



LUNDS UNIVERSITET
Lunds Tekniska Högskola

Course syllabus

Funktionsprogrammering Functional Programming

EDAN40, 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 Compulsory for: D2

Elective for: BME4, C4-pv, E4-pv, F4, F4-pv, L4-gi, N4, Pi4-pv, MMSR1

Language of instruction: The course will be given in English

Aim

The course gives an insight into how the functional programming often offers a possibility to write shorter and easier-to-understand programs than using the traditional imperative or object-oriented approaches.

Learning outcomes

Knowledge and understanding

For a passing grade the student must

- have a good understanding of the fundamental principles for functional programming
- understand the practical consequences of the differences in this paradigm relative to traditional programming
- know the common idioms of functional programming
- understand the benefits and the function of an advanced type system

Competences and skills

For a passing grade the student must

- be a fluent reader of program written in Haskell
- be able to utilize the possibilities of the functional paradigm to write Haskell programs in good style
- be able to do type analysis of relatively complex expressions in Haskell

Judgement and approach

For a passing grade the student must

- have learnt to appreciate the role of program code as a communication medium between people

Contents

The philosophy of functional languages. The programming language Haskell. Language constructs and idioms. Higher-order functions. Lazy evaluation and infinite data structures. Monads and monadic computations. Polymorphic type systems and type classes. Type analysis and type inference.

Examination details

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

Assessment: Written examination. To qualify for the exam students must have completed the assignments. The final grade of the course is based on the result of the written examination.

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.

Parts

Code: 0113. **Name:** Assignments.

Credits: 3,5. **Grading scale:** UG. **Assessment:** To qualify for a passing grade the assignments must be completed.

Code: 0213. **Name:** Written Examination.

Credits: 4. **Grading scale:** TH. **Assessment:** To qualify for the exam the assignments must be completed. The final grade of the course is based on the result of the written examination. **Contents:** Written examination.

Admission

Admission requirements:

- EDAA01 Programming - Second Course or EDAA30 Programming in Java - Second Course or FRTF25 Introduction to Machine Learning, Systems and Control

Assumed prior knowledge: FMAA05 and FMAB20 or FMAA50 and FMAA55 or EDAA40. Students are expected to have basic understanding of mathematical functions, functional composition and proof by induction.

The number of participants is limited to: No

The course overlaps following course/s: EDA120, EDAF40, EDAF95

Reading list

- Graham Hutton: Programming in Haskell, 2nd ed. Cambridge University Press, 2016, ISBN: 978-0-521-69269-4. Recommended reference.
- Bryan O'Sullivan, John Goerzen and Don Stewart: Real World Haskell. O'Reilly, 2008, ISBN: 978-0-596-51498-3. Recommended reference.
- Paul Chiusano and Rúnar Bjarnason: Functional Programming in Scala. Manning Publications, 2014, ISBN: 978-1617290657. Recommended reference.
- Richard Bird: Thinking Functionally with Haskell. Cambridge University Press, 2014,

ISBN: 978-1107452640. Recommended reference.

Contact and other information

Course coordinator: Professor Jacek Malec, Jacek.Malec@cs.lth.se

Course homepage: <http://cs.lth.se/edan40>