GE 211

C++ Programming

Lab 6

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Objectives

Objectives of this lab:

- Infinite series implementation.

- Random number implementation.

- Time function

Exercise 1

Exercise 1: Estimation of π using Leibniz series

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

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

```
Enter the number of N? 10

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

```cpp
#include <iostream>
#include <cmath>
#define PI 3.141592653589793238462643383279502
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=0; k<=N ;k++)
        {
            double x = 4*pow(-1.0,k) / (2*k+1);
            p += x ;
        }
    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;
}
```

Exercise 2

Exercise 2: Guessing Game

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

```
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.
```

```cpp
#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;
}
```

PostLab 6

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.

```cpp
#include <iostream>
#include <cstdlib>
#include <ctime>
using namespace std;
int main ()
{
  int s,k;
  time_t now;
   cout<<"  To start press 0 then enter"<<endl;
   cin>>k;
   k=1;
   now = time(0);
   s=now+10;
  while(abs(now-s)>0)
     now = time(0);
  cout << " hello \a\a\a\a " << endl;
  s=now+10;
return 0;
}
```