

Course Syllabi

CODE 204

NAME Data Structures

Credits 6 ECTS

Period Fall Semester

Course Specifications

Lectures and laboratory work.

Objectives and contents

This course provides an in-depth exploration of data structures, which are essential for organizing large datasets to enable efficient algorithmic processing. Aimed at students with prior experience in imperative programming using languages such as C, and object-oriented programming with Java, the course offers a comprehensive introduction to the most significant data structures in the field of Computer Science.

Participants will gain insights into various implementations of these structures using previously mentioned programming languages. The course will analyse and compare the performance of these implementations, providing a clear understanding of their efficiencies. Additionally, the practical application of these data structures in solving diverse problems will be demonstrated, highlighting their importance in computational tasks.

Contents

1. C Programming Language Review. An examination of dynamic memory management and the implementation of array-based and linked data structures in C.
2. Java Programming Language Review. A study of linear data structures in Java, including stacks, queues, lists, sets, bags, dictionaries, and priority queues.
3. Trees in Java. Coverage of binary search trees, heaps, and balanced trees, along with different data structure implementations based on trees.
4. Hash Tables in Java. An analysis of hash functions, collision resolution techniques, and the use of hash tables to implement various data structures.
5. Graphs in Java. Exploration of both directed and undirected graphs, including depth-first and breadth-first traversals and topological sorting.

Assessment

Continuous assessment during some laboratory sessions and on computer examinations.

Lecturer

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