Lab Assignment 2

CS 301 – Data Structures

For both problems below, you are given an integer array A and two integers i and j. You can assume that $i \leq j$ and that A is large enough to include $A[i]$ and $A[j]$.

Problem 1

Write a recursive function that determines if there are two consecutive numbers in $A[i]$, $A[i+1]$, …, $A[j]$ which are equal. That is, is there an index k with $i \leq k < j$ such that $A[k] = A[k+1]$.

Problem 2

A *palindrome* is a sequence that is equivalent to its reverse. Write a recursive function that determines if $A[i], \ldots, A[j]$ is a palindrome.

Implementation

You are given a file *Lab2.java* (which you can download from canvas). The file contains a class `Lab2` with the two functions `problem1` and `problem2`. Implement your solutions in the corresponding functions. **Do not make any changes outside of these two functions (e. g. by adding helper functions); such changes will be undone.** Do not output anything to the terminal.

Use comments in your code to clearly state which part of your code handles the base case and which part handles the recursive step.

The program already implemented in the file *Lab2.java* randomly generates test cases. This file contains a small number of test cases. The seed of the random number generator is set to ensure the same test cases whenever to program is executed. Note that the purpose of the tests is for you to avoid major mistakes. **Passing all given tests *does not* imply that your algorithm is correct, especially that is has the expected runtime.**

Submission

For your submission, upload the file *Lab2.java* with your implementation to canvas.

This is an individual assignment. Therefore, a submission is required from each student.

Deadline: On Canvas.