School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

CS-114 - Fundamentals of Programing

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ME-15/A

LAB REPORT # 5(HOME TASKS)

HOME TASKS

Objective:

To understand repetition structure and the types of repetition structure.

TASK 1

1. Write a program in C++ to find LCM of any two numbers using HCF.

CODE

```cpp
//Code to find the LCM of two numbers using the HCF
/* Juveriah Waqqas - 460510
01-11-2023
Lab Report # 5 */

#include<iostream>
using namespace std;
int main()
{
    int x, y, hcf, lcm, j;
/*defining variables x and y which are the numbers that will be input, hcf that will store the heighest common factor,
  lcm that will store the lowest common multiple that will be input and j which is in the condition of the loop*/
    cout<<"Input the first number : ";
    cin>>x;
    cout<<"Input the second number : ";
    cin>>y;

    j = (x < y) ? x : y;
//Loop will run till the smallest of the two numbers
    for(int i=1; i<=j; i++)
    {
        if( x % i == 0 && y % i == 0){ hcf = i; }
//The heigest common factor of both the numbers x and y is stored in the variable hcf
    }

    lcm= (x*y)/hcf;
//LCM can be calculated by multiplying the two numbers and dividing by the HCF

        cout<<"The LCM of "<<x<<" and "<<y<<" is "<<lcm;
    return 0;

}
```

EXECUTION (example)

```
Input the first number : 45
Input the second number : 6
The LCM of 45 and 6 is 90
--------------------------------
Process exited after 2.106 seconds with return value 0
Press any key to continue . . .
```

```
Input the first number : 18
Input the second number : 99
The LCM of 18 and 99 is 198
--------------------------------
Process exited after 3.853 seconds with return value 0
Press any key to continue . . .
```

```
Input the first number : 45
Input the second number : 77
The LCM of 45 and 77 is 3465
--------------------------------
Process exited after 3.124 seconds with return value 0
Press any key to continue . . .
```

TASK 2

2. Write a program in C++ to find out the sum of an Arithmetic progression series.

CODE

```
//Code to find the sum of an arithmetic progression
/* Juveriah Waqqas - 460510
01-11-2023
Lab Report # 5 */

#include<iostream>
using namespace std;
int main()
{
    int a1,d,n;
    cout<<"Enter the first term of the AP : ";
    cin>>a1;
    cout<<"Enter the common difference : ";
    cin>>d;

    int a11=a1;

//To output the Arithmetic series
    cout<<"The Arithmetic Progression is : "<<a1<<", ";
    for(int i=1; i<=3; i++)
    {
        a1 += d;
        cout<<a1<<", ";
    }
    cout<<"......"<<endl;

//To sum the arithmetic series

    cout<<"Enter the total number of terms : ";
    cin>>n;
    int sum = a11;
    for(int j=1; j<n; j++)
    {
        a11 += d;
        sum += a11;
    }

    cout<<"The sum of the Arithmetic Progression is : "<<sum;

    return 0;
}
```

EXECUTION (example)

```
Enter the first term of the AP : 2
Enter the common difference : 5
The Arithmetic Progression is : 2, 7, 12, 17, ......
Enter the total number of terms : 10
The sum of the Arithmetic Progression is : 245
--------------------------------
Process exited after 8.261 seconds with return value 0
Press any key to continue . . .
```

```
Enter the first term of the AP : 2
Enter the common difference : 4
The Arithmetic Progression is : 2, 6, 10, 14, ......
Enter the total number of terms : 5
The sum of the Arithmetic Progression is : 50
--------------------------------
Process exited after 2.922 seconds with return value 0
Press any key to continue . . .
```

TASK 3

3. Write a program in C++ to create a diamond.

CODE

```
//Code to make a diamond
/* Juveriah Waqqas - 460510
01-11-2023
Lab Report # 5 */

#include<iostream>
using namespace std;
int main()
{
    int num,i,j;
    cout<<"Input rows in half the diamond: ";
    cin>>num;

//First loop to print the top half of the diamond
    for(i=0; i<num; i++)
    {
//first nested loop that is used to print the number of spaces before the asterisks, total spaces decrease as i increases
        for(j=0; j<=num-i-1; j++){cout<<" ";
    }
//second nested loop that prints the asterisks , two astersiks are increased in each successive row
        for(j=1; j<= 2*i + 1; j++){cout<<"*";
        }
        cout<<endl;
    }
//second loop to print the second half of the diamond, in which the spaces increase and the asterisks decrease as i decreases
        for(i=num-2; i>=0; i--)
    {
        for(j=0; j<=num-i-1; j++){cout<<" ";
        }
        for(j=1; j<= 2*i + 1; j++){cout<<"*";
        }
        cout<<endl;
    }
    return 0;
}
```

EXECUTION (example)

```
Input rows in half the diamond: 5
      *
     ***
    *****
   *******
  *********
   *******
    *****
     ***
      *
```

```
Input rows in half the diamond: 7
       *
      ***
     *****
    *******
   *********
  ***********
 *************
  ***********
   *********
    *******
     *****
      ***
       *
```

```
Input rows in half the diamond: 2
  *
 ***
  *

--------------------------------
Process exited after 1.621 seconds with return value 0
Press any key to continue . . .
```

TASK 4

4. Write a program in C++ to convert a decimal number to binary number.

CODE

```
//Code to make a diamond
/* Juveriah Waqqas - 460510
01-11-2023
Lab Report # 5 */

#include<iostream>
using namespace std;
int main()
{
    int num, binary=0, remainder, product=1;

    cout<<"Input the decimal number : ";
    cin>>num;

    while(num!=0)
//loop will run until the the number is reduced to zero
    {
        remainder = num % 2;
//to find the remainder
        binary = binary + ( remainder * product );
//this operation is performed to save the value of the remainder in the unit place of the binary number

        num /= 2;
        product *= 10;
/*the variable produt is multiplied by 10 each time so that the next time the loop runs ,
  the value of the remainder is saved in the correct place value of the binary number*/
    }

    cout<<"Its corresponding binary representation is : "<<binary;
    return 0;
}
```

EXECUTION (example)

```
Input the decimal number : 35
Its corresponding binary representation is : 100011
--------------------------------
Process exited after 2.917 seconds with return value 0
Press any key to continue . . .
```

```
Input the decimal number : 35456
Its corresponding binary representation is : 695257216
--------------------------------
Process exited after 2.476 seconds with return value 0
Press any key to continue . . .
```

_____THE END_____