Northeastern Illinois University
CS207, Object-Oriented Programming and Data Structures, Summer 2022
Homework 3
Due date: Thursday 6/23/2022 at 11:59 p.m.

Problem 1:

Complete the **`sumOfDiagonals`** method in **SumOfDiagonals.java** to do the following:

- The method takes a 2D **`String`** array **`x`** as a parameter and returns no value.

- The method should calculate and print the sum of the elements on the major diagonal of the array **`x`**.

- In order to have a major diagonal, the array passed into the method should be a square ***(n-by-n),*** if it's not a square your program should handle that situation by throwing an exception. (**Do Not worry about ragged arrays**)

- If the array is a square, but there is a non-integer value on the major diagonal, your program should handle that situation by throwing an exception.

- When handling the exceptions, be as specific as you can be, **(i.e. Do Not just use the `Exception` class to handle all exceptions in one catch block).**

- Make the proper calls to the **`sumOfDiagonals`** method from the main method to test your **`sumOfDiagonals`** method on all the String arrays provided in the main method.

- Sample runs provided on the next page.

Argument Array x	Output
{{"2", "3", "4"}, {"5", "6", "7"}, {"8", "9" , "10"}}	18
{{"1", "2", "3"}, {"5", "6", "7"}, {"9", "10", "11"}, {"13", "14", "15"}};	Array not a square
{{"1", "2", "3", "4"}, {"5", "6", "7", "8"}, {"9", "10", "11", "12"}, {"13", "14", "15", "pp"}};	Not a valid integer
{{"1", "2", "3", "4"}, {"5", "6", "7", "8"}, {"9", "10", "11", "12"}, {"13", "14", "15", "16"}};	34

Instructions:

- Download the needed files and look for SumOfDiagonals.java.
- Complete SumOfDiagonals.java.
- Place SumOfDiagonals.java in a folder named YourName_HW9

Problem 2: What is the exact output of the following program, you should trace this program by hand, and save output as .pdf then add it to YourName_HW9 folder.

```
public class Tracing
{
   public static void main(String[] args)
   {
      String str = "HELLO-WORLD!!";
      String[] a = {"3", "4", "35", "0", "27", "0", "0", "90", "40", "55", "68"};
      String[] b = {"12", "", "0", "23", "w", "0", "f", "0"};

      for(int i = 0; i < a.length + 1; i++)
      {
         try
         {
            if(i < a.length - 2)
            {
               int x = Integer.parseInt(a[i + 1]);
               int y = Integer.parseInt(b[i]);
               System.out.println(x / y);
               System.out.println(str.charAt(i * 10));
               System.out.println("No exception this time.");
            }
            else if(i >= b.length)
            {
               int x = Integer.parseInt(b[i - 2]);
               int y = Integer.parseInt(a[i]);
               System.out.println(x / y);
            }
         }
         catch(ArithmeticException e)
         {
            System.out.println("Invalid Arithmetic Operation");
         }
         catch(ArrayIndexOutOfBoundsException e)
         {
            System.out.println("Array Out Of Bounds");
         }
         catch(StringIndexOutOfBoundsException e)
         {
            System.out.println("String Out Of Bounds");
         }
         catch(NumberFormatException e)
         {
            System.out.println("hmmm, can't convert.");
         }
      }
   }
}
```

Problem 3:

Download the needed files and look for the data.txt file. This file should have multiple lines, each line has first name, last name followed by multiple integers.

- Create a class named `MaximumOfEachLine` with a main method.
- Read the data from the "data.txt" file.
- Find the maximum integer in each line.
- Display the first name and the last name followed by the maximum integer found in that line.
- Make sure to have the proper import statements.
- Your code must handle `FileNotFoundException`.
- If the file is missing, your program should display "File Not Found".
- If you did all the above correctly, this is the output you should get:

```
Samantha Johns  Max: 99
Michael Smith   Max: 100
John Michael    Max: 92
Mary Hernandez  Max: 92
George Johnson  Max: 93
Sara Anderson   Max: 83
Susan John      Max: 84
Mark Smith      Max: 69
```

General Instructions:

- No hard copies will be collected.

- Do not send your files through the email!

- You should submit your work by the due date, **No** extensions will be given. (See syllabus for late homework policy).

- DO **NOT** turn in multiple files, only one .zip file.

What to turn in:

There should be two **.java** file(SumOfDiagonals.java & MaximumOfEachLine.java) and one **.pdf** file. put the file into a zip file and name it <YourFirstName_YourLastName>.zip, submit the zip file into the Dropbox on D2L.

How to zip multiple files?

On Windows: Select all the files > right click > Send to > Comprised File

On Mac: Select all the files > Click/Tap with two fingers > Compress Items