# Lab Manual #01&02


Course: **Fundamentals of Programming (CS 114)**

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# Home Tasks (Lab Manual #01)

## Task 1

```cpp
int main() {
    double x1, y1, x2, y2;

    cout << "Enter the x-coordinate of the first point: ";
    cin >> x1;
    cout << "Enter the y-coordinate of the first point: ";
    cin >> y1;

    cout << "Enter the x-coordinate of the second point: ";
    cin >> x2;
    cout << "Enter the y-coordinate of the second point: ";
    cin >> y2;

    double distance = sqrt(pow(x2 - x1, 2) + pow(y2 - y1, 2));

    cout << "Distance between the two points: " << distance << endl;

    return 0;
}
```

## Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask1 hometask1.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask1
Enter the x-coordinate of the first point: 3
Enter the y-coordinate of the first point: 5
Enter the x-coordinate of the second point: 1
Enter the y-coordinate of the second point: 6
Distance between the two points: 2.23607
```

## Task 2

```cpp
#include <iostream>

using namespace std;

int main() {
    double centimeters, meters, kilometers;

    cout << "Enter length in centimeters: ";
    cin >> centimeters;

    meters = centimeters / 100.0;
    kilometers = centimeters / 100000.0;

    cout << "Length in meters: " << meters << " m" << endl;
    cout << "Length in kilometers: " << kilometers << " km" << endl;

    return 0;
}
```

## Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask2 hometask2.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask2
Enter length in centimeters: 200
Length in meters: 2 m
Length in kilometers: 0.002 km
```

# Task 3

```cpp
#include <iostream>

using namespace std;

int main() {
    double a, b;

    cout << "Enter the value of a: ";
    cin >> a;

    cout << "Enter the value of b: ";
    cin >> b;

    double result = a * a + 2 * a * b + b * b;

    cout << "Result of the polynomial a^2 + 2ab + b^2: " << result << endl;

    return 0;
}
```

# Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask3 hometask3.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask3
Enter the value of a: 5
Enter the value of b: 6
Result of the polynomial a^2 + 2ab + b^2: 121
```

# Task 4

```cpp
#include <iostream>

using namespace std;

int main() {
    double fahrenheit, celsius;

    cout << "Enter temperature in Fahrenheit: ";
    cin >> fahrenheit;

    celsius = (fahrenheit - 32.0) * 5.0 / 9.0;

    cout << "Temperature in Celsius: " << celsius << endl;

    return 0;
}
```

# Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask4 hometask4.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask4
Enter temperature in Fahrenheit: 98.6
Temperature in Celsius: 37
```

# Home Tasks (Lab Manual #02)

## Task 1

```cpp
#include <iostream>

using namespace std;

int main() {
    int score;
    char grade;

    cout << "Enter the student's score: ";
    cin >> score;

    if (score >= 90 && score <= 100)
        grade = 'A';
    else if (score >= 75 && score < 90)
        grade = 'B';
    else if (score >= 60 && score < 75)
        grade = 'C';
    else if (score >= 45 && score < 60)
        grade = 'D';
    else if (score >= 0 && score < 45)
        grade = 'F';
    else
        grade = 'I';

    cout << "Grade: " << grade << endl;

    return 0;
}
```

## Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask5 hometask5.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask5
Enter the student's score: 79
Grade: B
```

## Task 2

```cpp
#include <iostream>

using namespace std;

int main() {
    int num;

    cout << "Enter an integer: ";
    cin >> num;

    if (num % 2 == 0 && num % 5 == 0)
        cout << "The number is both even and divisible by 5." << endl;
    else
        cout << "The number is not both even and divisible by 5." << endl;

    return 0;
}
```

## Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask6 hometask6.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask6
Enter an integer: 20
The number is both even and divisible by 5.
```

## Task 3

hometask7.cpp > ...

```cpp
#include <iostream>

using namespace std;

int main() {
    int year;

    cout << "Enter a year: ";
    cin >> year;

    if ((year % 4 == 0 && year % 100 != 0) || (year % 400 == 0))
        cout << year << " is a leap year." << endl;
    else
        cout << year << " is not a leap year." << endl;

    return 0;
}
```

## Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask7 hometask7.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask7
Enter a year: 2025
2025 is not a leap year.
```

# Task 4

hometask8.cpp > ...

```cpp
#include <iostream>

using namespace std;

int main() {
    double gpa;
    double attendance_percentage;

    cout << "Enter GPA: ";
    cin >> gpa;

    cout << "Enter attendance percentage: ";
    cin >> attendance_percentage;

    if (gpa >= 3.5 && attendance_percentage >= 80.0)
        cout << "The student is eligible for a scholarship." << endl;
    else
        cout << "The student is not eligible for a scholarship." << endl;

    return 0;
}
```

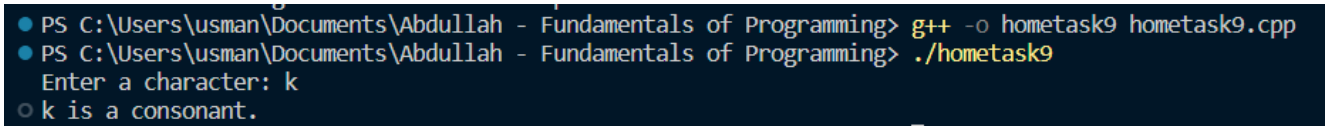
# Output

```
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask8 hometask8.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask8
Enter GPA: 3.6
Enter attendance percentage: 86
The student is eligible for a scholarship.
```

# Task 5

```cpp
#include <iostream>

using namespace std;

int main() {
    char ch;

    cout << "Enter a character: ";
    cin >> ch;

    if ((ch >= 'a' && ch <= 'z') || (ch >= 'A' && ch <= 'Z')) {
        if (ch == 'a' || ch == 'e' || ch == 'i' || ch == 'o' || ch == 'u' ||
            ch == 'A' || ch == 'E' || ch == 'I' || ch == 'O' || ch == 'U') {
            cout << ch << " is a vowel." << endl;
        } else {
            cout << ch << " is a consonant." << endl;
        }
    } else {
        cout << ch << " is not a valid alphabet character." << endl;
    }

    return 0;
}
```

## Output


PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> g++ -o hometask9 hometask9.cpp
PS C:\Users\usman\Documents\Abdullah - Fundamentals of Programming> ./hometask9
Enter a character: k
k is a consonant.