

Exercises 10 Strings

Exercise 1.10 - Average value

Write a program which calculates the average of integers entered in the command line.

For example:

```
java Exo10_1 8 10 9
the average value is 9.
```

Exercise 10.2 - Equality of content

Write a method that checks if an array and a string contain the same characters in the same order. You will write a `main()` method to test this method.

Exercise 10.3 – Equality independent from case value

Write a method testing whether two strings contain the same characters in the same order, **uppercase** and **lowercase** letters of the same character are considered identical.

Exercise 10.4 - Array not full

You want to store in an array the notes of a student. We want to keep the same array throughout the year, while the number of notes varies: at the beginning, there is none, then little by little, there is more. As an array has a fixed size and can not change, it will take a relatively large space and leave some boxes empty. In fact, these boxes contain irrelevant information that our program will not take into account.

Note that there will always be an integer in each box, no matter what. Our program does not interpret them as notes, he does not even look.

Operations we want to perform on the array are: add a note, view all notes and calculate the average of the student.

- **Solution 1**: store the number *N* of notes in a variable of type `int`. We put the notes in the first *N* cells of the array. Boxes from the index *N* +1 are "empty".

Example:

```
t1: 0  1  2  3  4  5  6  7
    12 15 10 19 8  7 15 -25
```

N=3.

Boxes whose indices are between 0 and *N*-1 (0, 1, 2) are loaded, while the boxes are between *N* and `t1.length-1` (3, 4, 5, 6, 7) are empty

- **Solution 2:** use a particular value of type `int` to represent the non-rating, or the absence of note. We put this value in the unused boxes. In our exercise, 0 is a useful value for notes. So do not choose value 0 to denote the non-occupation. We can however choose -1 that does not correspond to a note, or `Integer.MIN_VALUE`, the smallest value of type `int`.

Example:

```
t1:  0  1  2  3  4  5  6  7
     12 15 -1 10 -1 -1 -1 -1
     -
```

- **Solution 3:** Use in conjunction with the notes array a Boolean array in which each cell indicates whether the corresponding box of array note is used (true).

Example:

```
t1:   0    1    2    3    4    5    6    7
      12   15   13   10    8    9   13   14

t2:   0    1    2    3    4    5    6    7
      true  true  true false false false false
```

In this example, the boxes 0, 1 and 3 are used. Others are free.

1. Of these three solutions, which do you prefer? Why? In your reasoning, do you take into account the operations on the array.

2. Using the best solution, write a program that takes a number of notes on the keyboard. This number is not set in the program but by the user at runtime, and then displays the contents of the array (show only notes, not the contents of unused boxes) and the average. The display and the averaging will be performed by means of sub-programs. The addition will be done in the `main()` method.

3. If you have the courage; do the same for the other two solutions.