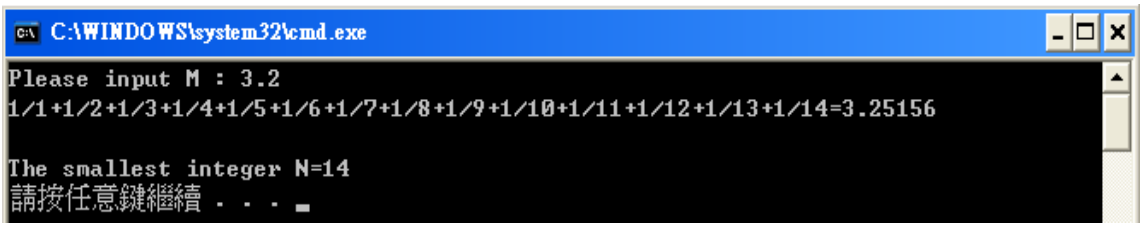
C++ Basic Course

04/14/2018

Homework Assignment No. 2

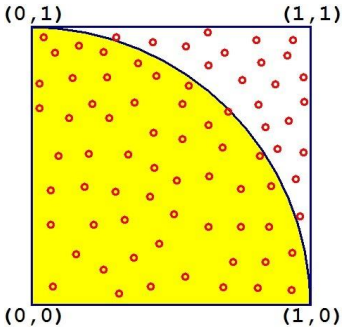
(Total 80%)

1. (20%) For the sum $S(N) = 1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} + \ldots + \frac{1}{N}$, write a C++ program to calculate the smallest integer N such that $S(N) > M$ where M is a user input. Below is a typical run:

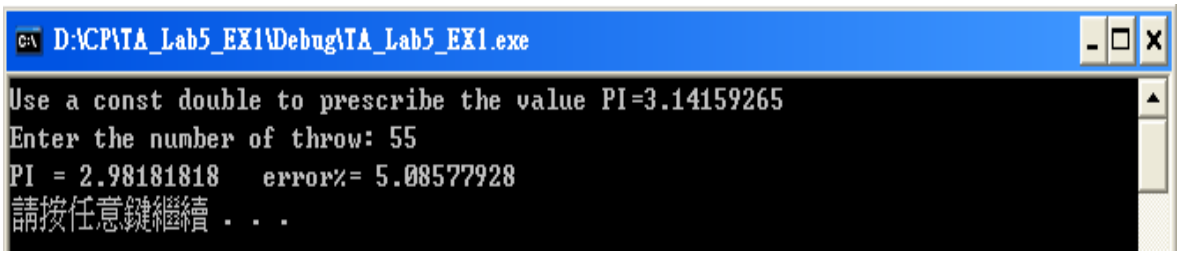


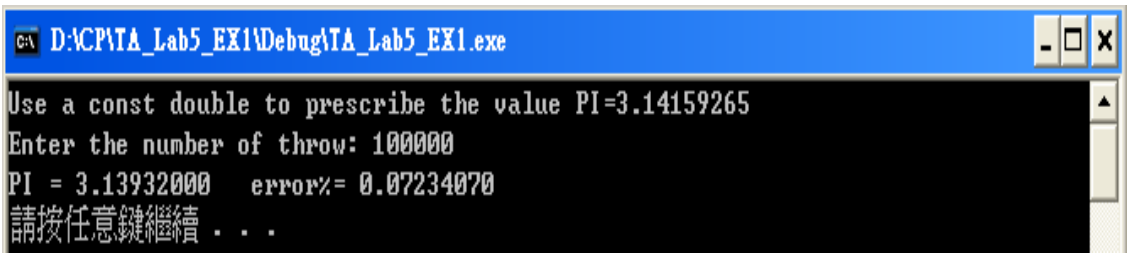
2. (30%) 蒙地卡羅法(Monte Carlo Method)求圓周率
   蒙地卡羅法(Monte Carlo Method)求圓周率的原理示意圖如下。正方形邊長為1單位長，面積為1平方單位；黃色扇形面積等於半徑為1單位長的 1/4圓，面積為 PI/4。在正方形內均勻隨機丟石頭(或隨機擲飛鏢)

   落在扇形內的機率 = 扇形面積 / 正方形面積 = PI/4



   Follow the note given above and write a Monte Carlo method to compute PI. You should ask the user to input the desirable number of random numbers and observe as the number gets bigger, your result should be closer to PI. Use a const double to prescribe the value PI=3.14159265 and report the error in % obtained from the Monte Carlo method. Below are sample runs:

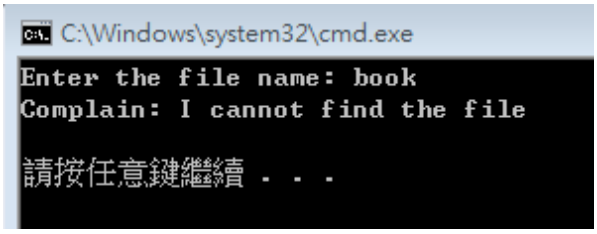


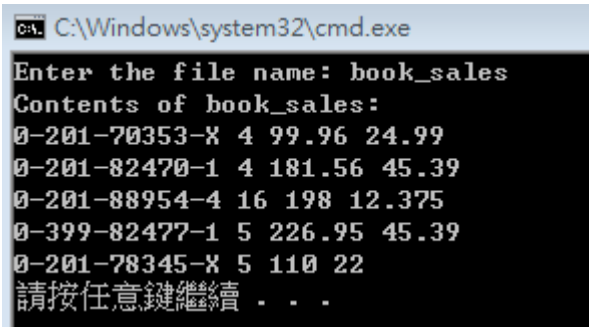


3. **(30%)** Download the folder `HW2_dist.zip` from the course website and unzip the folder. You will find `Sales_item.h`, a data file `book_sales` that contains a few book records and a supplementary note on input file stream from my Computer Programming course. To ease your life for now, you can safely assume the records for each ISBN is grouped together.

   Write a C++ program to read the transactions from the data file `book_sales` and output on a screen that shows, for each book, the total number of copies sold, the total revenue, and the average sales price. (**hint**: check (1) the supplementary note given in the `HW2_dist.zip` and (2) C++ primer Section 8.4 if you are not familiar with C++ input file stream)

   Your program should ask users to enter the data file name to be processed. It should complain if it cannot find the data file. Two sample outputs look like the following: the first shows the sample that cannot find the file and terminate the run and the second sample does the regular processing successfully.




C:\Windows\system32\cmd.exe
Enter the file name: book_sales
Contents of book_sales:
0-201-70353-X 4 99.96 24.99
0-201-82470-1 4 181.56 45.39
0-201-88954-4 16 198 12.375
0-399-82477-1 5 226.95 45.39
0-201-78345-X 5 110 22
請按任意鍵繼續 . . .