CS221: Spring, 2014 **Lab 4: 2D Arrays and File and I/O**

Assigned: Monday, February 17, 2014 Due: Friday, Feburary 21, 2014

(Source: Dr. Moskol)

**Problem:** The town of Podunk has enrollment data for years 2005 – 2010 for grades K – 4 in two elementary schools. The data are stored in two separate data files,  **School1.txt** and  **School2.txt** . Download these files from BB.

Your program must:

1) Read in the two data files, and store the data in 2 different and appropriate Table objects.

2) Add the enrollments for each year for each school and store in a new Table

***TotalEnrollment***

3) Find the column sums and the row sums for ***TotalEnrollment***

4) Write to an output file named Total.txt: The ***TotalEnrollment*** table along with the column and row sums.

\*\*5) Bonus: Write code to find the year (2005 – 2010) that had the largest enrollment. Print the year and the largest enrollment. This is not going to be quick – it can take some thinking !

To start:

a) Download the [Table-2DArrayJar.jar](https://blackboard.ric.edu/bbcswebdav/xid-266568_2) jar file for the Table class.

b) Open the jar file in BlueJ – using Project -> Open non-BlueJ

c) Save this project as LAB4

d) Download the 2 input files and save them inside the LAB 4 folder

e) Change the name of the class TableApp to SchoolEnrollment

1) In the  **Table** class add the following accessor method:

*public int [] [] get2DimArrayFromTable()*

*{*

*return table;*

*}*

2) In the  **Table** class write the following method that will add the elements of the two tables as parameters and store in a new Table and return it. My comments are hints to write the code. (This is a static method – so is not called on any object – and will be called as ***Table.addTables***(…, …).)

*public static Table addTables (Table atable1, Table atable2)*

*int [] [] a1, a2;*

*// set a1 to be the 2Dim array of atable1*

*// set a2 to be the 2Dim array of atable2*

*// declare and create a* ***new******Table******object*** *named* ***tableSum*** *– pass appropriate parameters to the constructor of Table using length of a1*

*//declare a variable* ***aSum****, and set it to be 2DimArray in tableSum*

*// add each element of a1 to a2 and store in aSum (nested for loops)*

*//return tableSum*

}

3) In the main method of ***SchoolEnrollment*** class: Delete any code in the main method, and do the following”

a) Declare and create three Table object variables.

Use any 3 appropriate names such as: table1, table2, totalEnrollment

To find out their dimensions/parameters for the Table constructor, check the data in the input files ***School1.txt*** or ***School2.txt***

b) Write a method call- to store the data in ***School1.txt*** – into table1

c) Write a method call- to store the data in ***School2.txt*** – into table2

d) Write code – using a method call – to assign an appropriate value to the 3rd table: totalEnrollment

e) Write a method call – to compute the row and column sums of the 3rd table and write that into an output file called “Total.txt”

Upload by Friday, February 21, 2013: Zipped file of your completed lab project. This should include the 2 input files and the output file.

**Input Files:**

School1.txt School2.txt

20 35 33 42 45

25 30 26 36 40

30 27 32 28 35

28 34 30 34 25

22 39 33 38 40

18 28 42 37 44

16 18 22 28 30

22 24 17 21 25

24 30 22 20 20

23 32 28 23 18

25 28 33 27 24

19 34 30 31 27

Note: If you have done the program correctly, this is what your output file should be:

**OutputFile**: TOTAL.TXT

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| 36 | 53 | 55 | 70 | 75 | 289 |
| 47 | 54 | 43 | 57 | 65 | 266 |
| 54 | 57 | 54 | 48 | 55 | 268 |
| 51 | 66 | 58 | 57 | 43 | 275 |
| 47 | 67 | 66 | 65 | 64 | 309 |
| 37 | 62 | 72 | 68 | 71 | 310 |
| 272 | 359 | 348 | 365 | 373 |  |