Sistemas Distribuídos

(ano letivo 2024'25)

General Problems

The primary objective is not to develop highly computationally efficient solutions to the problems below. Instead, the focus is on applying the object-oriented paradigm correctly in designing and implementing solutions in Java.

Specific Java features that are relevant for coding these solutions will be covered in tutorials. However, you are encouraged to develop your own solutions first before referring to these discussions.

1. Palindrome Checker

Write a program that reads a string from the keyboard and checks whether it is a palindrome (i.e., a word or phrase that reads the same forward and backward).

Suggestion: Implement your solution using both a **FIFO queue** and a **stack** to compare characters from both ends.

2. Towers of Hanoi

Write a program that solves the **Towers of Hanoi** problem and prints each move step-by-step on the screen.

Suggestion: Use a **stack** to represent each tower and manage the movement of disks.

3. Arbitrary-Length Arithmetic Library

Develop a library that provides functions for performing **addition** and **multiplication** on non-negative integers of **any length** (i.e., without an upper limit on the number of decimal digits).

Suggestion: To test the library, write a program that reads large operands from the keyboard, performs the operations, and prints the results.

4. Floating-Point and Complex Arithmetic Library

Create a library that supports the **four basic arithmetic operations** (addition, subtraction, multiplication, and division) on **double-precision floating-point numbers**, supporting both **real** and **complex numbers**.

Suggestion: To test the library, write a program that reads operands from the keyboard, performs the operations, and prints the results.