Assignment - 01(CPP)

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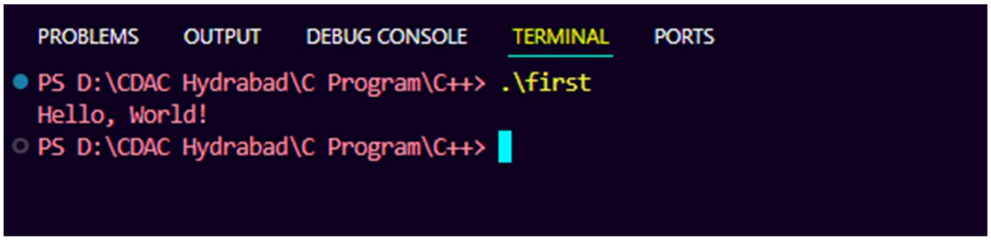
1. Write a C++ program that prints “Hello, World!” to the console**.**

first.cpp > ...

```cpp
#include <iostream>
using namespace std;
int main() {
    cout << "Hello, World!" << endl;
    return 0;
}

```



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

sec.cpp > ...

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

int main() {
    int num1, num2, sum;

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

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

    sum = num1 + num2;

    cout << "The sum is: " << sum << endl;

    return 0;
}

```

```
Enter first number: 34
Enter second number: 55
The sum is: 89
PS D:\CDAC Hydrabad\C Program\C++>
```

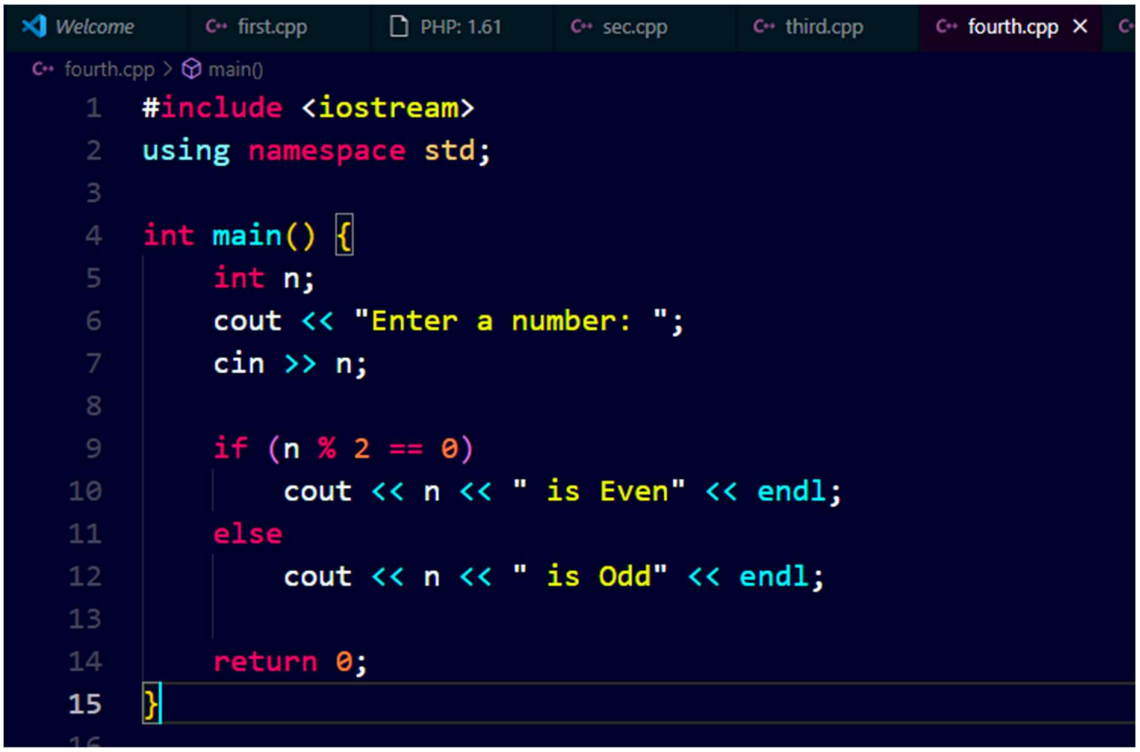
3. Write a C++ program to swap two numbers without using a third variable.

third.cpp > main()

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

int main() {
    int a, b;
    cout << "Enter two numbers: ";
    cin >> a >> b;

    a = a + b;
    b = a - b;
    a = a - b;

    cout << "After swapping: a = " << a << ", b = " << b << endl;
    return 0;
}
```

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

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




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

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

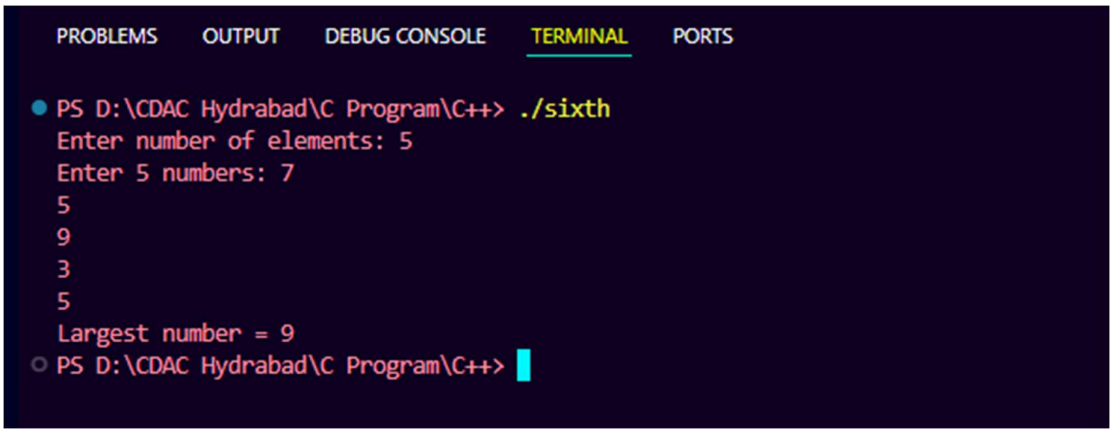
```cpp
#include <iostream>
using namespace std;

int main() {
    double a, b;
    char op;
    cout << "Enter two numbers: ";
    cin >> a >> b;
    cout << "Enter operator (+, -, *, /): ";
    cin >> op;

    switch (op) {
        case '+': cout << "Result = " << a + b << endl; break;
        case '-': cout << "Result = " << a - b << endl; break;
        case '*': cout << "Result = " << a * b << endl; break;
        case '/':
            if (b != 0) cout << "Result = " << a / b << endl;
            else cout << "Error! Division by zero." << endl;
            break;
        default: cout << "Invalid operator!" << endl;
    }
    return 0;
}
```

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

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

sixth.cpp > main()

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

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

    int arr[n];
    cout << "Enter " << n << " numbers: ";
    for (int i = 0; i < n; i++) cin >> arr[i];

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

    cout << "Largest number = " << largest << endl;
    return 0;
}
```



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

sebenth.cpp > main()

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

int main() {
    int n, sum = 0;
    cout << "Enter an integer: ";
    cin >> n;

    while (n > 0) {
        sum += n % 10;
        n /= 10;
    }

    cout << "Sum of digits = " << sum << endl;
    return 0;
}
```

```
Enter an integer: 456
Sum of digits = 15
PS D:\CDAC Hydrabad\C Program\C++>
```

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

eight.cpp > main()

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

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

    int arr[n];
    cout << "Enter " << n << " numbers: ";
    for (int i = 0; i < n; i++) cin >> arr[i];

    cout << "Array in reverse: ";
    for (int i = n - 1; i >= 0; i--) cout << arr[i] << " ";
    cout << endl;

    return 0;
}

```

```
PS D:\CDAC Hydrabad\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 Hydrabad\C Program\C++>
```

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, rev = 0, temp;
    cout << "Enter a number: ";
    cin >> n;
    temp = n;

    while (temp > 0) {
        rev = rev * 10 + temp % 10;
        temp /= 10;
    }

    if (n == rev) cout << n << " is Palindrome" << endl;
    else cout << n << " is Not Palindrome" << endl;

    return 0;
}
```

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

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

tenth.cpp > ...

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

int main() {
    int n, a = 0, b = 1, c;
    cout << "Enter number of terms: ";
    cin >> n;

    cout << "Fibonacci Series: ";
    for (int i = 1; i <= n; i++) {
        cout << a << " ";
        c = a + b;
        a = b;
        b = c;
    }
    cout << endl;
    return 0;
}
```

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

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>
#include <string>
using namespace std;

int main() {
    string str;
    cout << "Enter a string: ";
    getline(cin, str);

    int count = 0;
    for (char ch : str) {
        ch = tolower(ch);
        if (ch=='a'||ch=='e'||ch=='i'||ch=='o'||ch=='u')
            count++;
    }

    cout << "Number of vowels = " << count << endl;
    return 0;
}
```

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

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

tweth.cpp > ...

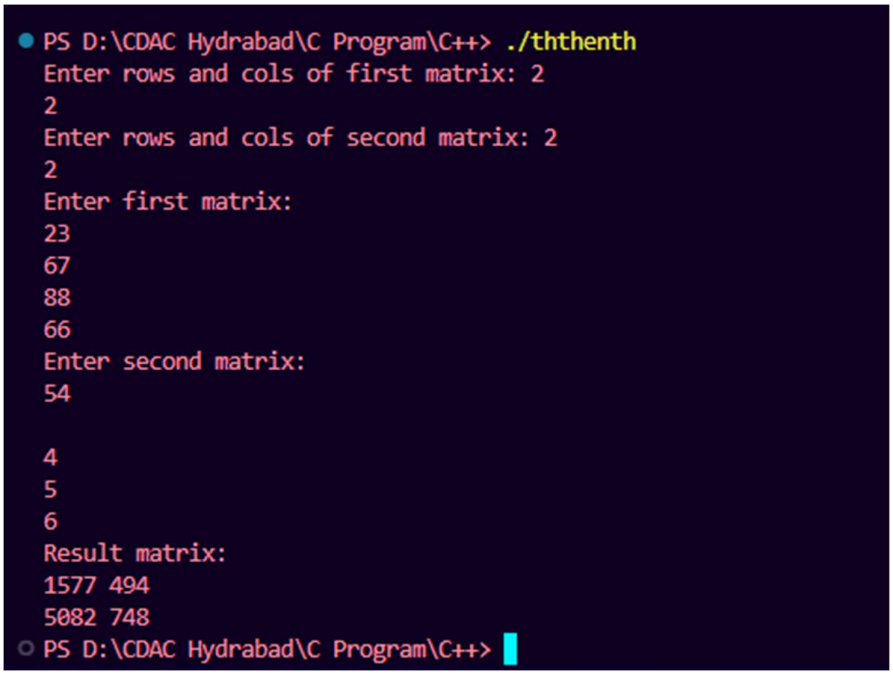
```cpp
#include <iostream>
using namespace std;

int gcd(int a, int b) {
    while (b != 0) {
        int temp = b;
        b = a % b;
        a = temp;
    }
    return a;
}

int main() {
    int x, y;
    cout << "Enter two numbers: ";
    cin >> x >> y;
    cout << "GCD = " << gcd(x, y) << endl;
    return 0;
}
```

```
PS D:\CDAC Hydrabad\C Program\C++> ./tweth
Enter two numbers:
55
44
GCD = 11
PS D:\CDAC Hydrabad\C Program\C++>
```

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

ththenth.cpp > ...

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

int main() {
    int r1, c1, r2, c2;
    cout << "Enter rows and cols of first matrix: ";
    cin >> r1 >> c1;
    cout << "Enter rows and cols of second matrix: ";
    cin >> r2 >> c2;

    if (c1 != r2) {
        cout << "Matrix multiplication not possible!" << endl;
        return 0;
    }

    int A[r1][c1], B[r2][c2], C[r1][c2];

    cout << "Enter first matrix:\n";
    for (int i=0;i<r1;i++)
        for (int j=0;j<c1;j++)
            cin >> A[i][j];

    cout << "Enter second matrix:\n";
    for (int i=0;i<r2;i++)
        for (int j=0;j<c2;j++)
            cin >> B[i][j];

    for (int i=0;i<r1;i++)
        for (int j=0;j<c2;j++) {
            C[i][j] = 0;
            for (int k=0;k<c1;k++)
                C[i][j] += A[i][k]*B[k][j];
        }

    cout << "Result matrix:\n";
    for (int i=0;i<r1;i++) {
        for (int j=0;j<c2;j++)
            cout << C[i][j] << " ";
        cout << endl;
    }

    return 0;
}
```


PS D:\CDAC Hydrabad\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 Hydrabad\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.

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

int main() {
    int n, temp, digits = 0, sum = 0;
    cout << "Enter a number: ";
    cin >> n;
    temp = n;

    while (temp > 0) {
        digits++;
        temp /= 10;
    }

    temp = n;
    while (temp > 0) {
        int d = temp % 10;
        sum += pow(d, digits);
        temp /= 10;
    }

    if (sum == n) cout << n << " is an Armstrong number" << endl;
    else cout << n << " is not an Armstrong number" << endl;

    return 0;
}
```

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

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 number of rows: ";
    cin >> n;

    for (int i=0;i<n;i++) {
        int num = 1;
        for (int j=0;j<=i;j++) {
            cout << num << " ";
            num = num * (i - j) / (j + 1);
        }
        cout << endl;
    }

    return 0;
}
```

```
PS D:\CDAC Hydrabad\C Program\C++> ./fifthrnth
Enter number of rows: 3
1
1 1
1 2 1
PS D:\CDAC Hydrabad\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 Hydrabad\C Program\C++>
```