

Data Structures

Programme course

6 credits

Datastrukturer

TND004

Valid from: 2019 Spring semester

Determined by

Board of Studies for Computer Science and
Media Technology

Date determined

2018-08-31

Main field of study

Computer Science and Engineering, Media Technology and Engineering

Course level

First cycle

Advancement level

G2X

Course offered for

- Electronics Design Engineering, M Sc in Engineering
- Media Technology and Engineering, M Sc in Engineering

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

Programming in C++

Intended learning outcomes

The aim of the course is to give students the tools to independently be able to create programs that solve practical problems dealing with large amounts of data, taking into account efficient use of time and memory. Upon completion of the course the student should fulfill the following learning outcomes.

- To propose specific data structures and algorithms to address practical problems.
- To motivate objectively the choices made, concerning chosen data structures, and relate to the known scientific results in the field.
- To analyze the trade offs, regarding efficiency in several aspects, of different data structures proposed for addressing a practical problem.

- To implement and use the data structures and algorithms in application programs.

Course content

Algorithm analysis. Recursion. Lists, stacks and queues. Trees and tree traversals. Binary search trees, threaded trees and balanced trees. Hashing and hash tables. Priority queues and binary heaps. Sorting och searching. Indexed files. Graphs and graph traversals. Fundamental graph algorithms.

Teaching and working methods

Lectures, lessons, and laboratory work.

Examination

UPG1	Optional assignment	U, G	0 credits
LAB1	Laboratory work	U, G	3 credits
TEN1	Written examination	U, 3, 4, 5	3 credits

The optional assignment consists of two quizzes. Results on the quizzes will give credits to the computer examination (and re-examination until the month of October after the course is completed).

Grades

Four-grade scale, LiU, U, 3, 4, 5

Department

Institutionen för teknik och naturvetenskap

Director of Studies or equivalent

Camilla Forsell

Examiner

Aida Nordman

Course website and other links

<http://weber.itn.liu.se/~aidvi05/courses/14/index.html>

Education components

Preliminary scheduled hours: 60 h

Recommended self-study hours: 100 h

Course literature

Data Structure and Algorithm Analysis in C++, Mark Allen Weiss, Addison Wesley, 4th edition, year 2014.