Instituto Superior de Engenharia do Porto
(ISEP)

Licenciatura em Engenharia de Telecomunicações e Informática (LETI)

Desenvolvimento de Software e Sistemas Móveis (DSSMV)

DSSMV: PL: Week 2

Strings and Arrays

Paulo Baltarejo Sousa and Carlos Filipe Freitas
{pbs,caf}@isep.ipp.pt
2025/26

1 Strings

Create a Java console project and add the following methods as well as the correspondent unit tests.

1.1 Get character

Write a method to get the character at the given index within the string.

```
package com.company;

public class Main {
  private static String text = "LETI students love Java";

  public static char getCharAt(int index){
    return text.charAt(index);
  }

  public static void main(String[] args) {
    // write your code here
  }
}
```

```
package com.company;

import org.junit.jupiter.api.Test;

import static org.junit.jupiter.api.Assertions.*;

class MainTest {

  @Test
  void getCharAt() {
    char expected = 'L';
    char result = Main.getCharAt(0);
    assertEquals(expected,result);
  }
}
```

1.2 Comparing strings

Write a method that check if two strings are equal or not.

1.3 Counting character

Write a method to count the number of a given character within the string.

1.4 Reverse string

Write a method that prompts user for a string and prints the reverse of the string.

1.5 Format to lowercase

Write a method to convert all the characters in a string to lowercase.

1.6 Find word

Write a Java program to find a given word within the string.

1.7 Format

Write a method to that given a string:

- Remove all spaces in the beginning and in the end;
- Remove multiple spaces between words;
- Uppercase the first character of each word;
- Lowercase all the characters of a word instead first.

2 Arrays

2.1 Statistical data

Write a Java program (with unit tests) that given an array of n integer, compute:

1. Sum n elements;
2. Maximum;
3. Minimum;
4. Average $\acute{x} = \frac{1}{n} * \sum_{i=1}^{n} x$;
5. Variance $\sigma^2 = \frac{1}{n} * \sum_{i=1}^{n} (x - \acute{x})^2$;
6. Standard deviation $\sigma = \sqrt{\frac{1}{n} * \sum_{i=1}^{n} (x - \acute{x})^2}$;

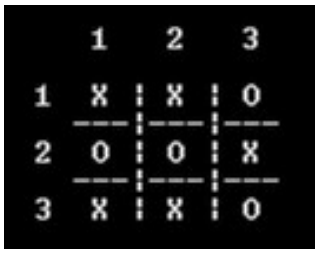
2.2 Operations

Write a Java program (with unit tests) that uses an array for n `int` as data. Implement the following functionalities:

1. Insert an element in a given position.
2. Remove an element from a given position.
3. Print all elements.
4. Check if exist a specific value (test if the array contains a specific value).
5. Get the index array of specific value (test if the array contains a specific value and return its array index).
6. Check if there are duplicate values.
7. Remove all duplicate values.
8. Find the second largest element;
9. Find the second smallest element;

2.3 Tic-tac-toe

Write a Java program that implements tic-tac-toe.



2.4 List of Names

Write a Java program that uses an `ArrayList` string as data. The data purpose is to store a set of people names. Implement the following functionalities:

1. Insert names.
2. Find a name.

3. Remove a specific name.
4. Check if there are duplicate names.
5. Remove all duplicate name.
6. Print names in ascendant/descendant order;