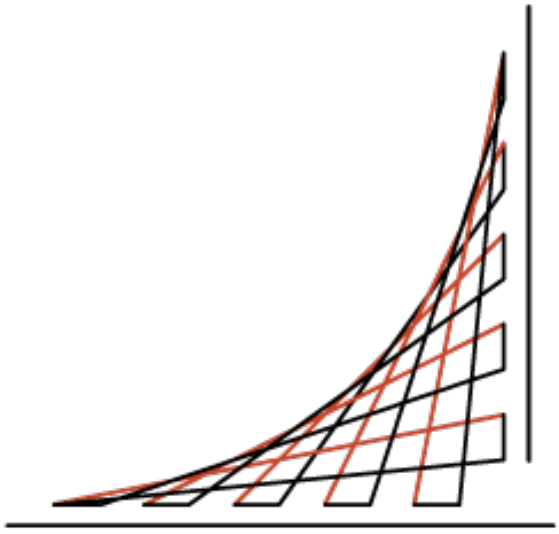

ESCUELA COLOMBIANA DE INGENIERÍA
JULIO GARAVITO

VIGILADA MINEDUCACIÓN

SYSTEMS ENGINEERING

Arquitecturas Empresariales

Workshop 1

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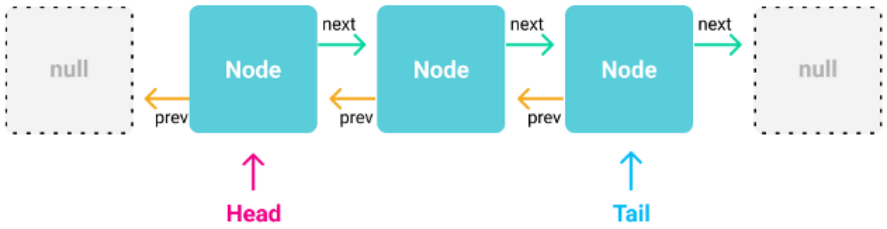
1 Introducction

The objective of this workshop is to write a calculator that allows you to obtain its values from a linked list to use them in the mathematical formula of standard deviation and mean, this linked list is created from scratch without using the main libraries and using the data entered by archive.

2 Linked List

The linked list are a bit complex data structures where memory allocation is done at runtime, they are simply a set of ordered nodes containing values.



medium.com/@bohndez.dev Linked List

3 Calculator

3.1 Mean

The mean is the average of a set of data. The average is the most common measure of location for a set of numbers. The average locates the center of the data.

The formula for calculating the mean is:

$$x_{avg} = \frac{\sum_{i=1}^{n} x_i}{n} \tag{1}$$

3.2 Standar Deviation

Standard deviation is a measure of the spread or dispersion of a set of data. The more widely the values are spread out, the larger the standard deviation. For example, say we have two separate lists of exam results from a class of 30 students;

$$s = \sqrt{\frac{\sum_{i=1}^{n} (x_i - x_{avg})^2}{n-1}} \tag{2}$$

4 Workshop

Write a program to find the mean and standard deviation of a set of n real numbers. Your program reads the n real numbers from a file. Test the program thoroughly. At

least two tests must use the data in the columns of Table 1. The expected results are provided in Table 2.

Column 1	Column 2
Estimate Proxy Size	Development Hours
160	15.0
591	69.9
114	6.5
229	22.4
230	28.4
270	65.9
128	19.4
1657	198.7
624	38.8
1503	138.2

Table 1

Figure 1: Table 1

5 Answer

When executing our code, the files with the data it contains are analyzed and immediately the new types of linked lists are created that will serve so that the calculator class can obtain its mean and standard deviation.

As we see in figure 3, the result that our program gives is the same as the one proposed in the workshop and with this we verify the correct operation of the software.

Test	Expected Value		Actual Value	
	Mean	*Std. Dev*	*Mean*	*Std. Dev*
Table 1: Column 1	550.6	572.03		
Table 1: Column 2	60.32	62.26		

Table 2

Figure 2: Table 2

```
D:\Semestre\arep\Laboratorios\Laboratorio1\laboratorio-AREP-1>mvn exec:java -D "exec.mainClass"="edu.escuelaing.Arep.main"
[INFO] Scanning for projects...
[INFO]
[INFO] ---------------< edu.escuelaing.Arep:laboratorio-AREP-1 >---------------
[INFO] Building laboratorio-AREP-1 1.0-SNAPSHOT
[INFO] --------------------------------[ jar ]---------------------------------
[INFO]
[INFO] --- exec-maven-plugin:3.0.0:java (default-cli) @ laboratorio-AREP-1 ---
mean table1 Column 1= 550.6  desviation table Column 1= 572.03
mean table1 Column 2= 60.32  desviation table Column 2= 62.26
```

Figure 3: Answer

6 References

https://visualgo.net/en/list

https://www.programiz.com/java-rogramming/examples/standard-deviation

https://medium.com/@bohndez.dev/estructuras-de-datos-linked-list-en-javascript.