GE211 Programming in C++
Lab (6)

Objectives of this lab:

- Infinite series implementation.
- Random number implementation.
- Time function

Exercise 1: Estimation of π using Leibniz series

Write a program to calculate the value of (pi ‘π’) using Leibniz series.

$$\frac{\pi}{4} = \sum_{k=0}^{\infty} \frac{(-1)^k}{2k+1}.$$

```
// C++ Lab 6 Exercise 1  Estimation of pi using Leibniz series
//
// Program by: Place your name here

#include <iostream>
#include <cmath>
#define PI 3.14159265359

using namespace std;
int main()
{
      double p = 0.0;
      double x,error;
      int N;

      cout << "Enter the number of N? ";
      cin >> N;
      cout << endl;
      p = 0.0 ;
      for(int k= 1 ; k<=N ; ++k)
            {
            x = -pow(-1,k) / (2*k-1);
            p += x ;
            }
      p = 4*p;
      error = fabs(PI - p) ;
cout << "N = "<< N <<"  pi is  "<< p <<" the error is "<< error <<"\n the
percent error is %"<< 100*(error/PI) << endl;

      return 0;
}
```

```
Enter the number of N? 10

N = 10  pi is  3.23232 the error is 0.0907232
 the percent error is %2.88781
```

Exercise 2: Guessing Game

Write a program that implements a guessing game. The program will generate a random number between 1 and 100 inclusive.

```
/* C++ Lab 6 Exercise 2  guessing game
   Program by: Place your name here
*/

#include<iostream>
#include<cstdlib>
#include<ctime>

using namespace std;

int main()
{
      srand(time(0));
      int number=rand()%100+1;
      int guess, tries(1);

      cout<<"Im thinking of a number between 1-100. Take a guess: ";
      cin>>guess;


      while(guess!=number)
      {
            tries++;

            if(guess>number)
                  cout<<"Too high,Guess again: ";
            else
                  cout<<"Too low, Guess again: ";

            cin>>guess;
      }
      cout<<"Congrats!! You got it after " << tries << " tries." << endl;


      return 0;
}
```

```
Im thinking of a number between 1-100. Take a guess: 50
Too low, Guess again: 80
Too low, Guess again: 90
Too high,Guess again: 85
Too low, Guess again: 88
Congrats!! You got it after 5 tries.
```

Post Lab

Q1. Modify Ex. 1 so that it finds N that gives any given error limit.

Q2. Use the time function from Ex2 to generate 5 beeps every 10 seconds for 3 times.