Exercise 5: Iteration Constructs

1. Fill in the blanks for the following programs to produce the respective outputs shown.

(a)

```
int m;
for(m=1; __________; m++)
{
  cout << "We've Got a problem.\n";
}
```

Console output:

```
We've Got a Problem.
We've Got a Problem.
We've Got a Problem.
```

(b)

```
int p =5;
while (p>=1)
{
  cout << p <<"*****\n";

  _____________;
}
```

Console output:

```
5*****
4*****
3*****
2*****
1*****
```

(c)

```
int limit = _____;
do
{
  cout << limit << endl;

  ___________________;
} while (limit<=10000);
```

Console output:

```
10
100
1000
10000
```

(d)

```
int layerOut,layerIn;

for(layerOut=0; layerOut<______; layerOut++)
{
  for(layerIn=0; layerIn<______; layerIn++)
  {
       cout << layerOut << "-" << layerIn << endl;
  }
  cout <<"*****\n";
}
```

Console output:

```
0-0
0-1
0-2
0-3
*****
1-0
1-1
1-2
1-3
*****
```

2a. What will be the output of the following code:

```
int i;
for(i=10; i<20; i=i+2)
{
    cout << i*10 ;
}
```

2b. Rewrite the code in question 1 using a **while** loop.

3. Spot and correct the errors in the following code segments:

(a)

```
int num;
for(num=1, num<=5, num=num+1)
{
  cout << "Square of num = << num*num << endl ;
}
```

Console output:

```
Square of 1 = 1
Square of 2 = 4
Square of 3 = 9
Square of 4 = 16
Square of 5 = 25
```

(b)

```
char input;
double voltage current;
while (input = y);
{
  cout << "Enter the voltage and current: ";
  cin >> voltage >> current;
  cout << "The resistance is " << voltage/current << endl;
  cout << Do you wish to continue [y/n]: ";
  input << cin ;
}
```

4. What is the output of the following code?

```
int count = 1, odd = 0;
do
{
    if ( (count %  2) != 0 )
         odd++;
         count++;
}while (count<10);
cout << "odd = " << odd;
```

5a. Write a program, which prompts the user to enter an integer. The program then displays the corresponding multiplication table.

A sample run is shown below:

Enter an integer : 8

8 x 1 = 8
8 x 2 = 16
8 x 3 = 24
8 x 4 = 32
8 x 5 = 40
8 x 6 = 48
8 x 7 = 56
8 x 8 = 64
8 x 9 = 72
8 x 10 = 80

5b. Modify your program in (a) above so that after displaying the multiplication table, the program repeats, asking the user to enter another number. If the number entered is non-zero, the multiplication table for the number is displayed and the program repeats. The program terminates if the number entered is zero.

6. The gain of a RC active filter is given by the following equation:

Gain = 1/(2πfRC)

Write a program, which prompts the user to enter the value of the resistor (R) and the capacitor (C). It then displays a table of *frequencies* and *Gains* for frequencies from f=0.1Hz to f=1GHz in decade steps (i.e for each iteration, the frequency is multiplied by 10).

Write your program using a
a) **for** loop
b) **while** loop
c) **do-while** loop