Lab Manuals 1 & 2

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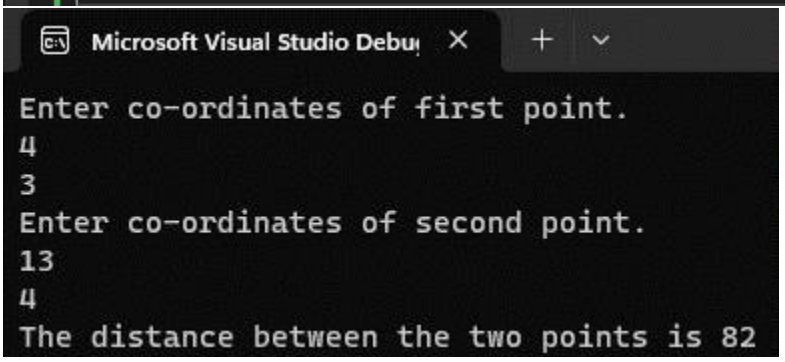
Manual 1:

Home Tasks:

Task 1:

Write a C++ program to calculate distance between two points. The values of coordinates should be input by user.

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout << "Enter co-ordinates of first point.\n";
    float ax;
    float ay;
    cin >> ax;
    cin >> ay;
    cout << "Enter co-ordinates of second point.\n";
    float bx;
    float by;
    cin >> bx;
    cin >> by;
    float d;
    d = bx - ax;
    float e = by - ay;
    float distance;
    distance = (d * d) + (e * e);
    cout << "The distance between the two points is " << distance;
    return 0;
}
```



Task 2:

Write a code in C++ to take length from user in centimeter and convert it into meter and kilometers.

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout << "Enter length in centimeters\n";
    float length;
    cin >> length;
    float meters;
    meters = length / 100;
    float kilometers;
    kilometers = length / 100000;
    cout << "The length in meters is " << meters<<endl;
    cout << "The length in kilometers is " << kilometers<<endl;
    return 0;
}
```

```
Enter length in centimeters
48
The length in meters is 0.48
The length in kilometers is 0.00048
```

Task 3:

Write a code in C++ that takes values of a and b from the user and displays result of polynomial a 2 + 2ab + b 2.

```cpp
#include <iostream>
using namespace std;
int main()
{
    int a=0;
    int b=0;
    cin >> a;
    cin >> b;
    int result;
    result = (a * a) + 2 * (a * b) + (b * b);
    cout << "The result is " << result;
    return 0;
}
```

```
Microsoft Visual Studio Debu

5
4
The result is 81
```

Task 4:

4. Write a program in C++ to convert temperature in Fahrenheit to Celsius.

```cpp
#include <iostream>
using namespace std;
int main()
{
    cout << "Enter temprature in farhenheit\n";
    float far = 0;
    cin >> far;
    float cel = 0;
    cel = ((far - 32) * 5) / 9;
    cout << "The temprature in celcius is " << cel;
    return 0;
}
```

```
Enter temprature in farhenheit
78
The temprature in celcius is 25.5556
```

Manual 2:

Home Tasks:

Task 1:

Create a program that inputs a student's score and assigns a grade based on predefined criteria using logical operators (e.g., A, B, C, D, F).

A-Grade: 90-100

Marks B-Grade: 75-90 Marks

C-Grade: 60-75 Marks

D-Grade: 45-60 Marks

F-Grade: 0-45 Marks

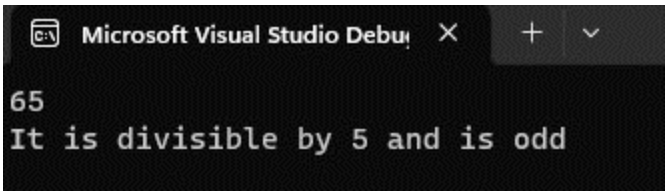
```cpp
#include <iostream>
using namespace std;
int main()
{
    int marks = 0;
    cout << "Enter Marks\n";
    cin >> marks;
    if (marks >= 90 && marks <= 100) {
        cout << "A Grade\n";
    }
    else if(marks>=75 && marks <=90)
    {
        cout << "B Grade\n";
    }
    else if (marks >= 60 && marks <= 75) {
        cout << "C Grade\n";
    }
    else if (marks >= 45 && marks <= 60) {
        cout << "D Grade\n";
    }
    else if (marks >= 0 && marks <= 45) {
        cout << "F Grade\n";
    }
    return 0;
}
```

```
Enter Marks
65
C Grade
```

Task 2:

Write a program that takes an integer as input and determines if it is both even and divisible by 5.

```cpp
#include <iostream>
using namespace std;
int main()
{
    int num = 0;
    cin >> num;
    if (num % 5==0)
    {
        if (num % 2 == 0)
        {
            cout << "It is divisible by 5 and is even\n";
        }
        else {
            cout << "It is divisible by 5 and is odd\n";
        }
    }
    else {
        if (num % 2 == 0)
        {
            cout << "It is not divisible by 5 and is even\n";
        }
        else {
            cout << "It is not divisible by 5 and is odd\n";
        }
    }
    return 0;
}
```



Task 3:

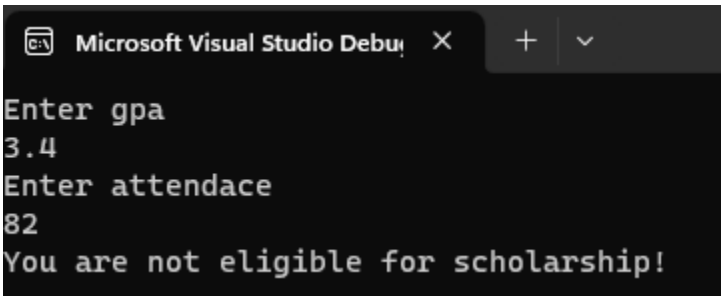
Create a C++ program that checks if a user-provided year is a leap year.

```cpp
#include <iostream>
using namespace std;
int main()
{
    int days = 0;
    cin >> days;
    if (days == 366) //checks if leap year
    {
        cout << "This is a leap year\n";
    }
    else {
        cout << "This is not a leap year\n";
    }
    return 0;
}
```

Task 4:

Create a C++ program that determines if a student is eligible for a scholarship based on their GPA (must have GPA >= 3.5) and attendance (must have attended at least 80% of classes).

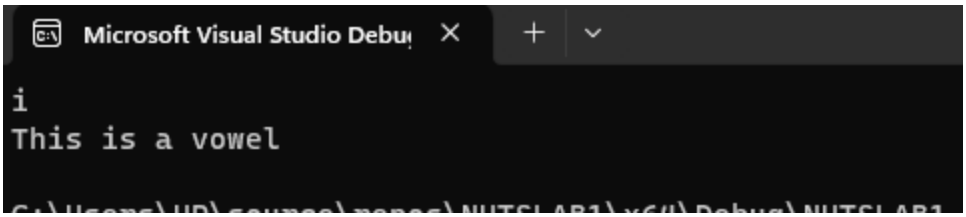
```cpp
#include <iostream>
using namespace std;
int main()
{
    float gpa=0;
    float attendance = 0;
    cout << "Enter gpa\n";
    cin >> gpa;
    cout << "Enter attendace\n";
    cin >> attendance;
    if (gpa >= 3.5 && attendance >= 80)
        cout << "You are eligible for scholarship!" << endl;
    else cout << "You are not eligible for scholarship!" << endl;
    return 0;
}
```



Task 5:

Using logical operators, write a program that checks if a given character is a vowel (a, e, i, o, u) or a consonant.

```cpp
#include <iostream>
using namespace std;
int main()
{
    float gpa=0;
    float attendance = 0;
    cout << "Enter gpa\n";
    cin >> gpa;
    cout << "Enter attendace\n";
    cin >> attendance;
    if (gpa >= 3.5 && attendance >= 80)
        cout << "You are eligible for scholarship!" << endl;
    else cout << "You are not eligible for scholarship!" << endl;
    return 0;
}
```



Lab Task:

Task 1:

Write a program that determines if a person is eligible to vote based on their age (e.g., 18 years or older) using logical operators.

```cpp
#include <iostream>
using namespace std;
int main()
{
    int age;
    cout << "Enter your age\n";
    cin >> age;
    if (age < 18) {
        cout << "You are under age";
    }
    else cout << "You are eligible to vote";
    return 0;
}
```

Task 2:

Write a program that takes an integer as input and checks if it falls within the range [10, 50] using logical operators.

```cpp
#include <iostream>
using namespace std;
int main()
{
    int num;
    cout << "Enter number\n";
    cin >> num;
    if (num >=10 && num <=50) {
        cout << "Number is in the given range";
    }
    else cout << "Number is not in the given range";
    return 0;
}
```

```
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Enter number
51
Number is not in the given range
```

Task 3:

Write a C++ program to compare two integers and find the maximum value.

```cpp
#include <iostream>
using namespace std;
int main()
{
    int num1 = 0;
    int num2 = 0;
    cin >> num1;
    cin >> num2;
    cout << "The bigger number is ";
    if (num1 < num2) {
        cout << num2;
    }
    else cout << num1;
    return 0;
}
```

```
Microsoft Visual Studio Debu
45
47
The bigger number is 47
```

Task 4:

Write a C++ program to calculate the average of three exam scores and determine if it's above a passing grade.

```cpp
// NUTSLAB1.cpp : This file contains the 'main' fun
//

#include <iostream>
using namespace std;
int main()
{
    int marks1 = 0;
    int marks2 = 0;
    int marks3 = 0;
    cin >> marks1;
    cin >> marks2;
    cin >> marks3;
    int avg = 0;
    avg = (marks1 + marks2 + marks3)/3;
    if (avg>=60) {
        cout << "You passed!";
    }
    else cout << "You failed!";
    return 0;
}
```