C++ Assignment

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

```cpp
#include <iostream>    // for input-output

using namespace std;  // standard namespace

int main() {
    cout << "Hello, World!";  // print to console
    return 0;  // end of program
}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop
Sublime\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?)
.\tempCodeRunnerFile }
Hello, World!
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Ass1 C++>
```

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

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

int main(){
    int num1,num2,sum;
    // Taking input

    cout<<"Enter first number: ";
    cin >> num1;

    cout<<"Enter Second number: ";
    cin >> num2;

    //Calculating Sum

    sum = num1 + num2;

    //Printing result

    cout<<"Sum is:"<<sum<<endl;
```

```
    return 0;



}
```

Output:

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

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

int main(){
    int num1=2;
    int num2=5;

    num1=num1+num2;
    num2=num1-num2;
    num1=num1-num2;

    //Printing result

    cout<<"After Swapping num1 : "<<num1<<endl;
    cout<<"After Swapping num2 : "<<num2<<endl;

    return 0;



}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\m
ahir\OneDrive\Desktop\Sublime\Ass1 C++\" ; if ($?) { g++ tempCodeRunner
File.cpp -o tempCodeRunnerFile } ; if ($?) { .\tempCodeRunnerFile }
After Swapping num1 : 5
After Swapping num2 : 2
```

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

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

int main()
{
    int n;
    // Taking input

    cout << "Enter number: ";
    cin >> n;

    if (n % 2 == 0)
    {
        cout << "Even number";
    }
    else
    {
        cout << "Odd number";
    }

    return 0;
}
```

Output:

```
e\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\tempC
odeRunnerFile }
Enter number: 3
Odd number
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Ass1 C++>
                                            cd "c:\Users\mahir\OneDrive\Desktop\Sublim
e\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\tempC
odeRunnerFile }
Enter number: 14
Even number
```

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

```cpp
#include <iostream>
using namespace std;
int main()
{

    int a, b;
    char ch;
    cout << "Enter two numbers: ";
    cin >> a >> b;
    cout << "Enter the operation (+,-,*,/): ";
    cin >> ch;
    switch (ch)
    {
    case '+':
        cout << "Sum is: " << a + b;
        break;
    case '-':
        cout << "Diff is: " << a - b;
        break;
    case '*':
        cout << "Mul is: " << a * b;
        break;
    case '/':
        if (b != 0)
        {
            cout << "Div is: " << a / b;
        }
        else
        {
            cout << "zero division error";
        }
```

```
            break;
        default:
            cout << "Invalid operation!";
        }
        return 0;
}
```

Output:

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

```cpp
#include<iostream>
using namespace std;
int main(){
    int n;
    cout<<"Enter size of arr:";
    cin>>n;
    int arr[n];
    cout<<"Enter the "<<n<<" terms: ";
    for(int i=0;i<n;i++){
        cin>>arr[i];
    }
// find largest

    int lar = arr[0];
    for(int i=1;i<n;i++){
        if(arr[i]>lar){
            lar=arr[i];
        }

    }
    cout<<"Largest number of arr: "<<lar;
}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ largest.cpp -o largest } ; if ($?) { .\largest }
Enter size of arr:4
Enter the 4 terms: 8 64 2 3
Largest number of arr: 64
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Ass1 C++>
```

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

```cpp
#include <iostream>
using namespace std;
int main()
{
    int n, r;
    cout << "Enter the number: ";
    cin >> n;
    int sum = 0;
    while (n != 0)
    {
        r = n % 10;
        sum = sum + r;
        n = n / 10;
    }
    cout << "sum of digit:" << sum;
}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\t
empCodeRunnerFile }
Enter the number: 789
sum of digit:24
```

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

```cpp
/* Write a C++ program to take n elements in an array and print them in
reverse order.*/

#include <iostream>
using namespace std;
int main()
{
```

```cpp
    int n;
    cout << "Enter the number of size: ";
    cin >> n;

    int arr[n];

    cout << "Enter the " << n << " terms: ";

    for (int i = 0; i < n; i++)
    {
        cin >> arr[i];
    }

    // print
    cout << "Print element in revers: ";
    for (int i = n - 1; i >= 0; i--)
    {
        cout << arr[i] << " ";
    }
    cout << endl;
    return 0;
}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\t
empCodeRunnerFile }
Enter the number of size: 4
Enter the 4 terms: 2 6 7 2
Print element in revers: 2 7 6 2
```

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

```cpp
include <iostream>
using namespace std;
int main()
{
    int n, r, m;
    int rs = 0;
    cout << "Enter the number: ";
    cin >> n;
    m = n;
    while (n > 0)
    {
```

```
        r = n % 10;

        rs = rs * 10 + r;

        n = n / 10;

    }

    if (m == rs)

    {

        cout << "palindrone number";

    }

    else

    {

        cout << "not palindrone number";

    }

}
```

Output:

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

```cpp
#include <iostream>
using namespace std;
int main()
{

    int p = 0, q = 1, m, c;

    cout << "Enter how may terms:";

    cin >> m;

    cout << "fibonacci series: ";

    cout << p << " " << q << " ";

    for (int i = 2; i < m; i++)

    {

        c = p + q;

        cout << c << " ";

        p = q;

        q = c;

    }


    return 0;

}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\t
empCodeRunnerFile }
Enter how may terms:5
fibonacci series: 0 1 1 2 3
```

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

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

int main()
{
    string s;
    int count = 0;

    cout << "Enter a string: ";
    getline(cin, s); // take full line input (with spaces)

    for (int i = 0; i < s.length(); i++)
    {
        char ch = tolower(s[i]); // convert to lowercase for easy check
        if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch ==
'u')
        {
            count++;
        }
    }

    cout << "Total vowels: " << count << endl;
    return 0;
}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\t
empCodeRunnerFile }
Enter a string: Anuj Mahi Madhuri
Total vowels: 7
```

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

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

int main(){
    int num1,num2;

        cout<<"Enter first number: ";
        cin>>num1;

         cout<<"Enter second number: ";
        cin>>num2;

         int a = num1;
         int b = num2;

         // Euclidean Algorithm to find GCD
         while (b != 0) {
             int temp = b;
             b = a % b;
             a = temp;
         }
          cout<<"GCD of "<<num1<<" and "<<num2<<" is: "<<a;
    ;
    }
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\t
empCodeRunnerFile }
Enter first number: 45
Enter second number: 90
GCD of 45 and 90 is: 45
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Ass1 C++>
```

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

```cpp
#include <iostream>
using namespace std;
#define N 50
int main()
{
    int a[N][N], b[N][N], c[N][N], i, j, k, sum, m, n, p, q;
```

```cpp
cout << "Enter rows and columns for first matrix:\n";
cin >> m >> n;
cout << "Enter first matrix:\n";
for (int i = 0; i < m; i++)
{
    for (int j = 0; j < n; j++)
    {
        cin >> a[i][j];
    }
}
cout << "Enter rows and columns for Second matrix:\n";
cin >> p >> q;
cout << "Enter second matrix:\n";
for (int i = 0; i < p; i++)
{
    for (int j = 0; j < q; j++)
    {
        cin >> b[i][j];
    }
}
cout << "\nfirst matrix is:\n";
for (i = 0; i < m; i++)
{
    for (j = 0; j < n; j++)
    {
        cout << a[i][j] << " ";
    }
    cout << "\n";
}
cout << "\nsecond matrix is:\n";
for (i = 0; i < p; i++)
{
    for (int j = 0; j < q; j++)
    {
        cout << b[i][j] << " ";
    }
    cout << "\n";
}


if (n != p)
{
    cout << "can not multiply";
}
```

```cpp
        else
        {
            for (i = 0; i < m; i++)
            {
                for (j = 0; j < q; j++)
                {
                    sum = 0;
                    for (k = 0; k < n; k++)
                    {
                        sum = sum + (a[i][k] * b[k][j]);
                    }
                    c[i][j] = sum;
                }
            }
            cout << "multiplication is:\n";
            for (i = 0; i < m; i++)
            {
                for (j = 0; j < q; j++)
                {
                    cout << c[i][j] << " ";
                }
                cout << "\n";
            }
        }
}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ ProdMat.cpp -o ProdMat } ; if ($?) { .\ProdMat }
Enter rows and columns for first matrix:
2 3
Enter first matrix:
1 23 34 5 6 7
Enter rows and columns for Second matrix:
3 2
Enter second matrix:
2 4 68 2 13 4

first matrix is:
1 23 34
5 6 7

second matrix is:
2 4
68 2
13 4
multiplication is:
2008 186
509 60
```

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.

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

int main()
{
    int n, m, r, count = 0;
    double sum = 0;
    cout << "Enter the number: ";
    cin >> n;

    m = n; // Keep a copy of the original number

    // Step 1: Count the number of digits
    int temp = n;
    while (temp != 0)
    {
        count++;
        temp = temp / 10;
    }

    // Step 2: Calculate sum of digits raised to 'count'
```

```
    temp = n;
    while (temp != 0)
    {
        r = temp % 10;
        sum = sum + pow(r, count); // raise digit to 'count'
        temp = temp / 10;
    }


    // Step 3: Compare
    if (m == (int)sum) // typecast to int for safety
        cout << "This is an Armstrong number\n";

    else
        cout << "Not an Armstrong number\n";


    return 0;
}
```

Output:

```
PS C:\Users\mahir\OneDrive\Desktop\Sublime\Assignment 8> cd "c:\Users\mahir\OneDrive\Desktop\Su
blime\Ass1 C++\" ; if ($?) { g++ tempCodeRunnerFile.cpp -o tempCodeRunnerFile } ; if ($?) { .\t
empCodeRunnerFile }
Enter the number: 1634
This is an Armstrong number
```

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

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

int main() {
    int n;
    cout << "Enter the number of rows: ";
    cin >> n;

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

        for (int j = 0; j < n - i - 1; j++)
            cout << " ";

        int val = 1;
        for (int j = 0; j <= i; j++) {
            cout << val << " ";
            val = val * (i - j) / (j + 1);
        }
    }
```

```
        cout << endl;
    }


    return 0;
}
```

Output:

Enter the number of rows: 5
    1
   1 1
  1 2 1
 1 3 3 1
1 4 6 4 1