NUST-SMME-

CS-114 Fundamentals of Programming Lab Report #04

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Name: - Mohammad Abdullah Tahseen

Qalam ID: - 462573

BE-ME15 Section: - A

Course Instructor: Dr. Jawad Khan

Lab Instructor: Muhammad Affan

Lab Manual #05 Hometasks - While, do-while loops and nested for loops -

(Note that all my tasks have been performed in one source file, under one function, the outputs too have been displayed all at once)

Task 1: -

Q. Create a C++ program to find the LCM of 2 numbers using their HCF

[*] LAB MANUAL HOMETASK 5.cpp

```cpp
/*
Mohammad Abdullah Tahseen 462573
ME-15 Sec-A
Lab Manual 5 hometasks
*/
#include<iostream>
using namespace std;
int main(){

    cout<<"TASK 1:- Finding LCM using HCF of two numbers"<<endl;
    //Write a C++ program to find LCM of a number using the hcf
    int num1, num2, i, HCF, LCM;
    cout<<"Please enter the numbers\n"; //Enter the numbers whose hcf and lcm is to be found
    cin>>num1;
    cin>>num2;
    i=num1;
    //first finding HCF using while loop
    while(i>0)
    {
    /*number moves from greatest possible factor down to lowest possible common factor (2), the first factor within
    this range which is common fullfills the following if condition and gets displayed and stored as variable "HCF"
    */
        if(num1%i==0 && num2%i==0)
        {HCF = i;
        cout<<"The HCF  of the two numbers is: "<<HCF<<endl;
        break;}

        i--;
    }
    //Using fomrula that relates HCF and LCM of a number; num1*num2 = HCF*LCM
    LCM  = (num1*num2)/HCF;
    cout<<"The LCM of the numbers is: "<<LCM<<endl;
//END OF TASK1

```

Output examples: -

```
TASK 1:- Finding LCM using HCF of two numbers
Please enter the numbers
36
24
The HCF  of the two numbers is: 12
The LCM of the numbers is: 72
```

```
TASK 1:- Finding LCM using HCF of two numbers
Please enter the numbers
933
1236
The HCF  of the two numbers is: 3
The LCM of the numbers is: 384396
```

Task 2: -

Q. Create a C++ program to find the sum of the arithmetic progression series.

```
    cout<<"TASK 2:- Finding sum of arithematic progression"<<endl;
//Write a C++ program to find the sum of the arithematic progression series
    int a1, d, n1=1, n, sum=0;
/*Requesting user to enter the first term, the constant difference and
number of terms in the arithematic progression*/
    cout<<"Please enter the first term of your arithematic progression\n";
    cin>>a1;
    cout<<"Please enter the constant difference d of your arithematic progression\n";
    cin>>d;
    cout<<"How many terms do you want the arithematic progression to go upto?\n";
    cin>>n;
/*using a while loop to prgressively add the difference d into the first term and
at the same time progressively add these terms into variable sum(the sum of AP series)*/
    while(n1<=n)
    {
        sum = a1 + sum;
        a1 = a1 + d;
        n1++;
    }
//As n1 becomes equal to n (entered number of terms), the loop stops and sum is displayed
    cout<<"The sum of the arithematic progression is = "<<sum<<endl;
//END OF TASK2
```

Output examples: -

```
TASK 2:- Finding sum of arithematic progression
Please enter the first term of your arithematic progression
1
Please enter the constant difference d of your arithematic progression
2
How many terms do you want the arithematic progression to go upto?
50
The sum of the arithematic progression is = 2500
```

```
TASK 2:- Finding sum of arithematic progression
Please enter the first term of your arithematic progression
100
Please enter the constant difference d of your arithematic progression
1
How many terms do you want the arithematic progression to go upto?
30
The sum of the arithematic progression is = 3435
```

Task 3: -

Q. Write a C++ program creating a diamond shape of asterisk using loops

```
cout<<"TASK 3:- Creating a diamond"<<endl;
//Write a C++ program creating a diamond shape using sterics as shown;
/*    *
     ***
    *****
   *******
  *********    for this given shape, user has to put m=5
   *******
    *****
     ***
      *
*/
int m;
cout<<"Please enter the number of rows in the upper half of your diamond\n";
cin>>m;
//first set of for loop and nested for loops for the upper half of diamond having m rows
for(int i=1; i<=m; i++){       //used to control number of rows

    for(int j=m-i; j>=0; j--) //used to display spaces
    {cout<<" "; }

    for(int j=1; j<=2*i-1; j++) //used to display sterics
    {cout<<"*";
    }
cout<<endl;
}
//2nd set of for loop and nested for loops for the lower half of diamond having (m-1) rows
for(int i=m-1; i>0; i--){

    for(int j= m-i; j>=0; j--)
    {cout<<" ";}

    for(int j =1; j<=2*i-1; j++)
    {cout<<"*";
    }
cout<<endl;
}
//END OF TASK3
```

Output Examples: -

```
TASK 3:- Creating a diamond
Please enter the number of rows in the upper half of your diamond
7
       *
      ***
     *****
    *******
   *********
  ***********
 *************
  ***********
   *********
    *******
     *****
      ***
       *
```

```
TASK 3:- Creating a diamond
Please enter the number of rows in the upper half of your diamond
5
     *
    ***
   *****
  *******
 *********
  *******
   *****
    ***
     *
```

Task 4: -

Q. Create a C++ program to convert a decimal number into binary

```
    cout<<"TASK 4:- Conversion of decimal into binary"<<endl;
    //Write a C++ program  converting decimal numbers into binary
    int y, p, binary=0, i1=1;
    cout<<"Please enter your number in decimal;"<<endl;
    cin>>y;  //input integer in decimal form
    cout<<"Your number in binary is;\n";
/*while loop in order to find remainder of the given decimal number when divided by 2 and progressively
reducing the number down to 1 by dividing by 2*/
    while (y>=1)
    {
        p = y%2;
        y=y/2;
        binary = binary + p*i1;
        //Each remainder recieved is placed as a digit in the binary number
        i1= i1*10;
        /*The first remainder in the units place, 2nd in tens place and so on..
        upto a point where number is reduced down to 1*/
    }
/*the obtained arrangement of 0s and 1s by the above loop as the number gets reduced down to 1
is the binary form of the decimal number*/
    cout<<binary;   //output integer in binary form
    //END OF TASK4

return 0;
}
```

Output examples: -

```
TASK 4:- Conversion of decimal into binary
Please enter your number in decimal;
126
Your number in binary is;
1111110
```

```
TASK 4:- Conversion of decimal into binary
Please enter your number in decimal;
679
Your number in binary is;
1010100111
--------------------------------
```