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 = 1; // initialized result to 1

int a, b; // need to declare ints before cin

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

cin >> a >> b; //changed << to >> for cin, changed the , to >> to apply cin to b

for (int i = 0; i < b; i = i + 1) { //took away the semicolon after the for(), replaced the , with ;

result = result \* a;

}

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

return 0;

}

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

for (int i = 0; i < 50; i++) {

cout << "Hi." << endl;

}

50 times

(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;

}

i=0, j=5

i=1, j=10

i=2, j=30

(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;

Factorial of 3 = 6

**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.

Enter a positive integer number:

1

n is prime

Enter a positive integer number:

2

n is prime

Enter a positive integer number:

10

n is not prime

Enter a positive integer number:

113

n is prime

**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, 102, 103 and

104 samples.

Please submit your .cpp file as “yourLastName\_hw5\_prob3.cpp”.

Enter the total number of rectangles n used to estimate pi:

10

The error between pi and the estimated pi is: -0.162926

Enter the total number of rectangles n used to estimate pi:

102

The error between pi and the estimated pi is: -0.0184666

Enter the total number of rectangles n used to estimate pi:

103

The error between pi and the estimated pi is: -0.0182928

Enter the total number of rectangles n used to estimate pi:

104

The error between pi and the estimated pi is: -0.0181223

**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 84

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.