清華大學 電機工程學系

107 學年度第一學期

EE-2310 計算機程式設計 (Introduction to Programming)

**Homework #5 (佔學期總成績 3 分)**

**(每人一組) Due on Dec. 6, 2018 @ the Lab Sesion**

**Late Homeworks will NOT be accepted !**

1. Write a C++ program to define a **class called "matrix"** with the following **data members**, **member functions**, and **regular function**:

   (**Private Data Members**)

   int row_count;
   int col_count;
   double M[MAX_ROW][MAX_COL]; // MAX_ROW and MAX_COL are the max. numbers of ROWs and COLUMNs supported.

   (**Public Member Functions**)

   - A constructor named "**matrix**(int *row*, int *col*)" – to create a matrix object, where *row* specifies the total number of rows and *col* specifies the total number of columns.
   - A member function "**void set_an_entry**(int *x*, int *y*, double *value*)" – to set a value to an entry with row index of *x* and column index of *y*.
   - A member function "**double get_an_entry**(int *x*, int *y*) – to get the value of an entry with row index of *x* and column index of *y*.
   - A member function "**int get_row_count**() – to get the number of rows in the local matrix
   - A member function "**int get_col_count**() – to get the number of columns in the local matrix
   - A member function "**matrix operator+**(matrix &*M2*)" – to add the local matrix and an external matrix *M2* and return the resulting matrix.

   (**A Regular Function Outside of the Class**)

   - A member function "**ostream& operator<<**(ostream& os, matrix &M)" – to print the content of a matrix *M* to an output channel *os*.

2. Test your program by adding up the following two matrices "M1" and "M2" and produce the result matrix "Sum" as shown below. (Note that you have to use the **overloaded operator "+"** to do the addition and **overloaded operator "<<"** to print out the matrices "M1", "M2" and "Sum".)

   Matrix M1:
   10 20
   30 40
   Matrix M2:
   1 2
   3 4
   Matrix Sum:
   11 22
   33 44

   - (Demonstrate it to one of your classmates, and then tell one of our TAs that you are done with this homework, and then you can get the 3 score points).