
1 #include <iostream>
2 using namespace std;
3
4 v int main() {
5     int num1, num2, sum;
6
7     cout << "Enter first number: ";
8     cin >> num1;
9
10    cout << "Enter second number: ";
11    cin >> num2;
12
13    sum = num1 + num2;
14
15    cout << "The sum is: " << sum << endl;
16
17    return 0;
18 }
19
```

```
PS D:\CDAC Hyderabad\C_Program\c++> ./sec
Enter first number: 34
Enter second number: 55
The sum is: 89
PS D:\CDAC Hyderabad\C_Program\c++>
```

3. Write a C++ program to swap two numbers without using a third variable.

```
third.cpp > main()
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int a, b;
6     cout << "Enter two numbers: ";
7     cin >> a >> b;
8
9     a = a + b;
10    b = a - b;
11    a = a - b;
12
13    cout << "After swapping: a = " << a << ", b = " << b << endl;
14    return 0;
15 }
16
```

```
PS D:\CDAC Hyderabad\C Program\C++> ./third
Enter two numbers: 4
6
After swapping: a = 6, b = 4
PS D:\CDAC Hyderabad\C Program\C++>
```

4. Write a C++ program that checks whether a number entered by the user is even or odd.

```
>Welcome C++ first.cpp PHP: 1.61 C++ sec.cpp C++ third.cpp C++ fourth.cpp X C
C++ fourth.cpp > main()
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int n;
6     cout << "Enter a number: ";
7     cin >> n;
8
9     if (n % 2 == 0)
10        cout << n << " is Even" << endl;
11    else
12        cout << n << " is Odd" << endl;
13
14    return 0;
15 }
```

```
PS D:\CDAC Hyderabad\C Program\C++> ./fourth
Enter a number: 67
67 is Odd
PS D:\CDAC Hyderabad\C Program\C++> ./fourth
Enter a number: 88
88 is Even
PS D:\CDAC Hyderabad\C Program\C++>
```

5. Write a C++ program that takes two numbers and an operator (+, -, \*, /) as input and performs the corresponding operation.

```
fifth.cpp > Φ main()
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     double a, b;
6     char op;
7     cout << "Enter two numbers: ";
8     cin >> a >> b;
9     cout << "Enter operator (+, -, *, /): ";
0     cin >> op;
1
2     switch (op) {
3         case '+': cout << "Result = " << a + b << endl; break;
4         case '-': cout << "Result = " << a - b << endl; break;
5         case '*': cout << "Result = " << a * b << endl; break;
6         case '/':
7             if (b != 0) cout << "Result = " << a / b << endl;
8             else cout << "Error! Division by zero." << endl;
9             break;
0         default: cout << "Invalid operator!" << endl;
1     }
2     return 0;
3 }
4 }
```

```
PS D:\CDAC Hyderabad\C Program\c++> ./fifth
Enter two numbers: 4
4
Enter operator (+, -, *, /): *
Result = 16
PS D:\CDAC Hyderabad\C Program\c++> ./fifth
Enter two numbers: 32
3
Enter operator (+, -, *, /): /
Result = 10.6667
PS D:\CDAC Hyderabad\C Program\c++> ./fifth
Enter two numbers: 34
34
Enter operator (+, -, *, /): +
Result = 68
PS D:\CDAC Hyderabad\C Program\c++>
```

6. Write a C++ program that takes n numbers as input, stores them in an array, and finds the largest number.

```
C++ sixth.cpp > main()
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int n;
6     cout << "Enter number of elements: ";
7     cin >> n;
8
9     int arr[n];
10    cout << "Enter " << n << " numbers: ";
11    for (int i = 0; i < n; i++) cin >> arr[i];
12
13    int largest = arr[0];
14    for (int i = 1; i < n; i++)
15        if (arr[i] > largest) largest = arr[i];
16
17    cout << "Largest number = " << largest << endl;
18    return 0;
19 }
20
```

PROBLEMS    OUTPUT    DEBUG CONSOLE    TERMINAL    PORTS

- PS D:\CDAC Hyderabad\C Program\c++> ./sixth  
Enter number of elements: 5  
Enter 5 numbers: 7  
5  
9  
3  
5  
Largest number = 9
- PS D:\CDAC Hyderabad\C Program\c++>

7. Write a C++ program that takes an integer input and calculates the sum of its digits.

```
* sebenth.cpp > main()
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int n, sum = 0;
6     cout << "Enter an integer: ";
7     cin >> n;
8
9     while (n > 0) {
10         sum += n % 10;
11         n /= 10;
12     }
13
14     cout << "Sum of digits = " << sum << endl;
15     return 0;
16 }
17
```

```
Enter an integer: 456
```

```
Sum of digits = 15
```

```
PS D:\CDAC Hyderabad\C Program\c++>
```

8. Write a C++ program to take  $n$  elements in an array and print them in reverse order.

```
• eight.cpp > ⌂ main()
1  #include <iostream>
2  using namespace std;
3
4  int main() {
5      int n;
6      cout << "Enter number of elements: ";
7      cin >> n;
8
9      int arr[n];
10     cout << "Enter " << n << " numbers: ";
11     for (int i = 0; i < n; i++) cin >> arr[i];
12
13    cout << "Array in reverse: ";
14    for (int i = n - 1; i >= 0; i--) cout << arr[i] << " ";
15    cout << endl;
16
17    return 0;
18 }
19
```

```
• PS D:\CDAC Hyderabad\C Program\c++> ./eight
Enter number of elements: 5
Enter 5 numbers: 4
45
55
88
5
Array in reverse: 5 88 55 45 4
• PS D:\CDAC Hyderabad\C Program\c++>
```

9. Write a C++ program to check if a given number is palindromic (reads the same forward and backward).

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int n, rev = 0, temp;
6     cout << "Enter a number: ";
7     cin >> n;
8     temp = n;
9
10    while (temp > 0) {
11        rev = rev * 10 + temp % 10;
12        temp /= 10;
13    }
14
15    if (n == rev) cout << n << " is Palindrome" << endl;
16    else cout << n << " is Not Palindrome" << endl;
17
18    return 0;
19}
20
```

- PS D:\CDAC Hyderabad\C Program\c++> ./nineth  
Enter a number: 55555  
55555 is Palindrome
- PS D:\CDAC Hyderabad\C Program\c++> ./nineth  
Enter a number: 4584  
4584 is Not Palindrome
- PS D:\CDAC Hyderabad\C Program\c++>

10. Write a C++ program to print the Fibonacci series up to n terms.

```
C++ tenth.cpp > ...
1 #include <iostream>
2 using namespace std;
3
4
5 int main() {
6     int n, a = 0, b = 1, c;
7     cout << "Enter number of terms: ";
8     cin >> n;
9
10    cout << "Fibonacci Series: ";
11    for (int i = 1; i <= n; i++) {
12        cout << a << " ";
13        c = a + b;
14        a = b;
15        b = c;
16    }
17    cout << endl;
18    return 0;
19 }
20
```

```
PS D:\CDAC Hyderabad\C Program\CPP> ./tenth
Enter number of terms: 10
Fibonacci Series: 0 1 1 2 3 5 8 13 21 34
PS D:\CDAC Hyderabad\C Program\CPP>
```

11. Write a C++ program that takes a string as input and counts the number of vowels (a, e, i, o, u).

```

1 #include <iostream>
2 #include <string>
3 using namespace std;
4
5 int main() {
6     string str;
7     cout << "Enter a string: ";
8     getline(cin, str);
9
10    int count = 0;
11    for (char ch : str) {
12        ch = tolower(ch);
13        if (ch=='a' || ch=='e' || ch=='i' || ch=='o' || ch=='u')
14            count++;
15    }
16
17    cout << "Number of vowels = " << count << endl;
18    return 0;
19}

```

```

PS D:\CDAC Hyderabad\C Program\c++> ./eleth
Enter a string: hello
Number of vowels = 2
○ PS D:\CDAC Hyderabad\C Program\c++>

```

## 12. Write a C++ program to find the GCD of two numbers

```

C> tweth.cpp > ...
1 #include <iostream>
2 using namespace std;
3
4 int gcd(int a, int b) {
5     while (b != 0) {
6         int temp = b;
7         b = a % b;
8         a = temp;
9     }
10    return a;
11}
12
13 int main() {
14     int x, y;
15     cout << "Enter two numbers: ";
16     cin >> x >> y;
17     cout << "GCD = " << gcd(x, y) << endl;
18     return 0;
19}

```

```
NUMBER OF VOWELS = 2
PS D:\CDAC Hyderabad\C Program\ C++> ./tweth
Enter two numbers:
55
44
GCD = 11
PS D:\CDAC Hyderabad\C Program\ C++>
```

### 13. Write a C++ program to multiply two matrices.

```
C++ thenth.cpp > ...
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int r1, c1, r2, c2;
6     cout << "Enter rows and cols of first matrix: ";
7     cin >> r1 >> c1;
8     cout << "Enter rows and cols of second matrix: ";
9     cin >> r2 >> c2;
10
11    if (c1 != r2) {
12        cout << "Matrix multiplication not possible!" << endl;
13        return 0;
14    }
15
16    int A[r1][c1], B[r2][c2], C[r1][c2];
17
18    cout << "Enter first matrix:\n";
19    for (int i=0;i<r1;i++)
20        for (int j=0;j<c1;j++)
21            cin >> A[i][j];
22
23    cout << "Enter second matrix:\n";
24    for (int i=0;i<r2;i++)
25        for (int j=0;j<c2;j++)
26            cin >> B[i][j];
27
28    for (int i=0;i<r1;i++)
29        for (int j=0;j<c2;j++) {
30            C[i][j] = 0;
31            for (int k=0;k<c1;k++)
32                C[i][j] += A[i][k]*B[k][j];
33        }
34
35    cout << "Result matrix:\n";
36    for (int i=0;i<r1;i++) {
37        for (int j=0;j<c2;j++) {
38            cout << C[i][j] << " ";
39            cout << endl;
40        }
41    }
42    return 0;
43 }
```

```
● PS D:\CDAC Hyderabad\C Program\c++> ./ththenth
Enter rows and cols of first matrix: 2
2
Enter rows and cols of second matrix: 2
2
Enter first matrix:
23
67
88
66
Enter second matrix:
54

4
5
6
Result matrix:
1577 494
5082 748
○ PS D:\CDAC Hyderabad\C Program\c++>
```

14. A number is an Armstrong number if the sum of its digits raised to the power of the number of digits is equal to the number itself (e.g.,  $153 = 1^3 + 5^3 + 3^3$ ). Write a C++ program to check if a number is Armstrong.

```
1 #include <iostream>
2 #include <cmath>
3 using namespace std;
4
5 int main() {
6     int n, temp, digits = 0, sum = 0;
7     cout << "Enter a number: ";
8     cin >> n;
9     temp = n;
10
11    while (temp > 0) {
12        digits++;
13        temp /= 10;
14    }
15
16    temp = n;
17    while (temp > 0) {
18        int d = temp % 10;
19        sum += pow(d, digits);
20        temp /= 10;
21    }
22
23    if (sum == n) cout << n << " is an Armstrong number" << endl;
24    else cout << n << " is not an Armstrong number" << endl;
25
26    return 0;
27 }
28
```

```
PS D:\CDAC Hyderabad\C Program\C++> ./forthenth
Enter a number: 54
54 is not an Armstrong number
PS D:\CDAC Hyderabad\C Program\C++> ./forthenth
Enter a number: 153
153 is not an Armstrong number
PS D:\CDAC Hyderabad\C Program\C++>
```

15. Write a C++ program to print Pascal's triangle up to n rows.

```
1 #include <iostream>
2 using namespace std;
3
4 int main() {
5     int n;
6     cout << "Enter number of rows: ";
7     cin >> n;
8
9     for (int i=0;i<n;i++) {
10         int num = 1;
11         for (int j=0;j<=i;j++) {
12             cout << num << " ";
13             num = num * (i - j) / (j + 1);
14         }
15         cout << endl;
16     }
17
18     return 0;
19 }
20
```

```
PS D:\CDAC Hyderabad\C Program\c++> ./fifthrnth
Enter number of rows: 3
1
1 1
1 2 1
PS D:\CDAC Hyderabad\C Program\c++> ./fifthrnth
Enter number of rows: 5
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
PS D:\CDAC Hyderabad\C Program\c++>
```