Assignment 1 **Due: September 18, 2024, 11:59 PM**

Please upload your assignment as a zip folder [FirstName_LastName_Assignment1]
Edit the Programs in such a way that your Main Class Name will be [FirstName_LastName_Problemno.]
Total Points: 50
Problem 1: Diagonal Difference [15 Points]

Given a square matrix, calculate the absolute difference between the sums of its diagonals.

For example, the square matrix **arr** is shown below:

1 2 3
4 5 6
9 8 9

The left-to-right diagonal 1 + 5+ 9 = 15. The right to left diagonal 3 + 5+ 9 = 17. Their absolute

difference is |15 – 17| = 2.

}

You should have a function named diagonalDifference that takes the following parameter:

- *int arr[n][m]*: an array of integer

Return

- *int*: the absolute diagonal difference

Input Format

The first line contains a single integer **n**, the number of rows and columns in the square matrix

arr.

Each of the next lines describes a row, **arr[i],** and consists of **n** space-separated integers **arr[i][j]**.

Constraints

Array size m x n must be less than 100 x 100

Output Format

Return the absolute difference between the sums of the matrix's two diagonals as a single integer.

Sample Input

3
1124
4 5 6
10 8 -12

Sample Output

15

Explanation

The primary diagonal is:

11
  5
    -12

Sum across the primary diagonal: 11 + 5 - 12 = 4

The secondary diagonal is:

    4
  5
10

Sum across the secondary diagonal: 4 + 5 + 10 = 19

Difference: |4 - 19| = 15 **Note:** |x| is the absolute value of

Problem 2: [10 Points]

Each new term in the Fibonacci sequence is generated by adding the previous two terms. By starting with 1 and 2, the first 10 terms will be:1, 2, 3, 5, 8, 13, 21, 34, 55, 89, …

By considering the terms in the Fibonacci sequence whose values do not exceed four million, find the sum of the even-valued terms.

Problem 3: [15 Points]

Write a static method that takes an ArrayList of Strings and an integer and modifies the ArrayList destructively to eliminate all Strings whose length is less than the integer argument. So, if the integer argument is 4 and the ArrayList is the following:

tomato	cheese	chips	Fruit	Pie	butter	tea	buns

After performing the operation, we will have the following output:

Tomato	cheese	Chips	fruit	butter	buns

Write a complete java program showing the operation.

Problem 4: [10 Points]

Write a different static method that performs the same operation as the one in question 3, but it does so constructively instead of destructively.

Write a complete java program showing the operation.

Note: Please refer to this documentation under the section titled **Methods which take ArrayList arguments** for understanding the concept of constructive and destructive methods.