

Concurrent Algorithms and Data Structures

fundamental

relevant

challenging

Parosh Aziz Abdulla

parosh@it.uu.se

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challenging

Stack

(Basic) Algorithms & Data Structures

top of stack

push(4)

add element
to top of stack



Concurrent Algorithms and Data Structures

fundamental

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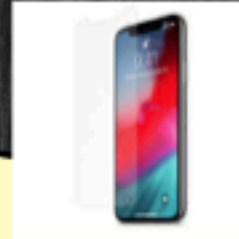
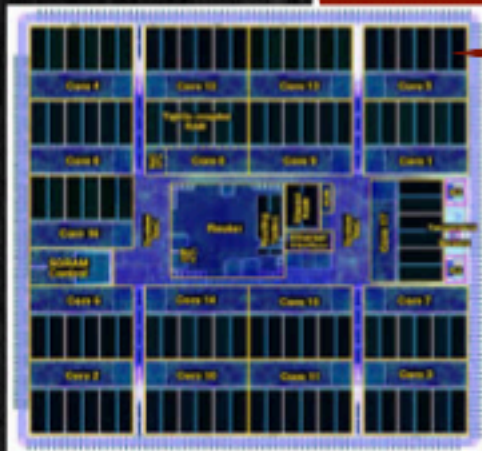
challenging

**Concurrent systems
are everywhere**

Concurrent Algorithms and Data Structures

Multicore architectures are challenging

challenging



intel

ARM

IBM Power everywhere

Programming languages



Facebook

Distributed databases

Amazon Aurora features and use cases.

Concurrency with Modern C++ book cover showing a word cloud of concurrency-related terms.

Overview

Goal



concurrent setting

Example

Stack

(Basic) Algorithms & Data Structures

push(4)

4

Thread 1

7

push(7)

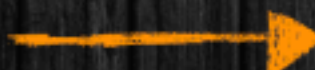
Thread 2

3

Stack

Which thread
goes first?

Goal



concurrent setting

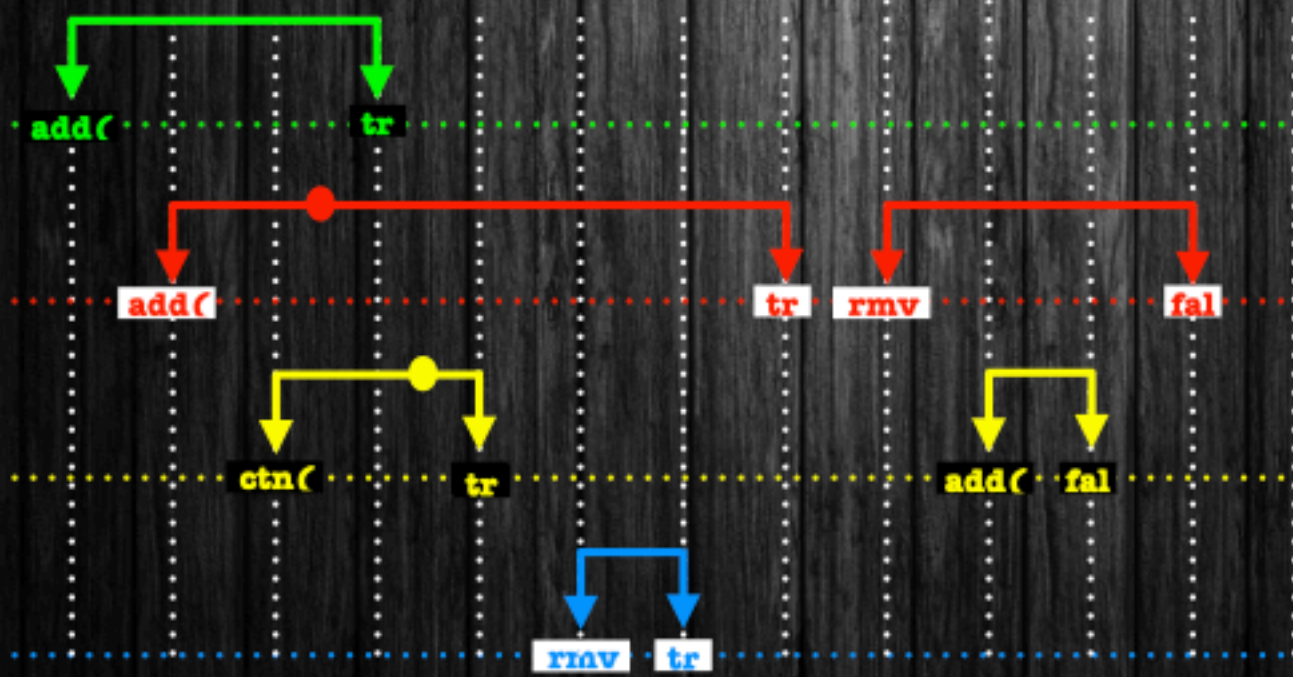
**concurrent
setting**

safety properties

liveness properties

**this
course**

- **linearizability**
- **wait-freedom**
- **starvation-freedom**
- **etc**



Linearizability

Concurrent Algorithms and Data Structures

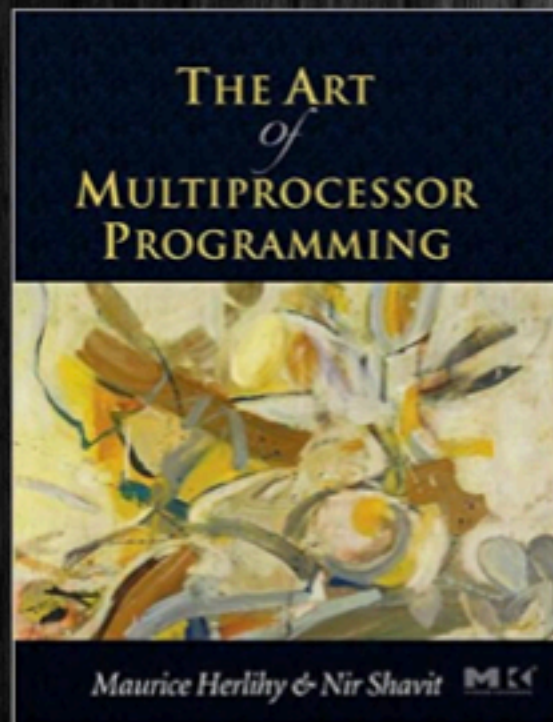
5 credits

Examination

- assignments
 - three theoretical
 - three programming

- Written Exam

Concurrent Algorithms and Data Structures



literature

**Reading list
will be
provided**



internet

Outline

- **Overview**
- **Abstract Data Types**
- **Sequential Programs**
- **Concurrent Programs**
- **Coarse-Grained Locking**
- **Fine-Grained Locking**
- **Lazy Lists**
- **Optimistic Lists**
- **Treiber Stack Algorithm**
- **Michael&Scott Queue Algorithm**
- **Transactional Memories**