**Computer Science 2**   **Lab # 01**



**Dr. Hanh Pham**

**Student Last Name: Martinez Student First Name: Adriel**

**CS2 Section # 01**

**Due:** Problem A by the **end of the lab** and Problems B by the end of **Saturday** of the same week.

**TOPIC:**

**Project A:**

**Problem Description:**

1) Problem A is at MyProgrammingLab # 71018 (chapter 8, Programming Projects)

**Analysis:**

(Describe the problem including input and output in your own words. Type your answer in the following with **BLUE font color**)

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| **…**  **INPUT: The user would have to manually input an integer for the dimension n (signifies the number of rows and columns), this creates the array and the user also inputs the elements of each matrix row separated by spaces. So, if the user inputs 4 for n, a 4 by 4 array is created and expects 4 elements per row.**  **OUTPUT: After giving in a dimension for the array and filling it up with elements, the array goes through the method, sumMajorDiagonal, which determines the sum of all major diagonal elements of the matrix and prints out the sum.** |

**Design:**

(Describe the major steps for solving the problem. Type your answer in the following with **BLUE font color**)

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| **The major steps for solving this problem was to find out how each row of the matrix would be filled up by the user’s input in the exact way the example on MyProgramming lab wanted it to be. When using the nested for loop in the main method, in between the two loops, I inserted a print statement, telling the user to input the elements for a particular row. For the method, another major step was to calculate the sum of all the major diagonal elements. For this I used a for loop and started off using the array’s first row and first column’s element and continually incremented by one so that it would only add up the subsequent diagonals.** |

**Coding:** (Copy and Paste Source Code here. Type your answer in the following with **BLUE font color**)

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| **import java.util.Scanner;**  **public class SumMajorDiagonal{**  **public static void main(String[] args) {**  **Scanner input= new Scanner(System.in);**  **System.out.print("Enter dimension n of nxn matrix:");**  **int n= input.nextInt();**  **//array created**  **double[][] array=new double[n][n];**  **for(int x=0;x<n;x++){**  **System.out.print("Enter row "+ x +":");**  **for(int y=0;y<n;y++){**  **array[x][y]=input.nextDouble();**  **}**  **}**  **System.out.println(sumMajorDiagonal(array));**  **}**  **public static double sumMajorDiagonal(double[][] m){**  **double sum=0;**  **for(int j=0; j<m.length;j++){**  **sum+=m[j][j];**  **}**  **return sum;**  **}**  **}** |

**Testing:** (Describe how you test this program. Type your answer in the following with **BLUE font color**)

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| **RUN three times, using the same input as in the sample runs:**  **Test 1:**  **Enter dimension n of nxn matrix 3**  **Enter row 0:5.0 6.4 7.8**  **Enter row 1:1.2 3.6 2.0**  **Enter row 2:8.8 6.7 3.0**  **11.6**  **Test 2:**  **Enter dimension n of nxn matrix 5**  **Enter row 0:5.0 6.4 7.8**  **Enter row 1:1.2 3.6 2.0**  **Enter row 2:8.8 6.7 3.0**  **11.6**  **Test 3:**  **Enter dimension n of nxn matrix:5**  **Enter row 0:1.2 13.4 5.6 3.4 9.4**  **Enter row 1:3.4 5.6 7.2 1.3 1.1**  **Enter row 2:1.1 5.6 4.8 9.4 3.2**  **Enter row 3:2.1 4.5 5.4 5.5 3.4**  **Enter row 4:1.1 2.4 0.6 4.4 1.1**  **18.200000000000003** |