

Concurrent and Operating Systems Programming

Programme course

4 credits

Process- och operativsystemprogrammering

TDIU16

Valid from: 2017 Spring semester

Determined by

Board of Studies for Computer Science and
Media Technology

Date determined

2017-01-25

Main field of study

Computer Science and Engineering, Programming

Course level

First cycle

Advancement level

G2X

Course offered for

- Computer Engineering, B Sc in Engineering
- Programming

Specific information

Overlapping course contents: TDDB63, TDDB68, TDDB72, TDDI12, TDDI81

Entry requirements

Note: Admission requirements for non-programme students usually also include admission requirements for the programme and threshold requirements for progression within the programme, or corresponding.

Prerequisites

The course presume very good proficiency in programming and basic data structures, as well as good knowledge about operating systems; processes, threads and system calls.

Intended learning outcomes

After the course, the student will be able to:

- implement a basic set of system calls in the educational operating system Pintos
- explain concepts related to synchronization

- analyse program code to identify critical sections and busy wait, and use suitable mechanisms to make it thread safe in a correct and adequate way

Course content

The course is very hands-on and involve many hours programming in a larger code base consisting of the educational operating system Pintos. The course includes:

- work in and expansion of a larger system.
- implementation of a basic set of system calls.
- concepts related to synchronization, such as thread, critical section, atomic operation.
- how to mechanisms like locks, semaphores and conditions works and are used in an adequate way.
- how to avoid busy wait.
- how deadlocks occur and methods to prevent them, for example bankers algorithm.

Teaching and working methods

Students will (in approximate order):

- be introduced to C programming and synchronization concepts during lectures
- implement a set of thread safe system calls in the educational operating system Pintos (implemented in C)

The course is given in Swedish to the extent possible. If Swedish speaking faculty, or suitable Swedish literature, is missing those parts will be in English.

Examination

LAB1	Computer exercises	U, G	3 credits
TEN1	Written examination	U, 3, 4, 5	1 credits

Grades

Four-grade scale, LiU, U, 3, 4, 5

Other information

Supplementary courses:

Parallel programming, real time systems, embedded systems

Department

Institutionen för datavetenskap

Director of Studies or equivalent

Ahmed Rezine

Examiner

Klas Arvidsson

Education components

Preliminary scheduled hours: 60 h

Recommended self-study hours: 47 h

Course literature

Operating Systems Concepts av Silberschatz A, Galvin P, Gagne G, 9:e upplagan eller senare. Valda forskningsartiklar relevanta för ämnet.

Common rules

Regulations (apply to LiU in its entirety)

The university is a government agency whose operations are regulated by legislation and ordinances, which include the Higher Education Act and the Higher Education Ordinance. In addition to legislation and ordinances, operations are subject to several policy documents. The Linköping University rule book collects currently valid decisions of a regulatory nature taken by the university board, the vice-chancellor and faculty/department boards.

LiU's rule book for education at first-cycle and second-cycle levels is available at http://styrdokument.liu.se/Regelsamling/Innehall/Utbildning_pa_grund-_och_avancerad_niva.