Level: bachelor

Course title: Data structures and algorithms 2 (course id: I033)

Status: obligatory

ECTS: 8

Requirements: completed course of Introduction to programming (course id: I011)

Learning objectives

Introducing students to data structures used to represent sets and basic tree types. In addition, introducing a variety of algorithms that can be done over the structures.

Learning outcomes

Minimum: At the end of the course, successful students should be able to implement the required sort or search algorithm.

Desirable: At the end of the course, successful students should be able to apply, implement and improve the appropriate sorting or searching algorithm.

Syllabus

Theoretical instruction

Abstract data type SET and its implementation. Set searching and abstract data type Dictionary (hashing). Set ordering: an elementary array sorting algorithms, complex array sorting algorithms, sorting lists. Complexity of sorting algorithms. The principle of divide and conquer programming and its application. Finding a subset (backtrack) and applications. Set searching with restrictions, dynamic programming and greedy algorithm. Constructive generation of subsets and the basic application on combinatorial objects. Abstract data type TREE and its implementation. Tree traversal. Binary search tree.

Practical instruction

Typical applications of the presented data structures and algorithms. Individual practical problems: hashing, sorting, backtrack, dynamic programming, tree traversal.

Weekly teaching load

Lectures: 2	Exercises: 1	Practical Exercises: 2	Student research: 0	Other: 0