DD2458 Problem Solving and Programming under Pressure 9.0 credits

Problemlösning och programmering under press

This is a translation of the Swedish, legally binding, course syllabus.

Establishment

The official course syllabus is valid from spring semester 2025 according to the decision of Director of First and Second Cycle Education: J-2024-2209. Date of decision: 2024-10-16

Grading scale

A, B, C, D, E, FX, F

Education cycle

Second cycle

Main field of study

Computer Science and Engineering

Specific prerequisites

Knowledge in algorithms and complexity, 7.5 higher education credits, equivalent to completed course DD1352/DD2350/DD2352

or

documented experience in active participation in algorithmic programming competitions with a degree of difficulty equivalent the algorithms that are studied in DD2350/DD2352.

Language of instruction

The language of instruction is specified in the course offering information in the course catalogue.

Intended learning outcomes

After passing the course, the student shall be able to

- use algorithm design methods such as greedy algorithms, dynamic programming, divide and conquer, and combinatorial search to design algorithms in order to solve given problems
- use basic algorithms in fields such as graph theory, number theory and geometry on given problems and adapt them to problem-specific circumstances
- analyse the efficiency of different algorithms to decide which ones are sufficiently efficient in a given context
- compare different problems with respect to difficulty
- implement algorithms and data structures given abstract specifications
- identify bugs in others' solution attempts on problems
- communicate with others during problem solving in groups
- present algorithms, data structures and problems orally in a concise and lucid way

in order to

- be able to use programming as a tool for problem-solving
- be able to apply theoretical knowledge from other computer science courses on practical problem-solving.

Course contents

Algorithms: computational geometry, graph algorithms, number theoretic algorithms, string matching. Design and analysis of algorithms: dynamic programming, amortised analysis, judging reasonableness. Programming skills, mainly in C++ and Java.

The course focuses on problem-solving all the way from theory (in the form of algorithm design) to practice (in the form of a working program).

During the course, the student solves a large number of assignments, implements a number of algorithms to build a smaller algorithm library, solves problems in small groups during "problem sessions", and present solutions to assignments orally.

Examination

- ÖVN1 - Exercises, 4.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB2 - Lab assignments and problem solving sessions, 4.5 credits, grading scale: A, B, C, D, E, FX, F

Based on recommendation from KTH's coordinator for disabilities, the examiner will decide how to adapt an examination for students with documented disability.

The examiner may apply another examination format when re-examining individual students.

If the course is discontinued, students may request to be examined during the following two academic years.

Examination can only take place in connection with an ongoing course offering.

Ethical approach

- All members of a group are responsible for the group's work.
- In any assessment, every student shall honestly disclose any help received and sources used.
- In an oral assessment, every student shall be able to present and answer questions about the entire assignment and solution.