Spring 2018, MIS 102 – COMPUTER PROGRAMMING

Homework 1

姓名：_____ 學號：_____ Email:_____

Graded out of 120 points. Due on 4/23. Typeset your homework. Submit your source code with comments (file name: yourStudentID_HW1.c) to NSYSU Cyber University. Also notice that your code must follow the suggested programming styles discussed in the class.

1. **[20pts]** Write a C function *leibnin()* that computes ratio of the circumference of a circle to its diameter $\boldsymbol{\pi}$ given a ***k*** value, where the larger the ***k*** value, the more precise the $\boldsymbol{\pi}$, as defined:

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

For example:

leibniz(10)=3.041840
leibniz(100)=3.131593
leibniz(1000)=3.140593

2. **[20pts]** Write a C function *dbinom()* that implements binomial probability mass function to compute the probability of getting exactly ***k*** successes in ***n*** (success/failure) trials with the probability of success ***p***, as:

$$dbin(\text{k, n, p}) = C_k^n \, p^k (1\text{-}p)^{\text{n-k}}$$

where C_k^n is binomial coefficient and k = 0, 1, …, n.

For example:

dbinom(5, 10, 0.3) = 0.102919

3. **[20pts]** Write a C recursive function *revPrint*(*string*) that prints reversed string of a given string. For example, *revPrint* ("string") will print "gnirts". Please DO NOT use any string manipulation functions in C/C++ standard library.

4. **[20pts]** Write a C function *lcm(a, b)* that find Least Common Multiple of given two integer numbers

a and *b*, as defined:

$$lcm(a,b) = \frac{|a \times b|}{\gcd(a,b)}$$

where *gcd*() is the Greatest Common Divisor of given two integer numbers. Note that *gcd()* must be written in recursive form.

Here is a sample output of your *lcm()*:

lcm(72,120) = 360

5. **[20pts]** Write a C function that counts the number of mismatched characters. For example,

$$mismatched\_char(\text{"abc","aaa"})=2$$

The function returns -1 if the lengths of two strings are different. Please DO NOT use any string manipulation functions in C/C++ standard library.

6. **[20 pts]** Write a C program that identifies the longest consecutive identical characters given a series of characters you enter. Please print the character and the length. For example,

C:\> 11122221133111234

The longest identical character is '2', the length is 4.

You may use EOF as the sentinel value to exit program.