CMPS 260
Spring 2005
Project #1
2005.01.17

Date Assigned: **Monday, January 24, 2005**
Due Date: **10:00 PM, Wednesday, February 2, 2005**

The coded solution to the following problem is to be done by you and only you. You may ask help from the class teaching assistants and the instructors, but you may not ask for help on this project from anyone else. You may use your notes, C++ texts, on-line tutorials, etc., but the code must be your own.

1. Project Description:

The year is 1854 and John Snow has just convinced the city Fathers that the cholera epidemic that is raging in many areas of London is being spread by contaminated water from public wells. The solution he has proposed is simple: Remove the handles from the pumps at the public wells that are central to the pockets of cholera in the city, making them inaccessible and requiring citizens to draw water from wells that are further away but are not contaminated. In order to identify the wells that are contaminated, a grid 60 x 60 cells has been drawn on a map of London. The cells have been numbered by row and column. Rows are numbered from 0 to 59. Columns are numbered from 0 to 59. Each cell is identified by its row and column. The population and the number of cholera cases in each cell has been hastily surveyed.

In order to assist Dr. Snow, write a program that does the following:

- Is controlled by an interactive menu that allows the users to select to
  - → halt the program
  - → enter a row and column number of a cell and the raw data for that cell; the data entered is to be stored in the corresponding element of the array
  - → enter a row and column number of a cell and see the raw data for that cell
  - → display a list of all cells that have an infection rate of cholera of greater than 1%, the display should include the cell coordinates and the infection rate
  - → display the average infection rate of cholera for all of London

- Holds the data in a 60 row, 60 column two dimensional array. The elements of the array are to consist of structs. The row index and the column index of each struct are to correspond to the row and column numbers of the cells on the map of London. Each element struct must hold the the population of the cell and the number of cases of cholera.

- When the user selects to halt the program, saves the data in the array to a file. This data is to be stored in such a what that the program can load the data back to the array when the program is restarted.

- At the start of the program, loads the data from the previous storage file into the array. If the file does not exist, the members of the stuct elements are to be initialized to zero.

2. Additional Requirements:

- You are responsible for following the requirements as given documents reachable from the class web site via the **Minimum Documentation** and **Naming Conventions** links.
- The logic of your program must be sub-divided into a function for each menu choice and a function for loading the data into the array from the storage file.
- Your program may have global constants but may not have global variables.

3. Submitting: You are responsible for submitting your work both electronically and via a hard copy.

- Instructions for submitting an electronic copy of your project can be found on the class web site, via the **Submitting Your Work** link.
- A hard copy of the code in your project is due the school day after you submit electronically. Place the print out of your code in a manila folder, write your name, clid and section on the folder, then bring the folder to class or your instructor's or TA's office.