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# What is Java?

Java Introduction

Java is a popular programming language, created in 1995.

It is owned by Oracle, and more than **3 billion** devices run Java. It is used for:

* Mobile applications (especially Android apps)
* Desktop applications
* Web applications
* Web servers and application servers
* Games
* Database connection
* And much, much more!

# Why Use Java?

Java works on different platforms (Windows, Mac, Linux, Raspberry Pi, etc.) It is one of the most popular programming languages in the world

It has a large demand in the current job market It is easy to learn and simple to use

It is open-source and free

It is secure, fast and powerful

It has a huge community support (tens of millions of developers)

Java is an object-oriented language which gives a clear structure to programs and allows code to be reused, lowering development costs

As Java is close to [C++](https://www.w3schools.com/cpp/default.asp) and [C#](https://www.w3schools.com/cs/default.asp), it makes it easy for programmers to switch to Java or vice versa

# Exercise 1:

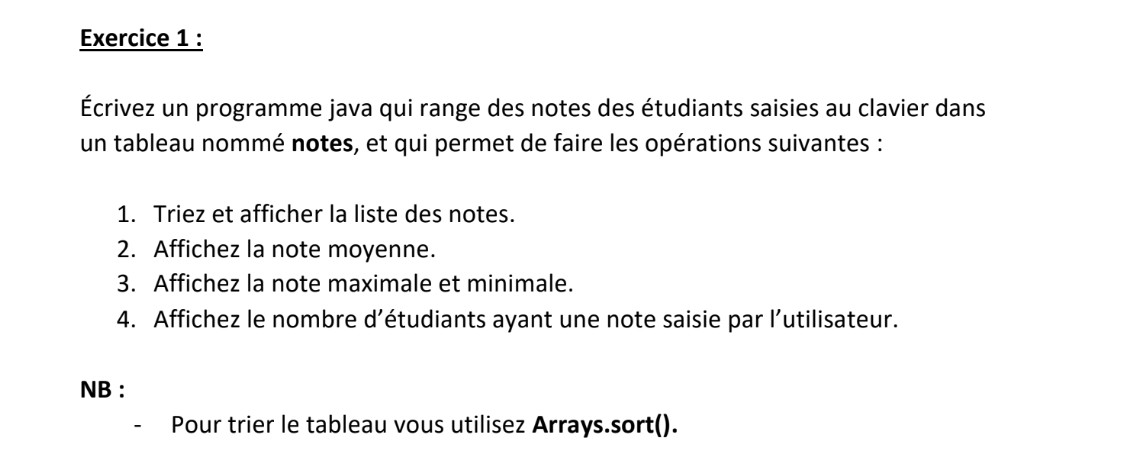
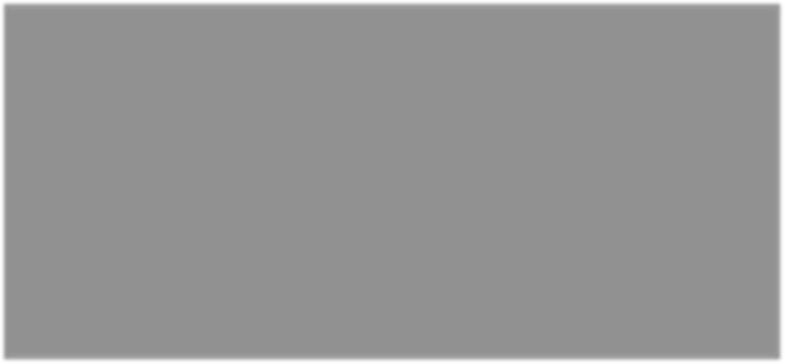
The first exercise is about learning how to use arrays and their different methods in Java Such as:

**Array. Length**: In **Java**, the **array length** is the number of elements that an array can holds. There is no predefined method to obtain the length of an array.

**Array. Sort**: The Arrays class of ‘java.util’ package provides the sort method that takes an array as an argument and sorts the array. This is a direct sorting method, and you can sort an array with just one method call.

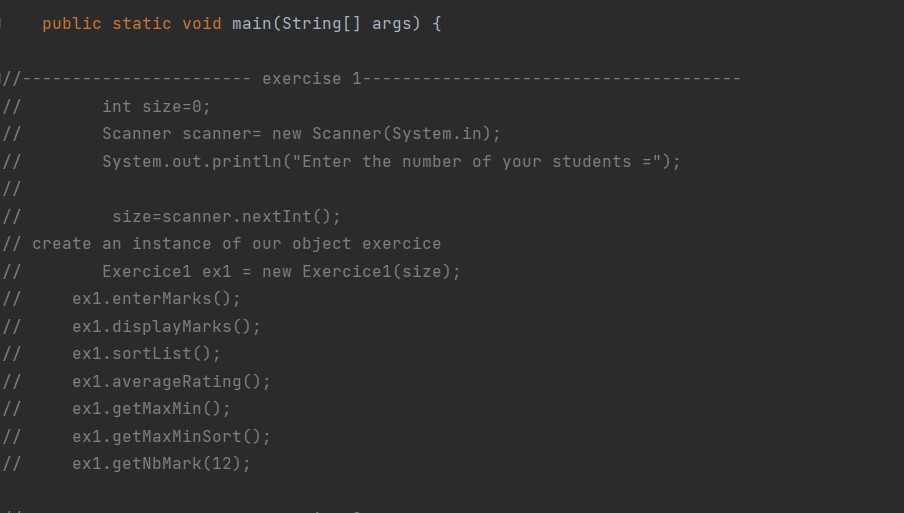
**Math. Min**: The Java.lang.math.min() function is an inbuilt function in java that returns the minimum of two numbers

**Math.max** : The Java.lang.math.min() function is an inbuilt function in java that returns the maximum Of two numbers .



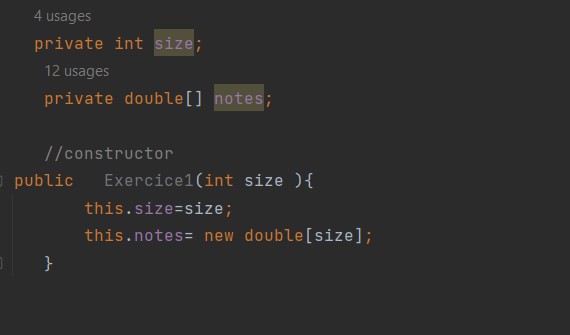
*Figure 1: Exercise 1*

The first step we need to do is create an instance (object) of our Class 1 exercise. Then scan to get the number of students the user wants to enter their grades.



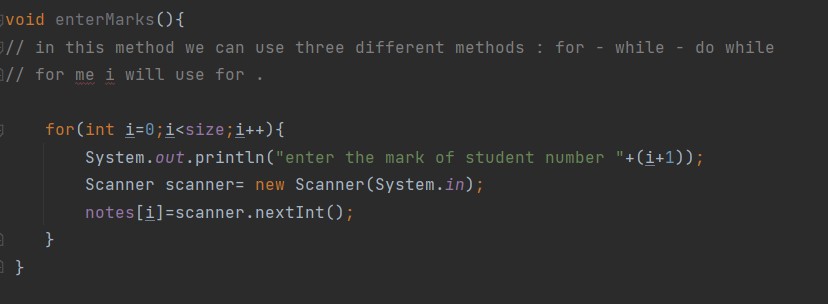
*Figure 2: main method*

Implementation of constructor will be the second step to build and fix the size of notes array



*Figure 3: constructor of class Exercise1*

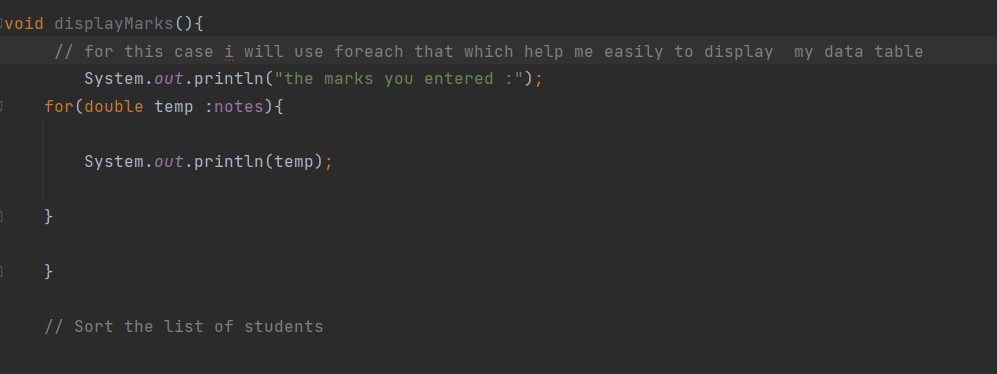
Then we should implement the method which will help us to enter marks of students



*Figure 4: Enter Marks Method*

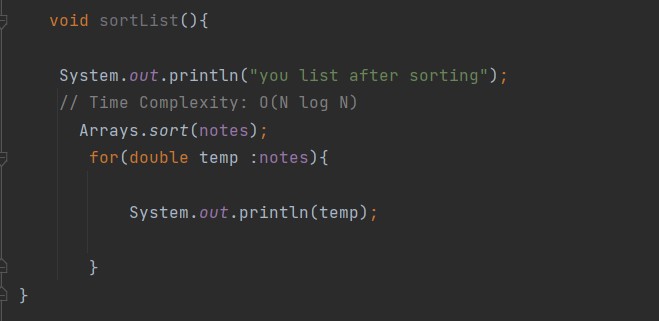
To display the data that we are stocked in notes array we should get the size of array to use it in loop for.

Array. Length: is the method to get the size of an array



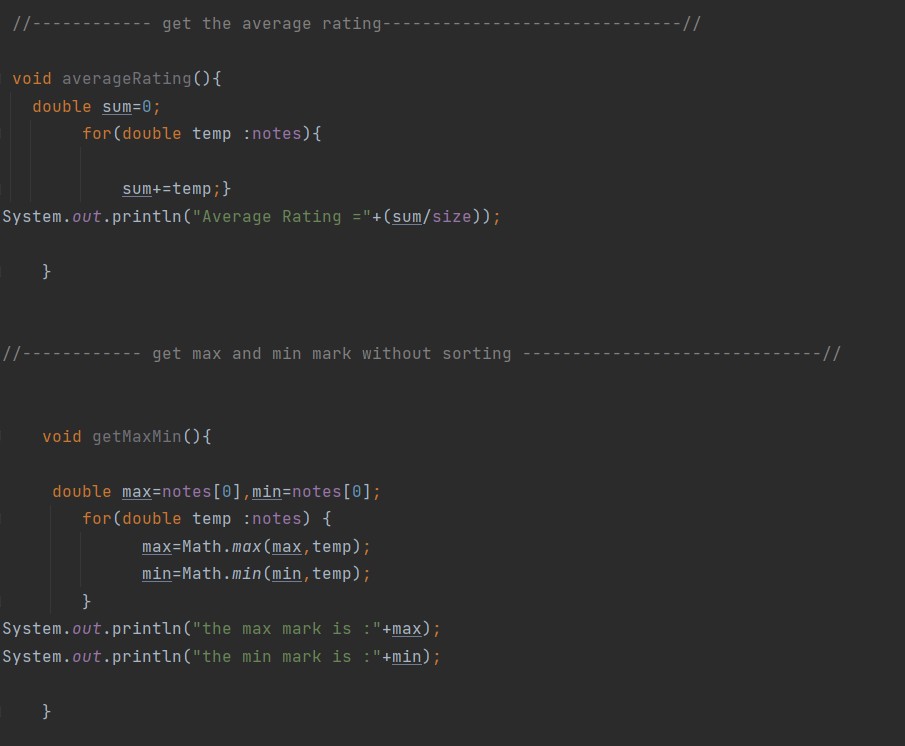
*Figure 5: Display Marks Method*

In this case I use foreach to display marks. Foreach is faster because the local variable that stores the value of the element in the array is faster to access than an element in the array



*Figure 6: Sort Marks Method*

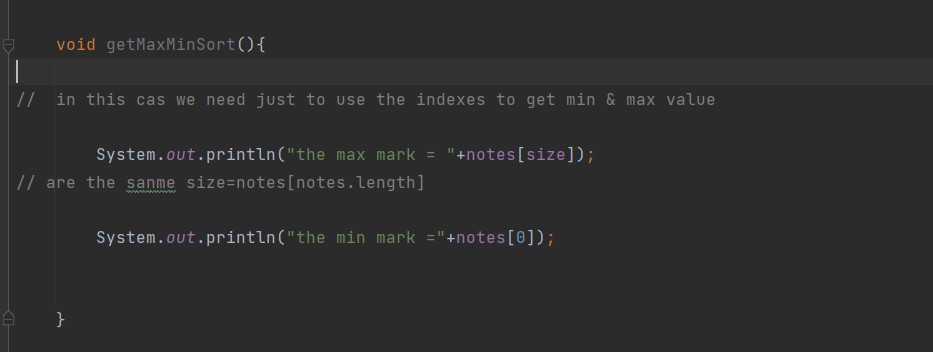
The sort() method sorts the elements of an array [in place](https://en.wikipedia.org/wiki/In-place_algorithm) and returns the reference to the same array, now sorted. The default sort order is ascending, built upon converting the elements into strings, then comparing their sequences of UTF-16 code units’ values.

*Figure 6: Sort Marks Method*

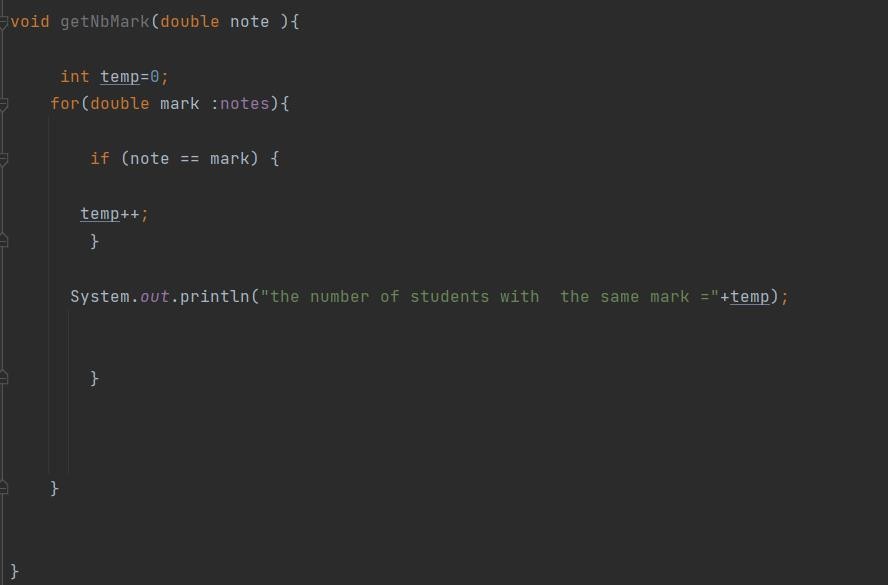
*Figure 7: Average-rating & Marks Method*

The second way to get min and max values is after sorting array Min: the first element

Max : will be the last element after sorting

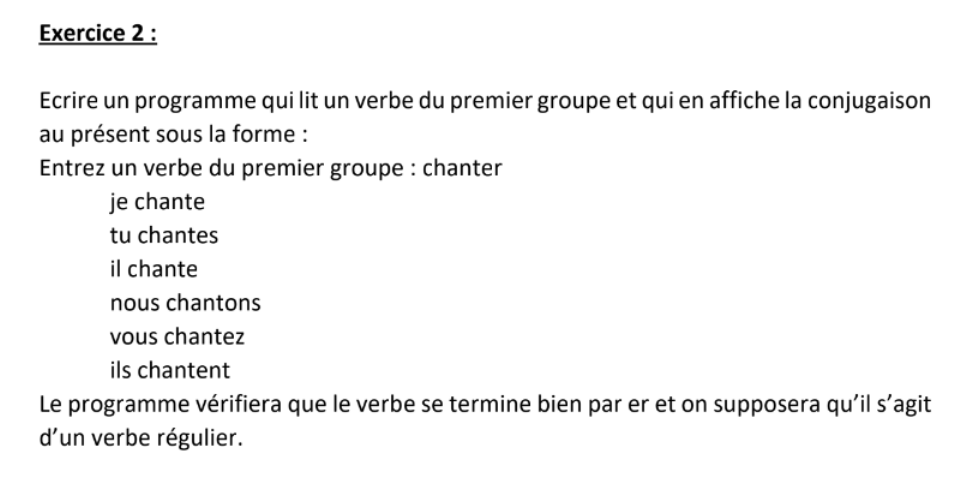
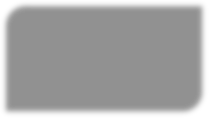


*Figure 8: Min - Max Marks Method*

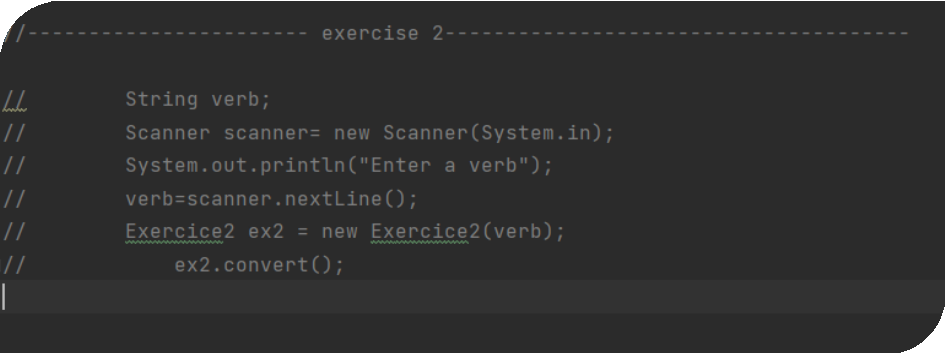
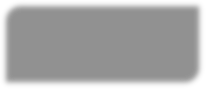


*Figure 9: get NbMarks Method*

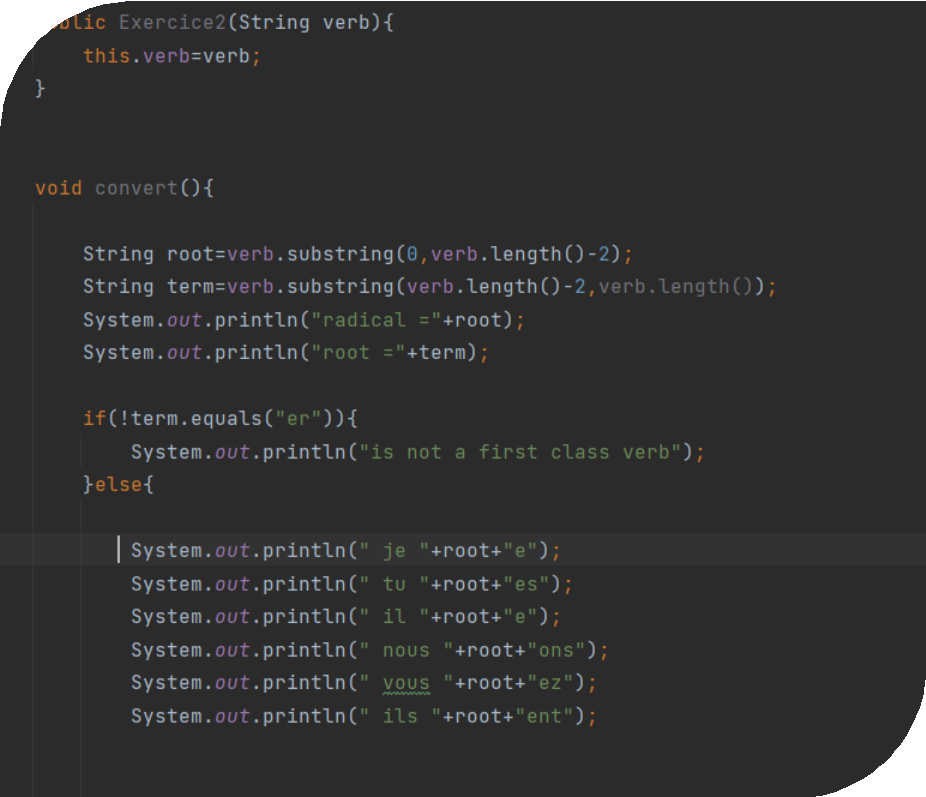
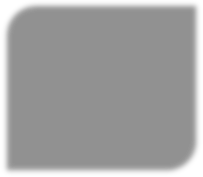
# Exercise 2:



*Figure 9: the second exercise*



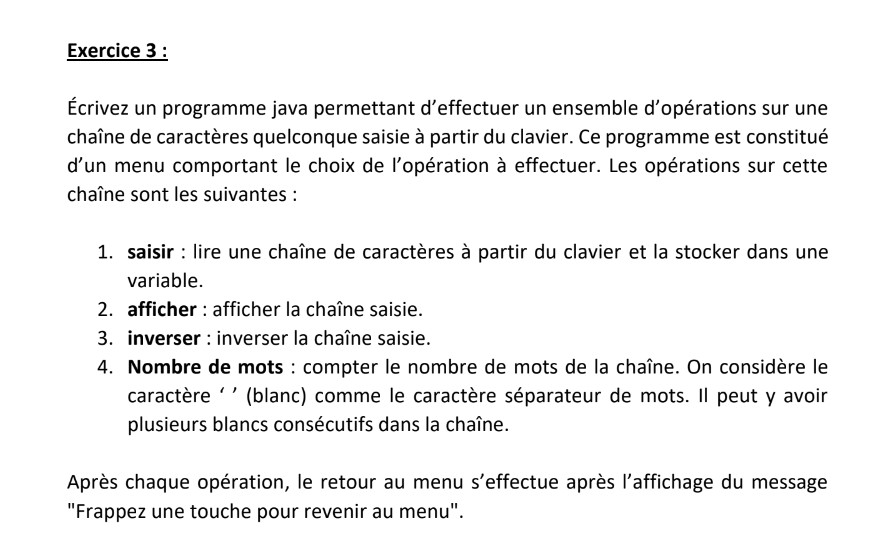
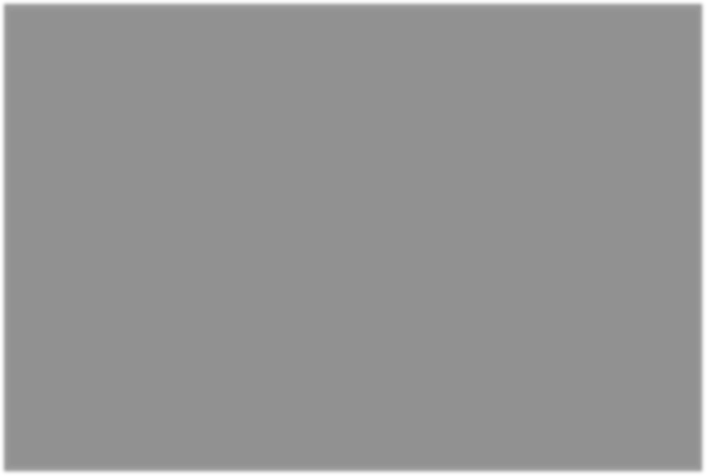
*Figure 10: the main method*



*Figure 11: convert method*

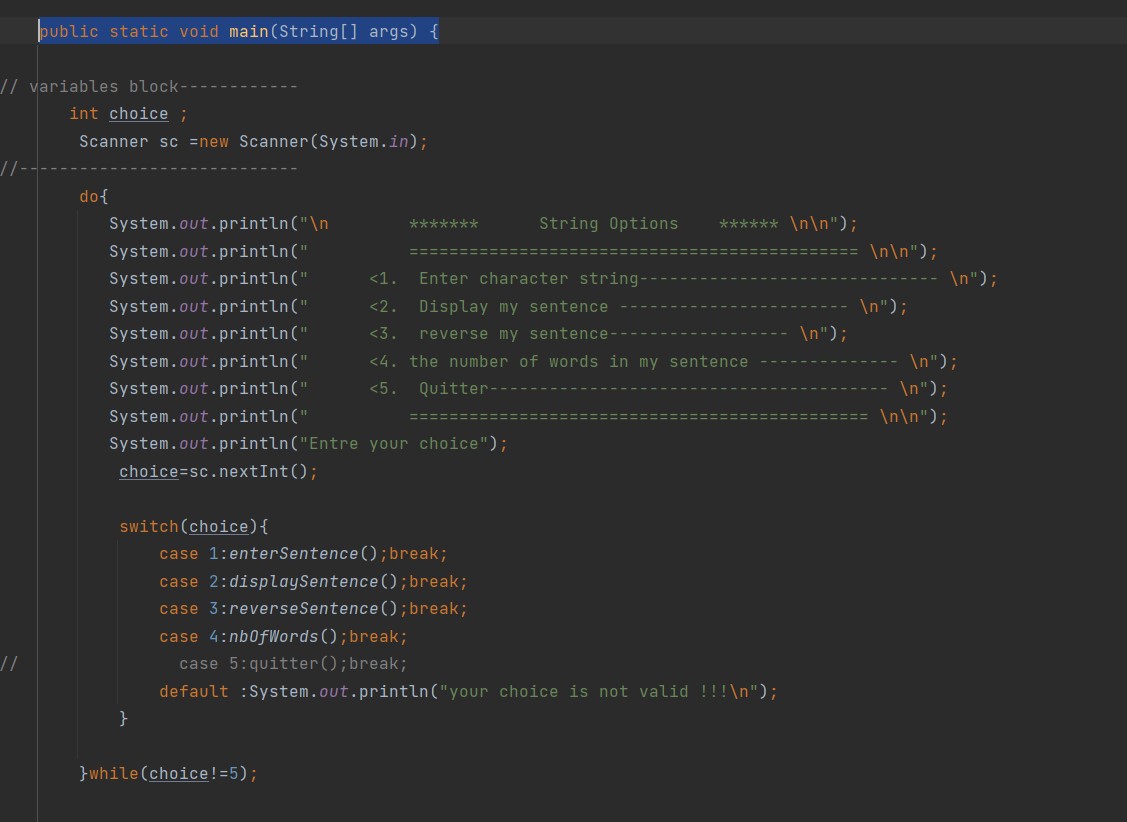
This program reads a verb of the first group and displays its conjugation, but before that we need to check if the verb response to the condition.

# Exercise 3:

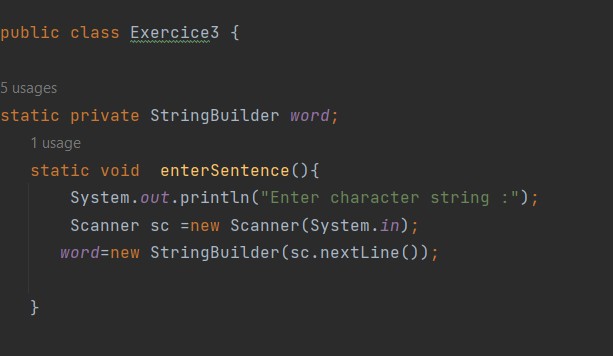


*Figure 12: the third exercise*

Main method should display to the users a table of options to choose the type of operation wanted

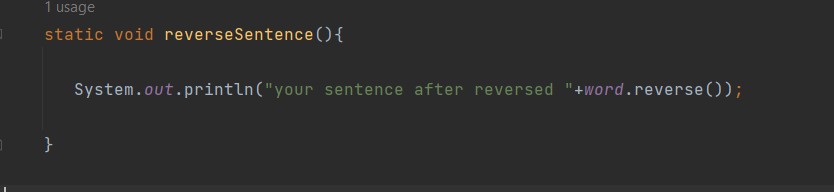


*Figure 13: main method*



*Figure 14: Enter sentence method*

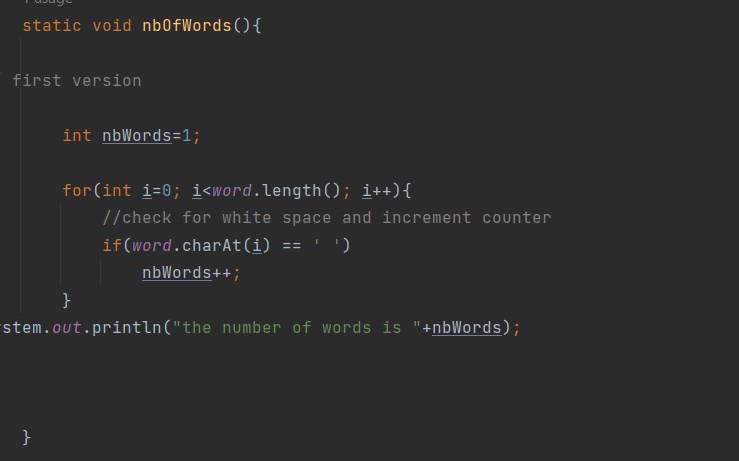
In this exercise I use StringBuilder instead of string for many reasons: StringBuilder in Java is a class used to create a mutable, or in other words, a modifiable succession of characters. Like StringBuffer, the StringBuilder class is an alternative to the Java Strings Class, as the Strings class provides an immutable succession of characters.



*Figure 15: Reverse method*

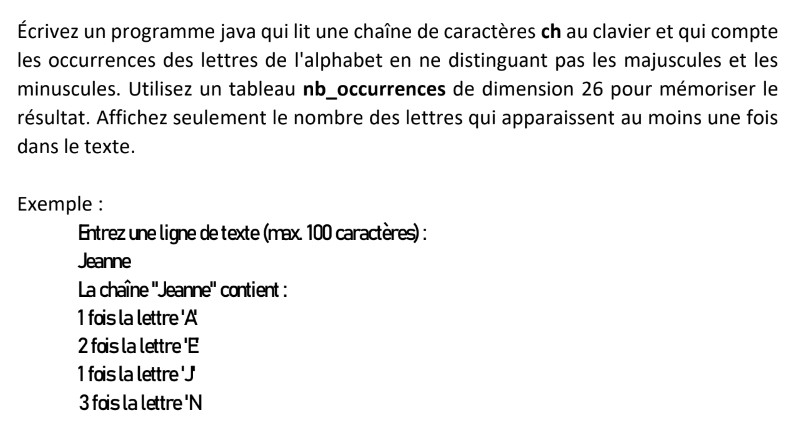
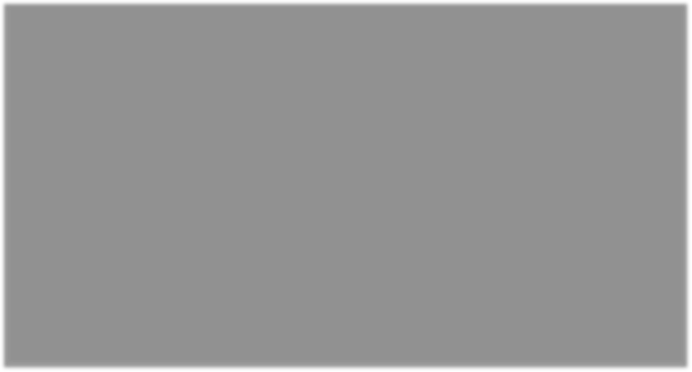
The **reverse()** method of StringBuilder is used to **reverse the characters in theStringBuilder**. The method helps to this character sequence to be replaced by the reverse

of the sequence.



*Figure 16: Get Number of words method*

# Exercise 4:



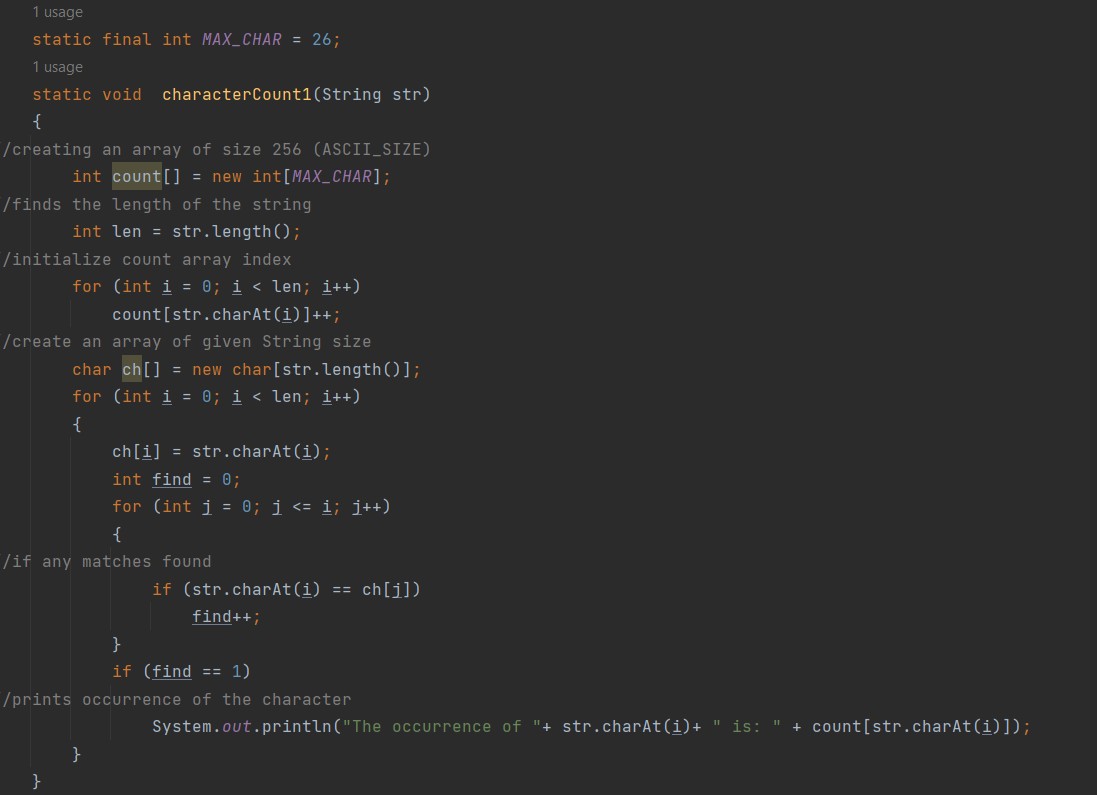
*Figure 17: EXERCISE 4*



*Figure 17: Character count method*

Given a string, the task is to write a program in Java which prints the number of occurrences of each character in a string.

* Declare a Hashmap in Java of {char, int}.
* Traverse in the string, check if the Hashmap already contains the traversed character or not.
* If it is present, then increase its count using [get() and put() function in Hashmap](https://www.geeksforgeeks.org/hashmap-get-method-in-java/).
* Once the traversal is completed, traverse in the Hashmap and print the character.



*Figure 17: Character count method 2*

*The second way to get character count is using this way :*

* Creating an array to count number of occurrences
* Initialize array of occurrence

o Create an array of given string size .

# Conclusion

Java is one of the most popular programming languages in the world, which you can use to develop web apps, mobile apps, and desktop apps. This lab therefore allows you to have a general idea of the java syntax,