

Data Structures and Algorithms, Winter term 2017
Practice Assignment 1

Exercise 1-1 Unsorted Array

Design a class `LinearArray` which is represented by 2 instance variables: *an array of integers* and *an integer variable* representing the total number of elements inserted in the array. Implement the class `LinearArray` with the following instance methods:

- a) Write a method `void insertLast(int x)` which inserts a new element at the end of the array.
- b) Write a method `void insertFirst(int x)` which inserts a new element at the beginning of the array.
- c) Write a method `int linearSearch(int x)` which returns the position of a specific element and -1 if it is not found.
- d) Write a method `void delete(int x)` which deletes a specific element from the array.

Exercise 1-2 Unsorted Array of Students

How would you change your implementation of the previous exercise to store Objects of type `Student` instead of integers in your unsorted array?

- a) Define a class `Student` to represent a Student in terms of his/her first name, last name and id.
- b) Define a class `LinearArrayStudents` to represent an unsorted array of students. Add methods to insert, search and delete students from the array.

Exercise 1-3 Sorted Array

Implement the class `LinearSortedArray` with the following instance methods.

- a) Write a method `void orderedInsert(int x)` which inserts a new element in its correct position in the array.
- b) Write an iterative method `int binarySearchIter(int x)` which returns the position of a specific element and -1 if it is not found.
- c) Write a recursive method `int binarySearchRec(int x)` which returns the position of a specific element and -1 if it is not found.
- d) Write a method `void delete(int x)` which deletes a specific element from the array.