Lab 04 - Recursion in Java

This repository contains solutions for Lab Week 04, which focuses on recursion in Java. It includes classroom tasks and homework problems with explanations, code, and test cases.

Classroom Tasks

Task 01: Countdown
- Original: Prints "..." until reaching 0, then "Blastoff!".
- Modified: Prints only even numbers before "Blastoff!".

Example Output (countDownEven(6)):
6
4
2
Blastoff!

Complexity:
- Time: O(n)
- Space: O(n)

Task 02: GCD
- Original: Uses the modulus operator (%).
- Modified: Uses subtraction instead.

Example:
gcd(48, 18) = 6
gcdSub(48, 18) = 6

Task 03: Fibonacci
- Standard recursive Fibonacci implementation.
- Time Complexity: O(2^n)
- Space Complexity: O(n)

Example:
fib(5) = 5

Homework

1. Print "Hello World" n times
Example Output (printHello(3)):
Hello World
Hello World
Hello World

2. Sum of multiples of 7 between n1 and n2
Example:
sumMultiplesOf7(1, 20) = 21
(Since 7 + 14 = 21)

3. Recursive Binary Search
- Works on sorted arrays only.
- Time Complexity: O(log n)
- Space Complexity: O(log n)

Example:
Array: {1, 3, 5, 7, 9, 11, 13}
Target = 7 → Found at index 3