FACULTY OF COMPUTING
SCSJ1023: PROGRAMMING TECHNIQUE II

Instruction:
Study the following question. **Choose a partner** to implement the solution to this problem. Follow the steps involved in the software development process as discussed in class. Gather requirements, perform a thorough analysis of the problem, produce your design (structure chart and either pseudo code or flowchart). Then code your program according to this design. Test your program with data as in **Figure C-1** so that it produces the desired output as in **Figure C-2.** You have about 4 weeks to complete this assignment and submit as instructed in the submission section below.

Submission:
Through E-learning and not later than **13 April 2014,** upload a ZIP file that contains all of below documents:
1) Complete Flowchart (in PDF file extension)
2) Complete C/C++ source code (in C or CPP file extension)
NOTE: Ensure group member names are written in both files.

Question
The 9-Eleven Mart is a convenience store company operating in the state of Johor. The company has five stores located in several branches; Johor Bahru, Segamat, Batu Pahat, Kota Tinggi and Mersing, respectively. At the end of each year, the management of the company wants to know the performance of their company. They have decided to use a computer program to help them in analyzing the company's sales. You, as a freelance programmer have been appointed to develop the program using C++ language. The requirements of the program are as follow:

Input:
- The program should read in sales data from a text file.
- The name of the input file has to be entered by the user.
- The format of the input file is as follows: The first to twelfth columns indicate the sales for each month, i.e., the first column is for the sales of January, second column is for February, third column is for March, and so forth. The last column indicates store branches. Note that sales in each cell is represented in multiple of RM 1000.00
- Figure C-1 shows an example of input file named "sales2012.txt" containing sales data for the year 2012.

Output:
- The program should print out a report into a text file.
- The name of the output file has to be entered by the user.
- The report should include:
    - The grand total of sales, i.e., over all stores throughout the year.
    - The average sales per month.

    - The highest sales. Print the store, month and the sales whose the highest sales.
    - The total sales for each month. The months should be printed with their abbreviated names, such as, "Jan", "Feb", "Mar", and so forth.
    - The total sales for each store.
    - The list of profitable stores. A store is considered profitable if it manages to achieve minimum annual sales of RM 600,000.00.
- Note that all money values have to be specified as with 2 decimal points, 10 spaces in width, and right-justified.
- Figure C-2 shows an example report file for the sales data of the year 2012.

Arrays:

- The program should use a two-dimensional array to store the sales data.
- The program should also use a one- dimensional array to store the store branches.

Functions:

The program should have the following function:

- **`readFile`**. The purpose of this function is to read the sales data and store branches from an input file , then put the read data into a two-dimensional array (for the sales data), and a one-dimensional array (for the store branches). The file's name and both the arrays have to be accepted as arguments for the function.

- **`grandTotalSales`**. This function should return the grand total of sales over all stores throughout the year. It should accept a two-dimensional array (representing sales) as its arguments.

- **`averageMonthlySales`**. This function should return the company's average sales per month. It should accept a two-dimensional array (representing sales) as its arguments.

- **`monthTotalSales`**. This function should accept a two-dimensional array and the index of a column in the array (representing a month) as its arguments. The function should return the total sales for the specified month.

- **`storeTotalSales`**. This function should accept a two-dimensional array and the index of a row in the array (representing a store branch) as its arguments. The function should return the total sales for the specified branch.

- **`indicesOfHighestSales`**. This function should accept a two-dimensional array (representing sales) as one of its arguments. It should determine the indices of row and column of a cell in the array whose the highest sales.

Write a complete C++ program based on the requirements given above.

```
94  49  96  67  82  34  91  64  15  97  98  78  Johor Bahru
71  57  17  31  63  38  77  74  61  22  27  59  Segamat
36  16  30  19  29  41  23  25  22  37  28  29  Batu Pahat
87  48  49  91  72  69  13  97  43  41  29  58  Kota Tinggi
34  32  74  57  32  80  76  40  64  48  41  68  Mersing
```

Figure C-1: An example of input file, "sales2012.txt"

```
Grand total of sales over all stores: RM 3140000.00
Average sales per month:              RM  261666.67

The highest sales:
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Store: Johor Bahru
Month: Nov
Sales: RM   98000.00

Total sales by month:
Month   Sales
-----   -----
Jan     RM  322000.00
Feb     RM  202000.00
Mar     RM  266000.00
Apr     RM  265000.00
May     RM  278000.00
Jun     RM  262000.00
Jul     RM  280000.00
Aug     RM  300000.00
Sep     RM  205000.00
Oct     RM  245000.00
Nov     RM  223000.00
Dec     RM  292000.00

Total sales by store:
Store         Total Sales
-----         -----------
Johor Bahru   RM  865000.00
Segamat       RM  597000.00
Batu Pahat    RM  335000.00
Kota Tinggi   RM  697000.00
Mersing       RM  646000.00

Profitable stores:
-----------------
Johor Bahru
Kota Tinggi
Mersing
```

Figure C-2: The output file for the sales data in Figure C-1.