School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

CS-114 - Fundamental of Programing

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LAB REPORT

LAB TASKS

1. Write a C++ code that displays your name, department and degree on the console. Make sure the three things are in three different lines.
2. Write a C++ code that takes two numbers and displays the addition, subtraction, division, multiplication and square of given numbers, on the console window. Make sure to comment your code.
3. Write a code in C++ that takes radius of a circle as input from user and outputs the circumference and area. The output should be clear and readable. Add proper comments to the code. You can set the value of π up to 3 decimal places.
4. Write a C++ code that prints out the following sequence: 0, 1, 1, 2, 3, 5, 8, 13 using three variables.

SUMMARY

Through these lab tasks I learnt different data types, and how to use them. I learnt how to assign values to variables and how to give number/s as input and receive and output from them in the form of an arithmetic operation

TASK 1

1. Write a C++ code that displays your name, department and degree on the console. Make sure the three things are in three different lines.

CODE:

```cpp
#include<iostream>
using namespace std;
int main()
{
    cout<<"Name:Juveriah Waqqas"<< endl;
    cout<<"Department:School of Mechanical and Manufacturing Engineering"<< endl;
    cout<<"Degree:Bachelor of Mechanical Engineering";
    return 0;
}
```

EXECUTION:

```
Name:Juveriah Waqqas
Department:School of Mechanical and Manufacturing Engineering
Degree:Bachelor of Mechanical Engineering
--------------------------------
Process exited after 0.08247 seconds with return value 0
Press any key to continue . . .
```

TASK 2

2. Write a C++ code that takes two numbers and displays the addition, subtraction, division, multiplication and square of given numbers, on the console window. Make sure to comment your code.

CODE :

```cpp
#include<iostream>
using namespace std;
int main()
{
    int alpha = 0; int beta = 0; float res = 0;

    cout<<"enter the first value"<< endl;
    cin>>alpha;
    cout<<"enter the second value"<< endl;
    cin>>beta;

    cout<<"Addition"<< endl;
    res = alpha + beta;
    cout<<res<< endl;

    cout<<"Subtraction"<< endl;
    res = alpha - beta;
    cout<<res<< endl;

    cout<<"Multiplication"<< endl;
    res = alpha * beta;
    cout<<res<< endl;

    cout<<"Division"<< endl;
    res = alpha / beta;
    cout<<res<< endl;

    cout<<"Square of 1st number"<< endl;
    res = alpha * alpha;
    cout<<res<< endl;

    cout<<"Square of 2nd number"<< endl;
    res = beta * beta;
    cout<<res<< endl;

    return 0;
}
```

EXAMPLE EXECUTION:

```
enter the first value
20
enter the second value
5
```

```
enter the first value
20
enter the second value
5
Addition
25
Subtraction
15
Multiplication
100
Division
4
Square of 1st number
400
Square of 2nd number
25
```

TASK 3

3. Write a code in C++ that takes radius of a circle as input from user and outputs the circumference and area. The output should be clear and readable. Add proper comments to the code. You can set the value of π up to 3 decimal places.

CODE:

[*] Lab Task 3.cpp

```
#include<iostream>
using namespace std;
int main()
{
    float pi = 3.1415f;
    int radius = 0;
    float area = 0;
    cout<<"Enter the radius of the circle ";
    cin>>radius;
    cout<<"The area of the circle is ";
    area = pi * radius * radius;
    cout<<area;
    return 0;
}

```

EXAMPLE EXECUTION:

```
Enter the radius of the circle
```

```
Enter the radius of the circle 23
```

```
Enter the radius of the circle 23
The area of the circle is 1661.85
--------------------------------
Process exited after 39.18 seconds with return value 0
Press any key to continue . . .
```

TASK 4

4. Write a C++ code that prints out the following sequence: 0, 1, 1, 2, 3, 5, 8, 13 using three variables.

CODE:

```cpp
#include<iostream>
using namespace std;
    int a = 0;
    int b = 1;
    int c = 0;
int main()
{
    cout<<a<<","; cout<<b<<",";
    c = a + b;
    cout<<c<<",";

    a = b; c = a + b;
    cout<<c<<",";

    a = c; c = a + b;
    cout<<c<<",";

    b = c; c = a + b;
    cout<<c<<",";

    a = c; c = a + b;
    cout<<c<<",";

    b = c; c = a + b;
    cout<<c;
    return 0;
}
```

EXECUTION:

```
0,1,1,2,3,5,8,13
--------------------------------
Process exited after 0.07934 seconds with return value 0
Press any key to continue . . .
```

HOME TASKS

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

$$d = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

2. Write a code in C++ to take length from user in centimeter and convert it into meter and kilometer.
3. Write a code in C++ that takes values of a and b from the user and displays result of polynomial $a^2 + 2ab + b^2$.
4. Write a program in C++ to convert temperature in Fahrenheit to Celsius.

SUMMARY

Through the home tasks I was further able to practice the concepts of input output and arithmetic operations on C++ and I was able to execute these formulas and questions successfully

TASK 1

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

$$d = (x_2 - x_1)^2 + (y_2 - y_1)^2$$

CODE:

```
#include<iostream>
using namespace std;
int main()
{
    float d = 0;
    int x1, x2, y1, y2, x, y;

//Defining variables
    cout<<"enter value of x1 ";
    cin>>x1;
    cout<<"enter value of x2 ";
    cin>>x2;
    x = x2 - x1;
    cout<<"x2 - x1 = "<<x<< endl;
//Using 'cin' so we can input any vallue of our variables x1 and x2 , which are then subtracted to give x
//Then using cout and x to output x
    cout<<"enter value of y1 ";
    cin>>y1;
    cout<<"enter value of y2 ";
    cin>>y2;
    y = y2 - y1;
    cout<<"y2 - y1 = "<<y<< endl;
//Using 'cin' so we can input any vallue of our variables y1 and y2 , which are then subtracted to give y
//Then using cout and y to output y
    d = (x*x)+ (y*y);
//D represents the distance formula, writing the code for the distance formula
    cout<<"So the distance between the points is ";
    cout<<d;
//Using cout and d to output the result of our formula
    return 0;
}
```

EXAMPLE EXECUTION:

```
enter value of x1 25
```

```
enter value of x1 25
enter value of x2 2
x2 - x1 = -23
enter value of y1
```

```
enter value of x1 25
enter value of x2 2
x2 - x1 = -23
enter value of y1 3
enter value of y2 17
```

```
enter value of x1 25
enter value of x2 2
x2 - x1 = -23
enter value of y1 3
enter value of y2 17
y2 - y1 = 14
So the distance between the points is 725
--------------------------------
Process exited after 58.34 seconds with return value 0
Press any key to continue . . .
```

TASK 2

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

CODE:

```
#include<iostream>
using namespace std;
int main()
{
//Defining variables, which are length in cm , meters and km
    float length_cm_ = 0;
    float length_m_ = 0;
    float length_km_ = 0;
//Inputting the length in cm
    cout<<"Input the length in centimeter ";
    cin>>length_cm_;
//Calculating length in meters and kilometers
    length_m_ = length_cm_ * 0.01;
    length_km_ = length_cm_ * 0.00001;
//Outputting those lengths
    cout<<"Length in meters is = ";
    cout<<length_m_<< endl;
    cout<<"Length in kilometers is = ";
    cout<<length_km_<< endl;
    return 0;
}
```

EXAMPLE EXECUTION:

```
Input the length in centimeter 2400
```

```
Input the length in centimeter 2400
Length in meters is = 24
Length in kilometers is = 0.024

--------------------------------
Process exited after 19.79 seconds with return value 0
Press any key to continue . . .
```

TASK 3

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

CODE:

```
#include<iostream>
using namespace std;
int main()
{
    cout<<"SUM-SQUARE FORMULA"<< endl;
//defining variables a and b and the result variable 'polyn'
    int a = 0; int b = 0; int polyn = 0;
//using cout to input any values of a and b
    cout<<"input value of a = ";
    cin>>a;
    cout<<"input value of b = ";
    cin>>b;
//calculating the polynomial
    polyn = a*a + 2*a*b +b*b;
//displaying the result
    cout<<"Result of sum and square formula = ";
    cout<<polyn;
    return 0;
}
```

EXAMPLE EXECUTION:

```
SUM-SQUARE FORMULA
input value of a = 5
input value of b = 9
```

```
SUM-SQUARE FORMULA
input value of a = 5
input value of b = 9
Result of sum and square formula = 196
--------------------------------
Process exited after 26.6 seconds with return value 0
Press any key to continue . . .
```

TASK 4

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

CODE:

```cpp
#include<iostream>
using namespace std;
int main()
{
    cout<<"Temprature from Fahrenheit to Celsius"<< endl;
    float temp_f_ = 0; float temp_c_ = 0; float in = 0;
//defining the variables for tempratures in Fahrenheit and Celsius and using in to define the ( F - 32 ) part
    cout<<"The temprature in Farenheiht is = ";
    cin>>temp_f_;
//Writing function to convert temprature from Fahrenheit to Celsius
    in = temp_f_ - 32;
    temp_c_ = in * 5.0 / 9.0;
//Displaying the resultant temprature in celsius
    cout<<"The corresponding temprature in Celsius is = ";
    cout<<temp_c_;
    return 0;
}
```

EXAMPLE EXECUTION:

```
Temprature from Fahrenheit to Celsius
The temprature in Farenheiht is = 350
The corresponding temprature in Celsius is = 176.667
--------------------------------
Process exited after 5.42 seconds with return value 0
Press any key to continue . . .
```

```
Temprature from Fahrenheit to Celsius
The temprature in Farenheiht is = 200
The corresponding temprature in Celsius is = 93.3333
--------------------------------
Process exited after 2.878 seconds with return value 0
Press any key to continue . . .
```