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(LAB TASKS)

LAB TASKS

Objective:

To understand repetition structure and the types of repetition structure.

TASK 1

1. Convert the following while loop to a do-while loop:

```
int x = 1;
 while (x > 0)
 {
cout << "enter a number: ";
 cin >> x;
 }
```

CODE

```
#include<iostream>
using namespace std;
int main()
{
    int x =0;
    do
    {
        cout<<"Enter a number ";
        cin>>x;
    }while(x>0);

    return 0;
}
```

EXECUTION (example)

```
Enter a number 5
Enter a number 6
Enter a number 99
Enter a number 647
Enter a number 0

--------------------------------
Process exited after 3.737 seconds with return value 0
Press any key to continue . . .
```

TASK 2

2. Use a do while loop to make a simple calculator for two numbers. Insert buttons for it to ask again and for termination.

CODE

```
#include<iostream>
#include<cmath>
using namespace std;
int main()
{
    double n1, n2, res;
    char opt;
    char fnc;
    do{
        cout<<"Enter the first number = ";
        cin>>n1;
        cout<<"Enter the second number = ";
        cin>>n2;

        cout<<"Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)"<<endl;
        cin>>fnc;
         fnc = tolower(fnc);

        switch(fnc){
            case'+': res = n1+n2;
                     cout<<n1<<" + "<<n2<<" = "<<res<<endl<<endl;
                     break;
            case'-':cout<<"Enter 1 if you want num1-num2 OR 2 if you want num2-num1"<<endl<<endl;
                     cin>>opt;
                         switch(opt){
                             case'1': res= n1-n2; cout<<n1<<" - "<<n2<<" = "<<res<<endl<<endl; break;
                             case'2': res= n2-n1; cout<<n2<<" - "<<n1<<" = "<<res<<endl<<endl; break;
                             default : cout<<"Invalid Input";}
                     break;
            case'*': res = n1*n2;
                     cout<<n1<<" * "<<n2<<" = "<<res<<endl<<endl;
                     break;
            case'/':cout<<"Enter 1 if you want num1/num2 OR 2 if you want num2/num1"<<endl;
                     cin>>opt;
                         switch(opt){
                             case'1':
                             if(n2 != 0)
                             {res= n1/n2; cout<<n1<<" / "<<n2<<" = "<<res<<endl<<endl;}
                             else{cout<<n1<<" / "<<n2<<" = Undefined";}
                             break;
                             case'2':
                             if(n1 != 0)
                             {res= n2/n1; cout<<n2<<" / "<<n1<<" = "<<res<<endl<<endl;}
                             else{cout<<n2<<" / "<<n1<<" = Undefined";}
                             break;
                             default : cout<<"Invalid Input";}
                     break;
            case'%': res=fmod(n1,n2); cout<<n1<<" % "<<n2<<" = "<<res<<endl<<endl;
                     break;
            case'p': res = pow (n1,n2); cout<<n1<<" ^ "<<n2<<" = "<<res<<endl<<endl;
                     break;}

    }while( fnc != 'q');

    cout<<"THE END";

    return 0;
}
```

EXECUTION (example)

```
Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)
+
2 + 446 = 448

Enter the first number = 2
Enter the second number = -29
Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)
-
Enter 1 if you want num1-num2 OR 2 if you want num2-num1
2
-29 - 2 = -31

Enter the first number = 55
Enter the second number = 4
Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)
*
55 * 4 = 220

Enter the first number = 63
Enter the second number = 5
Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)
/
Enter 1 if you want num1/num2 OR 2 if you want num2/num1
1
63 / 5 = 12.6

Enter the first number = 44
Enter the second number = 5
Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)
%
44 % 5 = 4

Enter the first number = 2
Enter the second number = 3
Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)
p
2 ^ 3 = 8

Enter the first number = 2
Enter the second number = 4
Enter the operation you wish to perform (+,-,*,/,%,p for power,q to quit)
q
THE END
--------------------------------
Process exited after 92.22 seconds with return value 0
Press any key to continue . . .
```

TASK 3

3. Write programs with while or do while loops that compute:

a. The sum of all even numbers between 2 and 100 (inclusive).

b. The sum of all squares between 1 and 100 (inclusive).

CODE

```
#include<iostream>
using namespace std;
int main()
{

    int sum=0; int i=2;
    while(i<=100)
    {
        if(i % 2 == 0){sum += i;}
        i++;
    }
    cout<<"The sum of all even numbers between 2 and 100 (inclusive) is = "<<sum<<endl;

    sum=0; i=1;
    while(i<=100)
    {
        sum = sum + i*i;
        i++;
    }
    cout<<"The sum of all sqaures between 1 and 100 (inclusive) is = "<<sum;

    return 0;
}
```

EXECUTION (example)

```
The sum of all even numbers between 2 and 100 (inclusive) is = 2550
The sum of all sqaures between 1 and 100 (inclusive) is = 338350
--------------------------------
Process exited after 0.1045 seconds with return value 0
Press any key to continue . . .
```

TASK 4

4. Write programs with while or do while loops that compute:

a. All powers of 2 from 2 up to 220.

b. The sum of all odd numbers between a and b (inclusive), where a and b are inputs

CODE

```
#include<iostream>
#include<cmath>
using namespace std;
int main()
{
    cout<<"POWERS OF '2' FROM '0 TO 20'"<<endl;

    int i=0; int power;
    while(i<=20)
    {
        power = pow(2,i);
        cout<<"2^"<<i<<" = "<<power<<endl;
        i++;
    }
cout<<"--------------------------------------------------------------------------------"<<endl;

cout<<"SUM OF ODD NUMBERS"<<endl;
    int a,b;
    cout<<"Input the start number of the range ";
    cin>>a;
    cout<<"Input the end number of the range ";
    cin>>b;

    i = a; int sum = 0;
    while(i<=b)
    {
        if(i % 2 == 1){ sum += i; }
        i++;
    }
    cout<<"The sum of odd numbers from "<<a<<" to "<<b<<" = "<<sum<<endl;

return 0;
}
```

EXECUTION (example)

```
POWERS OF '2' FROM '0 TO 20'
2^0 = 1
2^1 = 2
2^2 = 4
2^3 = 8
2^4 = 16
2^5 = 32
2^6 = 64
2^7 = 128
2^8 = 256
2^9 = 512
2^10 = 1024
2^11 = 2048
2^12 = 4096
2^13 = 8192
2^14 = 16384
2^15 = 32768
2^16 = 65536
2^17 = 131072
2^18 = 262144
2^19 = 524288
2^20 = 1048576
--------------------------------------------------------------------------------
SUM OF ODD NUMBERS
Input the start number of the range 3
Input the end number of the range 33
The sum of odd numbers from 3 to 33 = 288

--------------------------------
Process exited after 3.707 seconds with return value 0
Press any key to continue . . .
```

```
POWERS OF '2' FROM '0 TO 20'
2^0 = 1
2^1 = 2
2^2 = 4
2^3 = 8
2^4 = 16
2^5 = 32
2^6 = 64
2^7 = 128
2^8 = 256
2^9 = 512
2^10 = 1024
2^11 = 2048
2^12 = 4096
2^13 = 8192
2^14 = 16384
2^15 = 32768
2^16 = 65536
2^17 = 131072
2^18 = 262144
2^19 = 524288
2^20 = 1048576
--------------------------------------------------------------------------------
SUM OF ODD NUMBERS
Input the start number of the range 9
Input the end number of the range 19
The sum of odd numbers from 9 to 19 = 84

--------------------------------
Process exited after 7.318 seconds with return value 0
Press any key to continue . . .
```