ID2202 Compilers and Execution Environments 7.5 credits

Kompilatorer och exekveringsmiljöer

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

Establishment

Course syllabus for ID2202 valid from Autumn 2019

Grading scale

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

Education cycle

Second cycle

Main field of study

Computer Science and Engineering

Specific prerequisites

- Completed course in basic computer engineering/architecture equivalent to IS1200 Computer Hardware Engineering.
- Completed course ID1020 Algorithms and Data Structures or the equivalent.

Language of instruction

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

Intended learning outcomes

Having passed the course, the student should be able to:

- explain the general structure of a compiler
- use methods for lexical, syntactic and semantic analysis
- use methods for generation of machine code
- use methods for optimizing programs
- explain common components in execution environments

in order to

- obtain an understanding of how a programming language is implemented as well as for the general theories that are used and how these can be applied.

Course contents

The course covers technologies for implementation of programming languages by means of compilers, both for real and virtual execution environments, technologies to read, understand, translate, improve as well as execute programs:

- To read programs: lexical analysis and syntax analysis. Finite state machines, regular expression context free grammars, LL and LR-parsing.
- To understand programs: semantic analysis, type checking.
- To translate programs: machines and instructions.
- Intermediary code, choice of instructions, conventions for procedure calls.
- To improve programs: machine independent optimisations; computer-oriented optimisations (register allocation, scheduling of instructions).
- To execute programs: virtual execution environments and runtime systems. Memory management, garbage collection, to load and link programs, just-in-time compilation.

Course literature

Modern Compiler Implementation in Java, Andrew W. Appel

Upplaga: Second Förlag: Cambridge University Press År: 2002

ISBN:

Examination

- INL1 - Assignments, 1.5 credits, grading scale: P, F
- TEN1 - Examination, 6.0 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.

In agreement with KTH´s coordinator for disabilities, it is the examiner who decides to adapt the examination for students in possession of a valid medical certificate. The examiner may permit other examination forms at the re-examination of few students

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.