# CSE101L Computer Programming Laboratory QUIZ 2

## Disclaimer:

You will submit your file to an assignment that is given through MS teams. **Your filename should be "Quiz2_yourStudentNumber.java". So if your student number is 202051056016, then the file you need to submit will have the name Quiz2_202051056016.java. If your file does not include your student number in its name, I cannot grade it. This doesn't necessarily means that your file will include '.java' in the name, but its file extension will be java.**

Submissions made after the deadline will not be accepted, be sure to submit your work before the due date and **make sure to click turn in button**. Your code will be automatically graded, so be sure to have only one public class in your file that has the same name with your file. Failure to do so may result in you receiving 0 from this quiz. You will turn in a single java file.

## Questions:

1. Sort Characters in a String:

Write a method **sort** that sorts a given string and returns it. The sorting should be case insensitive and numeric characters should be placed after the alphabetic characters. You do not have to consider Turkish characters.

2. Locker Puzzle:

A school has N lockers and N students. All lockers are closed on the first day of school. As the students enter, the first student, denoted as S1, opens every locker. Then the second student, S2, begins with the second locker, denoted L2, and closes every other locker (every second locker). Student S3 begins with the third locker, L3, and changes every third locker (closes it if it was open, and opens it if it was closed). Student S4 begins with L4 and changes every fourth locker. S5 starts with L5 and changes every fifth locker, and so on, until student SN changes LN.

After all the students have passed through the building and changed the lockers, which lockers are open? Find the indices of lockers that are open and return them as counting numbers (this means index 0 should be 1, so add +1 to each index value you are storing in returned array).

Write this method **lockerPuzzle** that takes Boolean array of any length and returns indices of open lockers as counting numbers

3. Markov Matrix:

An n * n matrix is called a positive Markov matrix if each element is positive and the sum of the elements in each column is 1. Write a method **isMarkovMatrix** to check whether a matrix is a Markov matrix.

4. Moving Average:

A moving average is a statistical calculation used to smooth out fluctuations in data by creating a series of averages of different subsets of the full data set. This involves taking the average of a subset of data points within a given window or period, and then shifting the window across the dataset to create a series of average values

Write a method **movingAverage** that reads a source and writes the moving average of the numeric values in the source file to the destination file. movingAverage method should take source file name, destination file name and window size.

A simple example of moving average calculation for window size 5:

Source Serie: 16, 4, 6, 6, 14, 10, 8, 6, 19, 5

Moving Average: 9.2, 8, 8.8, 8.8, 11.4, 9.6

5. Recursion:

Implement following methods using recursion:

- Write a recursive **factorial** method to calculate factorial of a number
- Write a recursive **isPalindrome** method that checks a given string is palindrome or not.
- Write a recursive **decimalToBinary** method that converts a given integer to binary number.