Course syllabus

Datorarkitektur
Computer Architecture

EITF20, 7,5 credits, G2 (First 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, D4-is, D4-hs, E4-is, F4, MSOC1
Language of instruction: The course will be given in English

Aim

The goal of this course is to introduce the operation of computer systems at the level of Instruction Set Architectures (ISA). It aims to provide a basic understanding of the design principles that govern modern computer architectures and their components. Especially it pays attention to (super scalar) pipelining and memory hierarchy techniques including caches. Implementation and efficiency issues are exemplified. Metrical performance analysis methods are discussed to evaluate architectural alternatives.

Learning outcomes

Knowledge and understanding
For a passing grade the student must

- understand a computer architecture

- know how to quantify the potential performance of a computer

- have an overview of the architectural alternatives and technological restrictions to solve a computing problem.

Competences and skills
For a passing grade the student must

· Be skilled in establishing computer functionality

· Be well-versed in system simulation

· Be experienced in architecture quantification

· Have an operational knowledge of architectures

Judgement and approach
For a passing grade the student must

have learnt trade-offs in creating computer support for solving problems

Contents

The course introduces the foundations of low-level computer functioning. The course syllabus includes, among other things, the main parts of computer system and low-level programming techniques and the techniques of RISC-processors and pipelining, cache memory and virtual memory. The course also illuminates the alternative design principles of modern computer architectures in order to provide an understanding of their impact on performance. Quantitative methods to evaluate design principles for performance constitutes an important subject of the course. In coarse overview the lectures treat:

· Performance

· ISA principles

· Pipelining

· Memory Systems

. I/O, Multiprocessor

. ASIP (Application specific instruction set architecture)

Examination details

Grading scale: TH - (U,3,4,5) - (Fail, Three, Four, Five)
Assessment: Examination through approved labs followed by a successful 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: 0112. **Name:** Examination.
Credits: 4. **Grading scale:** TH. **Assessment:** Written exam.
Code: 0212. **Name:** Laboratory Work.
Credits: 3,5. **Grading scale:** UG. **Assessment:** Passed laboratory work.

Admission

Admission requirements:

- EIT070 Computer Organization or EITF70 Computer Organization

The number of participants is limited to: No
The course overlaps following course/s: EIT090

Reading list

- Hennesy, J L, Patterson, D A: Computer Architecture – A Quantitative Approach. Morgan Kaufman Publishers, 2017, ISBN: 9780128119051. 6th edition.
- Articles and documents from the Web.
- Course notes and labs.

Contact and other information

Course coordinator: Liang Liu, liang.liu@eit.lth.se
Course homepage: http://www.eit.lth.se/course/eitf20