DD2481 Principles of Programming Languages 7.5 credits

Principer för programspråk

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

Establishment

Grading scale

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

Education cycle

Second cycle

Main field of study

Computer Science and Engineering

Specific prerequisites

Knowledge and skills in programming, 6 credits, corresponding to completed course DD1337/DD1310-DD1319/DD1321/DD1331/DD1333/DD100N/ID1018/ID1022.

Knowledge in algorithms and data structures, 6 credits, corresponding to completed course DD1338/DD1320-DD1328/DD2325/ID1020/ID1021.

Knowledge in discrete mathematics, 7.5 credits, corresponding to completed course SF1610/SF1630/SF1662/SF1679 or completed courses SF1671 and SF1688.

Intended learning outcomes

After completion of the course, the student should be able to:

- formally describe languages and program behavior,
- precisely reason about state, effects, and mutation,
- reason about and use mechanisms for abstraction and modularization,
- define type systems formally,
- prove type soundness,
- reason about program equivalence,
- define and reason about contracts,
- discuss open questions about advanced language features and reflect critically over them,
- write programs that implement various formalisms, mechanisms and language features

in order to

- be able to take part in deeper discussions about principles of programming languages,
- be prepared for courses in compiler construction.

Course contents

Formal languages, finite automata, context free grammars.

State, scope, extent, static and dynamic information, effects, mutability.

Basic operational semantics.

Abstraction mechanisms, modularity, contracts.

Types, invariants, program equivalence.

Information flow control.

Symbolic execution.

Examples of advanced features of programming languages.

Examination

- TEN1 - Examination, 2.5 credits, grading scale: A, B, C, D, E, FX, F
- LAB1 - Laboratory assignments, 3.5 credits, grading scale: P, F
- UPP1 - Essay, 1.5 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.

Other requirements for final grade

Passed laboratory assignments, thesis and examination

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.