



# LTAT.06.007 Distributed Systems

## Practical Seminar 9

Farooq Ayoub

TEACHING ASSISTANT

Tartu, Estonia 14/04/2021

# Recap



- Explored the Hierarchy of DNS Servers using DIG Tool
  - Used the functionality of **DIG** Tool in exploring the hierarchy of DNS Servers
  - Use **DIG** tool's *trace* functionality to create iterative queries.

# Agenda

- **Goal: Check whether a given execution steps are Sequentially Consistent or Not**
- **Content:**
  - Sequential Consistency
  - Check for Sequential Consistency and if not rearrange the Operations to make them Sequentially Consistent.
- **Quiz**

# Session Content



## Description

- Some background idea about Sequential Consistency
- Check whether a given execution steps are Sequentially Consistent or Not
- If not rearrange the Operations to make them Sequentially Consistent.

## Observation

Instructions to complete this practical session can be found in the course website: <https://courses.cs.ut.ee/2021/ds/spring/Main/Instructions5>

# Sequential Consistency

- A consistency model is essentially a contract between processes and the data store.
- It says that if processes agree to obey certain rules, the data store promises to work correctly.
- Normally, a process that performs a read operation on a data item, expects the operation to return a value that shows the results of the last write operation on that data.
- Sequential consistency is an important data-centric consistency model, which was first defined by Lamport in the context of shared memory for multiprocessor systems.

# ***Sequential Consistency - Definition***

A data store is said to be sequentially consistent when it satisfies the following condition:

***The result of any execution is the same as if the (read and write) operations by all processes on the data store were executed in some sequential order and the operations of each individual process appear in this sequence in the order specified by its program.***

# Sequential Consistency - Notation

## Notation:

- $W_i(x)a$  - denotes that  $P_i$  writes value  $a$  to data item  $x$ .
- $R_i(x)b$  represents the fact that process  $P_i$  reads  $x$  and is returned the value  $b$ .

# Sequential Consistency - Example

P1:	W(x)a		
P2:	W(x)b		
P3:		R(x)b	R(x)a
P4:		R(x)b	R(x)a

(a)

P1:	W(x)a		
P2:	W(x)b		
P3:		R(x)b	R(x)a
P4:		R(x)a	R(x)b

(b)

**Figure** (a) A sequentially consistent data store. (b) A data store that is not sequentially consistent.



# Session Instructions at Course Page

# Quiz



## Content

- Lecture 9 (Naming, identifiers and addresses)
- Two attempts
  - One in Seminar Session
  - Next available until Monday 23:59 (Deadline)
- Open Quiz in Moodle
- Total Quiz Points = 100

## Observation

Quiz review is available after the quiz is closed



# Questions?

E-mail: [farooq.ayoub.dar@ut.ee](mailto:farooq.ayoub.dar@ut.ee)