Lab Manual # 1 & 2

Home Task/Lab Task

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Course: CS-114

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Home Task 1

1. Write a C++ code to calculate the distance between two points. The value of the coordinates should be put in by users.

D = (X2-X1) ^2 + (Y2-Y1) ^2

```
#include <iostream>
using namespace std;
int main()
{
    int age;
    cout << " Please enter your age: ";
    cin >> age;
    if(age < 18 )
    {
        cout <<"User ineligible to vote";
    }
    else
    {
        cout <<"User is eligible to vote";
    }
    return 0;
}
```

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

```cpp
#include <iostream>
using namespace std;
int main()
{
    float lenCM, lenM, lenKM;
    cout << "Enter length in cm:" <<endl;
    cin>>lenCM;
    lenM = lenCM/100;
    lenKM = lenCM/100000;
    cout<<"Length in meters: "<<lenM<<endl;
    cout<<"Length in kilometers: "<<lenKM<<endl;
    return 0;

}
```

3 Write a Code in C++ that take value of a and b from users and displays result of polynomial a^2 + b^2 + 2ab

```cpp
#include <iostream>
using namespace std;
int main()
{
    float a,b,poly;
    cout << "Enter values:"<<endl;
    cout<<"a: ";
    cin>>a;
    cout<<"b: ";
    cin>>b;
    poly = a*a + 2*a*b + b*b;
    cout<<"Polynomial = "<<poly;
    return 0;
}
```

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

```cpp
#include <iostream>
using namespace std;
int main()
{
    float far,cel;
    cout<<"Enter Temperature in Fahrenheit: "<<endl;
    cin>>far;
    cel = ((far-32)*5)/9;
    cout<<"Temperature in Celsius: "<<cel;
    return 0;
}
```

Lab Task 2

1 Write a program that determines if a person is eligible to vote based on their age using logical operators

```
#include <iostream>
using namespace std;
int main()
{
    int age;
    cout << " Please enter your age: ";
    cin >> age;
    if(age < 18 )
    {
        cout <<"User ineligible to vote";
    }
    else
    {
        cout <<"User is eligible to vote";
    }
    return 0;
}
```

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

```
#include <iostream>
using namespace std;
int main()
{
    int num;
    cout << "Enter a number:";
    cin >> num;
    if(num >= 10 && num <= 50)
    {
        cout<<"The number falls between the given range";
    }
    else
    {
        cout<<"The number does not fall between the given range";
    }
    return 0;
}
```

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

```cpp
#include <iostream>
using namespace std;
int main() {
    int i, j;
    cout << "Enter the first integer:"<<endl;
    cin>>i;
    cout << "Enter the second integer:"<<endl;
    cin>>j;
    if (i>j)
    {
        cout<<i<<" is the larger value";
    }
    else
    {
        cout<<j<<" is the larger value";
    }

    return 0;
}
```

4 Write a C++ program to calculate the average of three exam scores and determine if it's above a passing grade (e.g., average >= 60).

```cpp
#include <iostream>
using namespace std;
int main() {
    int i,j,k;
    float avg;
    cout << "Enter the exam scores:"<<endl;
    cin>>i>>j>>k;
    avg = (i+j+k)/3;
    if (avg >= 60)
    {
        cout<<"PASS";
    }
    else
    {
        cout<<"FAIL";
    }
    return 0;
}
```

Lab Task 2

1 Create a program that takes a student's score as input 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

```
#include <iostream>
using namespace std;
int main() {
    int score;
    cout << "Enter your score:"<<endl;
    cin >> score;
    if(score >= 90 && score <= 100)
    {
        cout<<"A";
    }
    else if(score >= 75 && score < 90)
    {
        cout<<"B";
    }
    else if(score >= 60 && score < 75)
    {
        cout<<"C";
    }
    else if(score >= 45 && score < 60)
    {
        cout<<"D";
    }
    else if(score >= 0 && score < 45)
    {
        cout<<"F";
    }
    else
    {
        cout<<"invalid input";
    }
    return 0;
}
```

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;
    cout << "Integer:" <<endl;
    cin>>num;
    if (num%2==0 && num%5==0)
    {
        cout<<"It is both even and divisible by 5; all conditions are satisfied";
    }
    else if (num%2==0 && num%5!=0)
    {
        cout<<"It is even but not divisible by 5";
    }
    else if (num%2!=0 && num%5==0)
    {
        cout<<"It is odd and divisible by 5";
    }
    else
    {
        cout<<"None of the conditions are satisfied";
    }
    return 0;
}
```

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 year;
    cout << "Enter a year: "<<endl;
    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;
}
```

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).

```
#include <iostream>
using namespace std;
int main()
{
    float gpa,att;
    cout << "Enter student info:" <<endl;
    cout << "GPA: ";
    cin>>gpa;
    cout << "Attendance: ";
    cin>>att;
    if (gpa>=3.5 and att>=80)
    {
        cout<<"Candidate is eligible for scholarship";
    }
    else
    {
        cout<<"Candidate is NOT eligible for scholarship";
    }

    return 0;
}
```

5 Write a program that checks if a given character is a vowel (A, E, I, O, U) or a consonant using logical operators.

```
#include <iostream>
using namespace std;
int main() {
    char input, ch;
    cout << "Enter the character:" <<endl;
    cin >> input;
    ch = (char)tolower(input);
    if (ch =='a' || ch =='e' || ch =='i' || ch =='o' || ch =='u')
    {
        cout<<"It is a vowel";
    }
    else
    {
        cout<<"It is not a vowel";
    }
    return 0;
}
```