COE 301 Introduction to Computer Programming Fall, 2019

Homework 5 – Due: 10/04/2019 9:00 am

Problem 1. (25 points) Short answers.

(1) [10 points] Find all errors in the following code:

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

     int result;

     cout << "Please enter two integers a and b: "<< endl;
     cin << a, b;

     for (int i = 0, i < b, i = i + 1); {

       result = result * a;

     }

     cout << "a^b is " result << endl;

     return 0;

}
```

(2) [5 points] How many times do the following for-loops execute?

```
     for (int i = 0; i < 50; i++) {
          cout << "Hi." << endl;
     }
```

(3) [5 points] What is the output for the following code segment.

```
int j=5;
for( int i=1; j<=15; i+=2 ) {
    j=i*j;
    i=i-1;
    cout << "i=" << i << ", j=" << j << endl;
}
```

(4) [5 points] What is the output of the following code block?

```
int factorial = 1;
int n = 3;
for (int i = 1; i <= n; ++i) {
        factorial *= i;
 }
 cout<< "Factorial of " << n << " = "<< factorial << endl;
```

Problem 2. (25 points) The definition of a prime number is a natural number greater than 1 that cannot be formed by multiplying two smaller natural numbers. Write a C++ program that asks the user to input a positive integer number, and then tests whether the number is a prime number or not. Assuming the user always enters a valid integer number, the program should verify that n is greater than 0 and if not, ask for another. Test your results using the following cases: 1, 2, 10, and 113.

Problem 3. (25 points) Write a C++ program to estimate PI using the numerical integration method. Your program should ask the user to input the total number of rectangles n that are used to estimate the area of a quarter of the circle with radius r = 1.
Define PI = 3.14159265 and report your error when you use n = 10, 10^2, 10^3 and 10^4 samples.
Please submit your .cpp file as “yourLastName_hw5_prob3.cpp”.

Problem 4. (25 points) Generate the following multiplication table and save it a text file “MultiplicationTable.txt”.

```
1
2  4
3  6  9
4  8 12 16
5 10 15 20 25
6 12 18 24 30 36
7 14 21 28 35 42 49
8 16 24 32 40 48 56 64
9 18 27 36 45 54 63 72 81
```

Submission Instructions:

There should be 4 files in your submission:

1. A write up (any type- .txt, .docx, .pdf are all fine) that contains your answers to all questions in problem 1-4.
2. The .cpp file for problem 2.
3. The .cpp file for problem 3.
4. The .cpp file for problem 4.

Please make sure your last name is included in the filename.