FIK3620 Types, Semantics, and Programming Languages 7.5 credits

Typer, semantik och programmeringsspråk

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

Establishment

Course syllabus for FIK3620 valid from Spring 2019

Grading scale

P, F

Education cycle

Third cycle

Specific prerequisites

Language of instruction

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

Intended learning outcomes

After the course, the student will be able to

- Construct type soundness proofs
- Analyze type rules
- Analyze small-step and big-step operational semantics
- Implement an interpreter and a type checker for a typed functional language
- Apply untyped and simply typed lambda calculus with extension

Course contents

The course is divided into three separate modules, each covering different aspects on types, semantics, and programming language theory:

1. Operational semantics and the lambda calculus

- Small-step and big-step operational semantics
- Untyped lambda calculus
- Fundamental typed functional programming

2. Typed lambda calculus with extensions

- Type rules
- Type soundness proofs
- Semantics for let bindings, pairs, tuples, records, sums, and lists
- References and exceptions

3. Subtyping and Polymorphism

- Subtype polymorphism
- Parametric polymorphism
- Ad-hoc polymorphism
- Structural and nominal type systems
- Gradual typing

Examination

- EXA1 - Examination, 7.5 credits, grading scale: P, 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.

See "Requirements for final grade" below.

Other requirements for final grade

The student receives grade P if the following is fulfilled:
1. Active participation in seminars
2. Approved oral presentations at the seminars
3. Approved solutions to theoretical exercises
4. Approved submission and presentation of a software implementation
If the student cannot participate in a seminar, the student can do complementary work at another occasion.

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.