School Of Mechanical & Manufacturing Engineering, NUST

Department of Mechanical Engineering

CS-114 - Fundamentals of Programming

Lab Report # 05

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DATE:
31-10-23

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Lab Manual # 05
Repetition structures (II)

Objectives:
To understand repetition structure and the types of repetition structure.

Home Tasks:
Task 1:
Write a program in C++ to find LCM of any two numbers using HCF.
Code:

```cpp
1   #include <iostream>
2   using namespace std;
3
4   int main()
5   {
6       int x, y, hcf, lcm;
7       cout<<"Program to calculate LCM of two numbers from their HCF"<<endl;
8       cout<<"Enter first number: ";
9       cin>>x;
10      cout<<"Enter second number: ";
11      cin>>y;
12
13      if(x<y)
14      {
15          hcf = x;
16      }
17      else
18      {
19          hcf = y;
20      }
21
22      while(true)
23      {
24          if((x%hcf==0) && (y%hcf==0))
25          {
26              break;
27          }
28          else
29          {
30              hcf--;
31          }
32      }
```

```
33        lcm = (x*y)/hcf;
34
35        cout<<"The LCM of "<<x<<" and "<<y<<" is: "<<lcm<<endl;
36
37        return 0;
38    }
```

Output:

```
Program to calculate LCM of two numbers from their HCF
Enter first number: 5
Enter second number: 4
The LCM of 5 and 4 is: 20


---------------------------------
Process exited after 1.837 seconds with return value 0
Press any key to continue . . .
```

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

Code:

```cpp
1    #include <iostream>
2    using namespace std;
3
4    int main()
5    {
6        int a, n, d, l, sum = 0;
7        cout<<"Program to find out the sum of an Arithmetic Progression Series"<<endl;
8        cout<<"Enter the first term of the A.P. series: ";
9        cin>>a;
10       cout<<"Enter the number of terms for the A.P. series: ";
11       cin>>n;
12       cout<<"Enter the common difference of the A.P. series: ";
13       cin>>d;
14
15       l = a + (n-1)*d;
16       cout<<"The sum of the Arithmetic Progression series is: ";
17       while(a<=l)
18       {
19           sum +=a;
20           a = a + d;
21       }
22       cout<<sum<<endl;
23
24       return 0;
25   }
```

Output:

```
Program to find out the sum of an Arithmetic Progression Series
Enter the first term of the A.P. series: 2
Enter the number of terms for the A.P. series: 5
Enter the common difference of the A.P. series: 2
The sum of the Arithmetic Progression series is: 30


------------------------------------
Process exited after 18.16 seconds with return value 0
Press any key to continue . . .
```

Task 3:

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

Code:

```cpp
1   #include<iostream>
2   using namespace std;
3
4   int main()
5   {
6       int i, j, row_num, space;
7       cout<<"Enter the number of rows: ";
8       cin>>row_num;
9       space = row_num-1;
10      for(i=1; i<=row_num; i++)
11      {
12          for(j=1; j<=space; j++)
13              cout<<" ";
14          space--;
15          for(j=1; j<=(2*i-1); j++)
16              cout<<"*";
17          cout<<endl;
18      }
19      space = 1;
20      for(i=1; i<=(row_num-1); i++)
21      {
22          for(j=1; j<=space; j++)
23              cout<<" ";
24          space++;
25          for(j=1; j<=(2*(row_num-i)-1); j++)
26              cout<<"*";
27          cout<<endl;
28      }
29      cout<<endl;
30      return 0;
31  }
```

Output:

```
Enter the number of rows: 5
    *
   ***
  *****
 *******
*********
 *******
  *****
   ***
    *


---------------------------------
Process exited after 1.582 seconds with return value 0
Press any key to continue . . .
```

Task 4:

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

Code:

```cpp
#include <iostream>
using namespace std;

int main()
{
    int n, bin = 0;
    int rem, i = 1;
    cout << "Enter a decimal number: ";
    cin >> n;
    cout <<n<< " in decimal = ";
    while (n!=0)
    {
        rem = n % 2;
        n /= 2;
        bin += rem * i;
        i *= 10;
    }
    cout<<bin<< " in binary" << endl ;
    return 0;

}
```

Output:

```
Enter a decimal number: 13
13 in decimal = 1101 in binary

----------------------------------
Process exited after 7.402 seconds with return value 0
Press any key to continue . . .
```

Conclusion:

We learned how to use while and do-while loops to perform certain tasks. We understood how useful loops are in making our code short and more time-efficient, as using loops takes less computing time than other methods to perform the same task.