



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Programanalys

Program Analysis

EDAP15, 7,5 credits, A (Second Cycle)

Valid for: 2023/24

Faculty: Faculty of Engineering, LTH

Decided by: PLED C/D

Date of Decision: 2023-04-18

General Information

Elective for: C4-sec, C4-pv, D4-pv, E4-pv, F4, F4-pv, Pi4-pv

Language of instruction: The course will be given in English

Aim

Program analysis allows us to better understand what software does and does not do. The techniques of program analysis can thereby contribute to software security, software quality control, program understanding, software maintenance and evolution, and software performance improvement.

The aim of this course is to provide a detailed understanding of modern program analysis techniques, as well as their strengths and weaknesses, when applied to realistic software.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- understand and demonstrate knowledge about static program analysis techniques and their strengths and weaknesses.
- understand and demonstrate knowledge about dynamic program analysis techniques, their strengths and weaknesses, and their effect on program execution.
- understand and be able to express themselves in the formal language(s) used in the class.

Competences and skills

For a passing grade the student must

- be able to design, implement, and validate static, dynamic, and combined static-dynamic program analyses for different tasks.

Judgement and approach

For a passing grade the student must

- demonstrate the ability to describe, understand, and critically evaluate different program analysis techniques as applied to different tasks.

Contents

The course topics include: type systems, operational semantics, data flow analysis, constraint-based analysis, heap abstraction, call graph analysis, domain-specific languages for program analysis, profiling, and sampling.

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)

Assessment: For a passing grade (3), completed compulsory work is required. For higher grades, an oral exam is also required. In order to take the exam (for grades 4 or 5), all criteria for passing must be met. Detailed regulations regarding the completion of compulsory work will be found in the course programme.

The examiner, in consultation with Disability Support Services, may deviate from the regular form of examination in order to provide a permanently disabled student with a form of examination equivalent to that of a student without a disability.

Admission

Admission requirements:

- EDA180 Compiler Construction or EDA230 Optimising Compilers or EDAF40 Functional Programming or EDAN40 Functional Programming or EDAN65 Compilers or EDAN75 Optimising Compilers

The number of participants is limited to: No

Reading list

- Nielson, Flemming, Nielson, Hanne R., Hankin, Chris: Principles of Program Analysis. Addison Wesley, 1999, ISBN: 978-3-662-03811-6. Optional textbook.
- Anders Møller and Michael I. Schwartzbach: Static Program Analysis. Optional textbook, online <https://cs.au.dk/~amoeller/spa/>.

Contact and other information

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Course homepage: <http://cs.lth.se/edap15>