INTRODUCTION TO COMPLEX SYSTEMS, JAVA, MVN, AND GIT

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1 Introduction

With the help of Maven and Git, a mean and standard deviation calculator was developed. For this program the input was read from a file with n real numbers.

2 Content

- **Mean**: The mean or average consists of the result obtained by creating a division between the sum of the different quantities by the number that represents the total amount of quantities in the set. [1]
- **Standard Deviation** The standard deviation allow us to understand how close the numbers of a set are to the mean. [2]

3 Design

3.1 Class Diagram

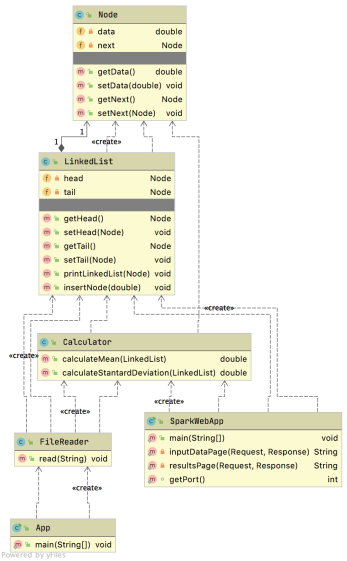

Figure 1: Class Diagram

3.2 Design Description

In order to build the data structure required to solve this problem, there are two classes involved: Node and LinkedList

1. **Node**:This class represents each node of the linked list, in here we are going to store the data as well as the next node so we have its neighboor

2. **LinkedList**: This class represents the hole structure of the linked list, in here there can be found the required operations to insert and get nodes, and display the linked list to the end user

4 Execution and Tests

In order to successfully execute the program and tests, follow the next step by step:

1. First, download the project from GitHub executing the following command:

   ```
   git clone https://github.com/srubianof/AREP-LAB-1.git
   ```

2. Second, built the project using maven:

   ```
   mvn package
   ```

3. Third, execute the project with java, keep in mind to put the right file name where the data sets are located:

   ```
   java -cp target/ComplexSystems-1.0-SNAPSHOT.jar
   edu.escuelaing.arem.ASE.app.FileReader "data.txt"
   ```

4. Fourth, execute the tests, the idea of each test is to verify right behaviour of each class

   ```
   mvn test
   ```

5 Conclusion

Overall, the execution of the proposed workshop succeeded in showing the advantages of the use of linked lists where faster access time was the most outstanding one.

References

[1] Statistics intro: Mean, median, amp; mode (video). (n.d.). Retrieved August 08, 2020, from https://www.khanacademy.org/math/ap-statistics/summarizing-quantitative-data-ap/measuring-center-quantitative/v/statistics-intro-mean-median-and-mode

[2] ¿Qué es la desviación estándar? (n.d.). Retrieved August 08, 2020, from https://support.minitab.com/es-mx/minitab/18/help-and-how-to/statistics/basic-statistics/supporting-topics/data-concepts/what-is-the-standard-deviation/