Welcome to …

TDTS11 (Computer Networks and Internet Protocols)

… IT program students

TDDE35 (Large-scale Systems Distributed Systems and Networks)

… U program students

Andrei Gurtov, Professor
https://www.ida.liu.se/~andgu38/

Niklas Carlsson, Professor
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Kick starting science ...

What do you have in the future?

How do we build services that are …

Efficient

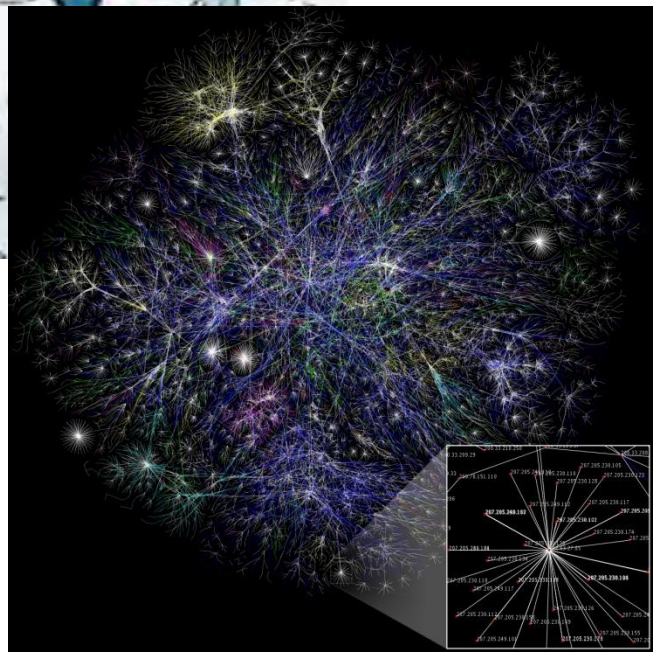
Secure

Reliable

Basic example problems include …

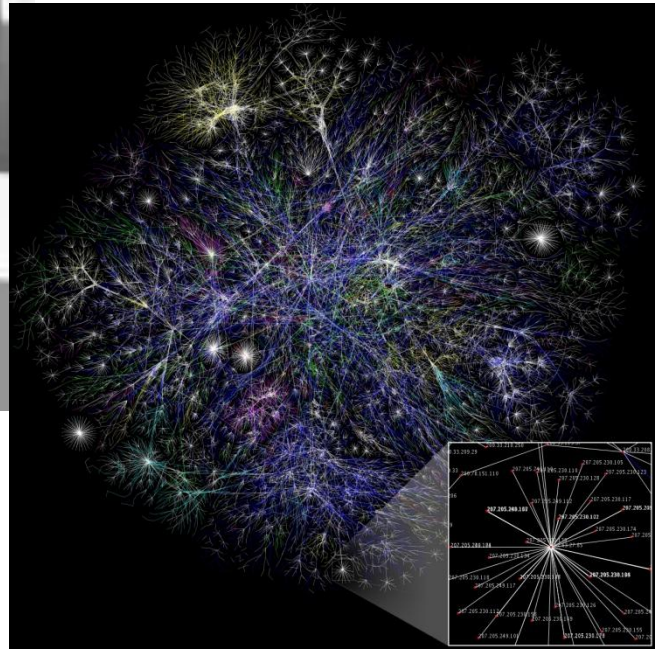
How do we communicate with a machine across the world?

How do we find out who to talk to?



How can we trust that we talk to the right machine/organization?

How do we find a path?



How do we **avoid sending too much** for the receiver and network to handle?

What happens at our machine? Inside the network? Along the path?

What to expect? (What will be covered?)

- Design principles for computer networks
  - Conceptual view of Internet architecture
- Design, resource, and performance tradeoffs
  - General working knowledge of protocols/applications
  - Detailed knowledge of selected protocols/applications
  - Some practical hands-on experience
- Glimpse into the future of the Internet
  - Emerging trends and technologies

Course evaluations [focus on complaints]

- Different quality/style of lectures [2024]: Different styles. There are also online alternatives + excellent textbook. Also, added new instructor and changed distribution of lectures.
- Shared summary lecture confusing [2023]: Separated: Niklas gives lecture for TDDE35 and Adrie for TDTS11
- vt1 + vt2 split of TDDE35[*Per design. See prior slides + explanation/motivation*]
  - [some] Student prioritize Pintos + envar. [*Explain/motivate*]
  - [some] Time consuming [*Explain/motivate*]
  - Some restructuring suggestions [mostly not feasible/reasonable]
  - Did move DS lectures to vt2 (2025); further planned
- Expected attendance at TDDE35 seminars (2+4+2+4 hrs): *Not that much time + Important learning opportunity*
- Request for help/suggestions how to succeed [*Added more examples + pointers + TDDE35 Friday sessions*]
- LAB1 + TEN1 alignment: They are complementing examination forms, testing (and teaching) complementing skills/knowledge (one is not just training for the other)
-

People During vt1

Andrei

Niklas

Nikolaos

- Examiner TDTS11 + lecturer
  - Andrei Gurtov, Professor
  - Research area: Networking, network security, cloud computing, future Internet architectures, 6G, ...
- Examiner TDDE35 + lecturer
  - Niklas Carlsson, Professor
  - Research area: Security, privacy, social media analysis, multimedia systems, networking, internet measurements, performance evaluation of distributed systems and networks, sports analytics, ...
- Lecturer
  - Nikolaos Pappas, Associate Professor (Docent)
  - Research area: Semantic wireless communications, age of information, stochastic modelling and performance analysis of communication networks, wireless energy harvesting networks, ...
- Lab assistant TDTS11
  - Gurjot Singh (gurjot.singh@liu.se), Assistant Professor
- Lab assistant TDDE35
  - No labs/assignments during vt1
  - During vt2: Minxing + Sheyda (PhD students)
- Director of studies
  - Niklas Carlsson

A few words about the lecturers

Air and Ground Information Security Group

Andrei Gurtov, professor

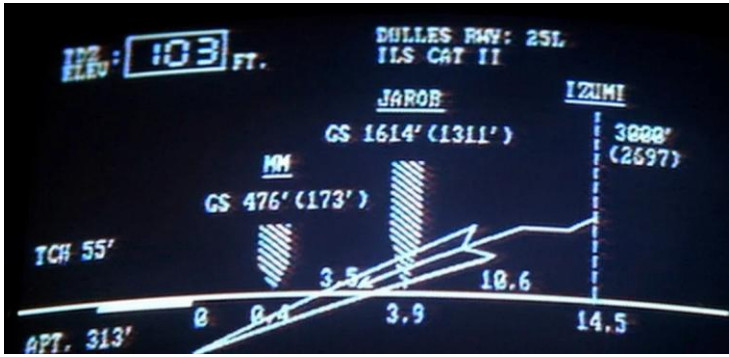
Air and Ground Information Security

AEGIS Group led by Prof. Andrei Gurtov

3 PhDs, 1 postdoc, master students
World top 1% scientist by research.com
Chair, IEEE Sweden Section

Cybersecurity of transport and Industrial Internet

Secure Remote Drone ID standard
AI-based intrusion detection for data link
Lightweight security for legacy and future aircraft
Training Air Traffic Controllers with a simulator



Landing hack/Die Hard 2

Detecting vulnerable Industrial devices
Scalable and secure LAN-as-a-service
Open-source development of Host Identity Protocol
6G and SatCom

ETHER

Co-funded by the European Union

Communications for Networked Intelligent Systems Group

Nikolaos Pappas

Associate professor, docent

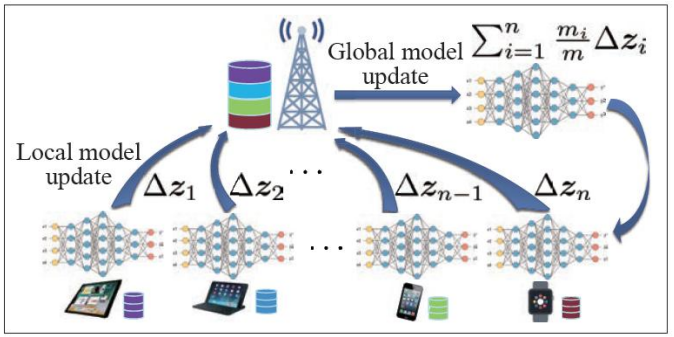
Swedish Research Council

ELLIIT

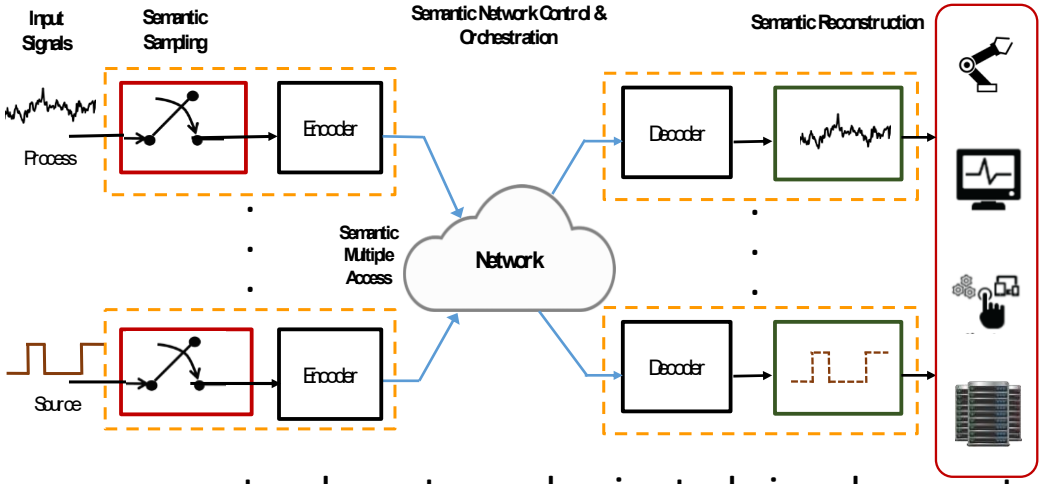
Excellence Center at Linköping – Lund in Information Technology

CENIIT

Emerging wireless ecosystem in 5G and beyond

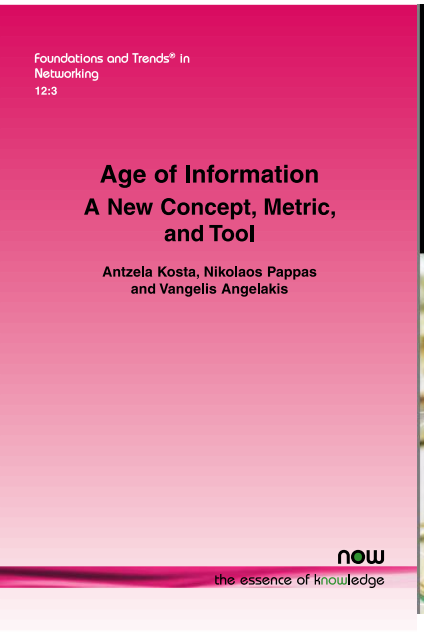


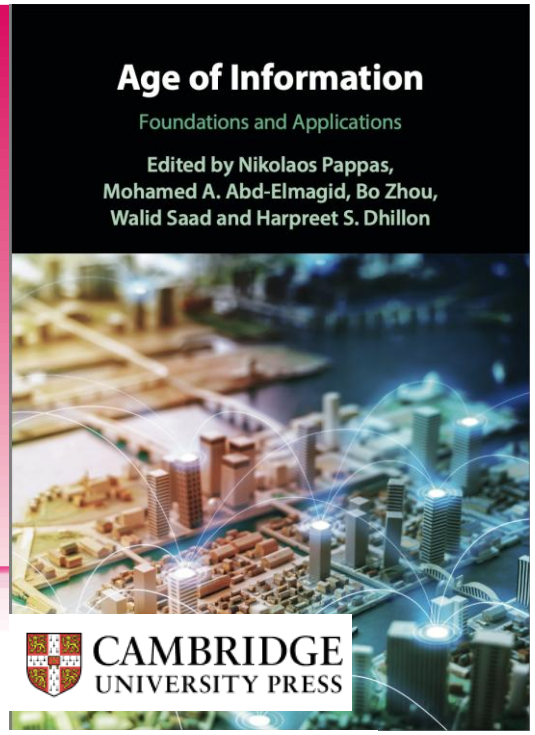
Towards Goal-oriented Semantic Communication

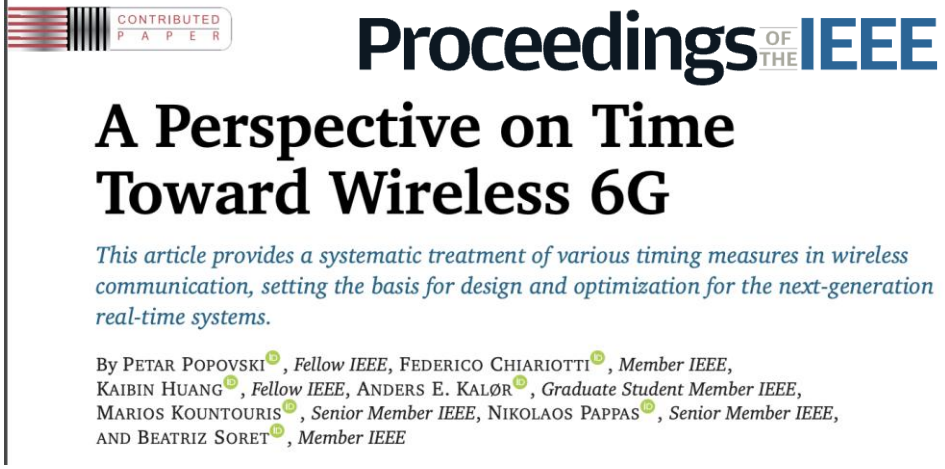


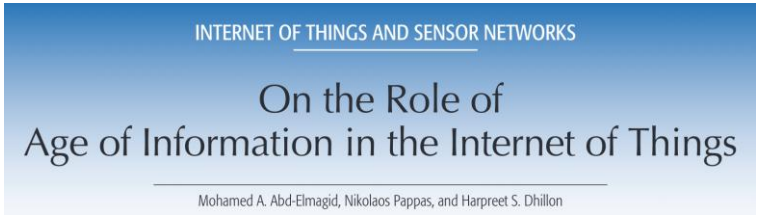
- Communication process extends up to goal-oriented signal reconstruction and information exploitation
- A monitored signal: a physical phenomenon/event distributed in space and evolving in time
- Key semantic operations - Prioritize information and the goal-driven representation of it

High Impact Publications

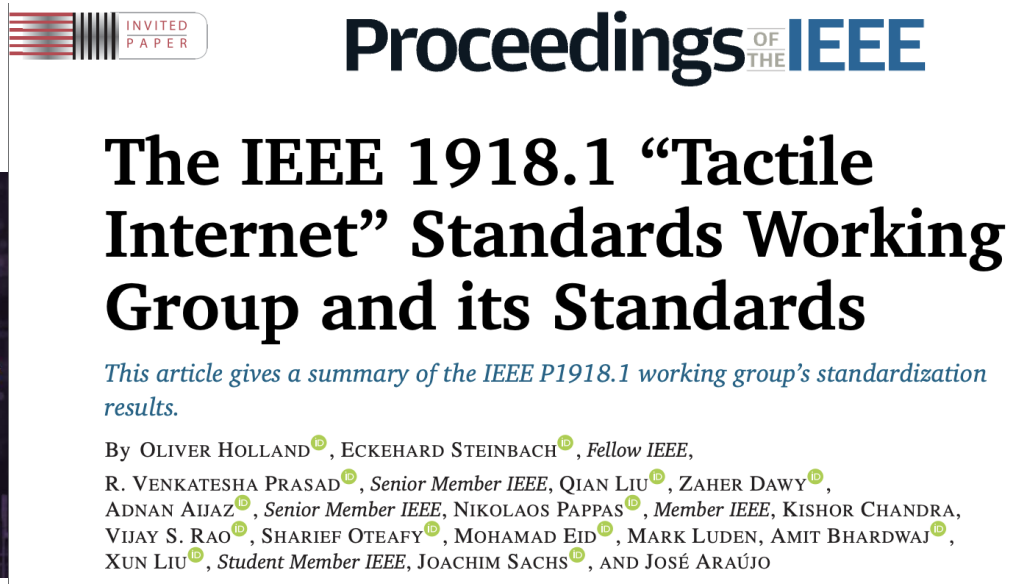








IEEE Communications Magazine • December 2019



National and international collaboration

香港中文大學
The Chinese University of Hong Kong

Aalto University

UNIVERSITY OF OULU

UPPSALA UNIVERSITET

LUND UNIVERSITY

SINGAPORE UNIVERSITY OF TECHNOLOGY AND DESIGN

UNIVERSITÉ DU LUXEMBOURG

Security and Networks Group

Niklas Carlsson, professor

Research group overview

Group leader: Niklas Carlsson (Professor)

Interest/aims: Provide system insights and solutions that help deliver tomorrow's services both effectively and securely

Methodologies: E.g., measurement, mathematical modeling, optimization, system design, real-world experiments, data analytics, statistical methods

Current team


Niklas


Alireza

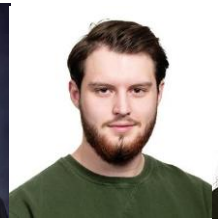

David


Karol


Carl Magnus


Sheyda


Minxing


Ethan


Somiya

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New team members (joined in March/April 2025)…


Sehrish


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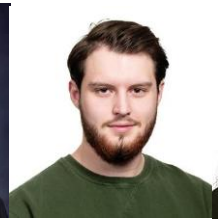
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Current example topics/questions

Network security


Tomorrow's streaming

DL + privacy/security

Characterization, analytics, modeling


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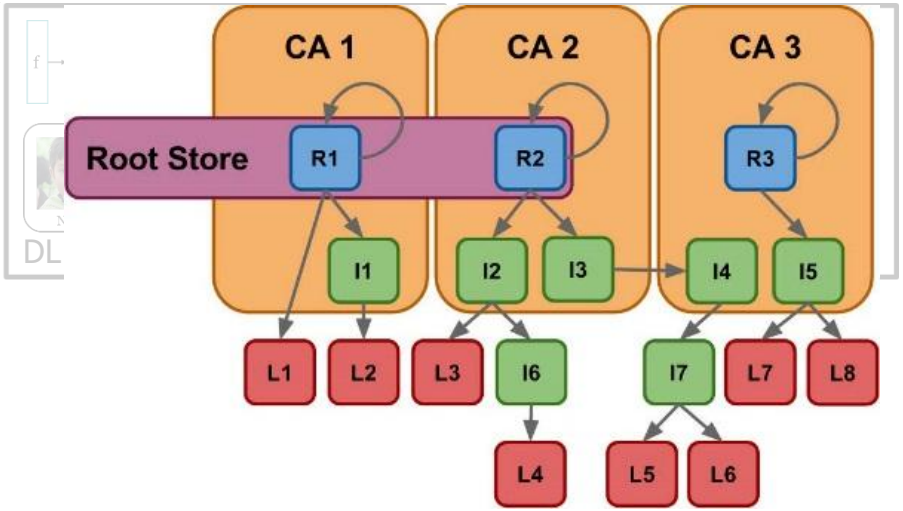

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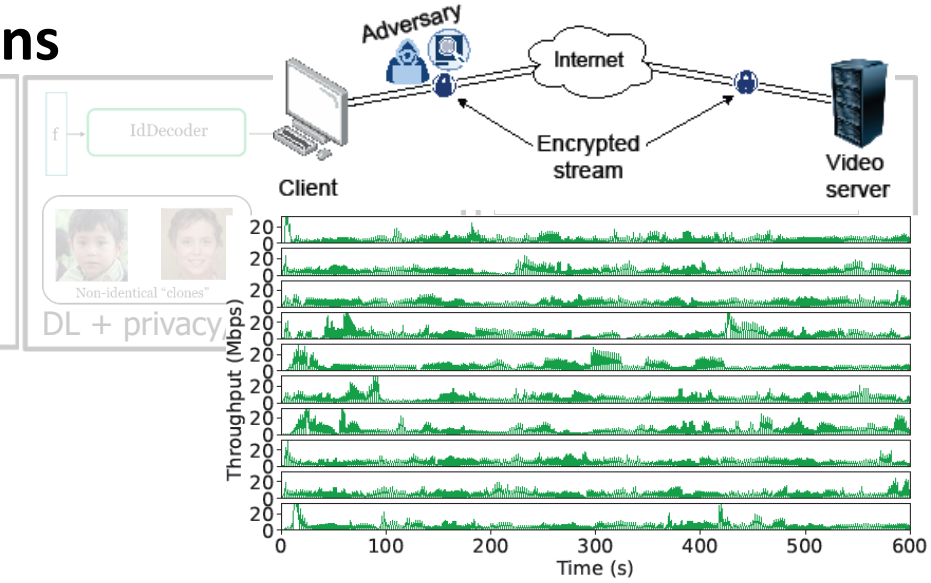

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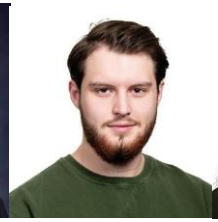
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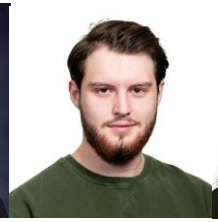
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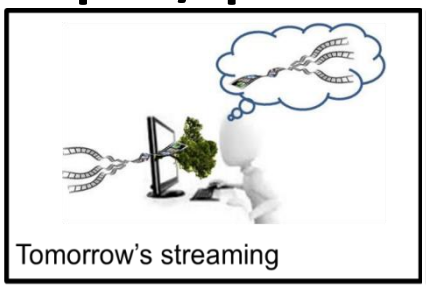
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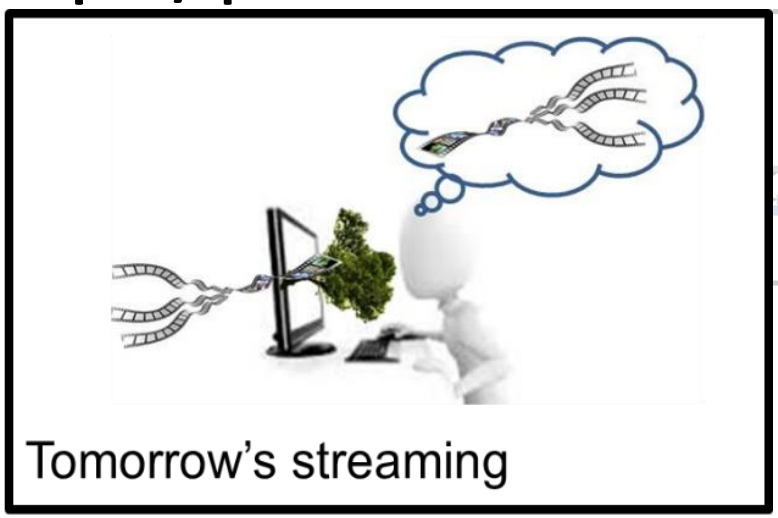


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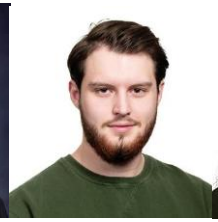
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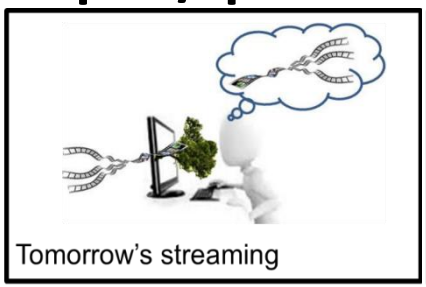
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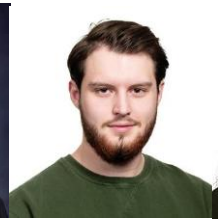
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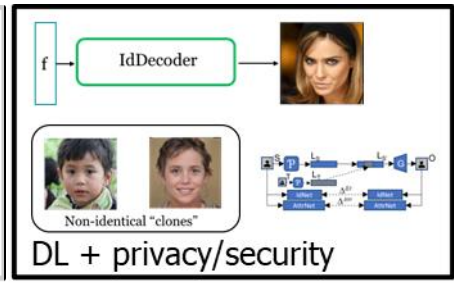

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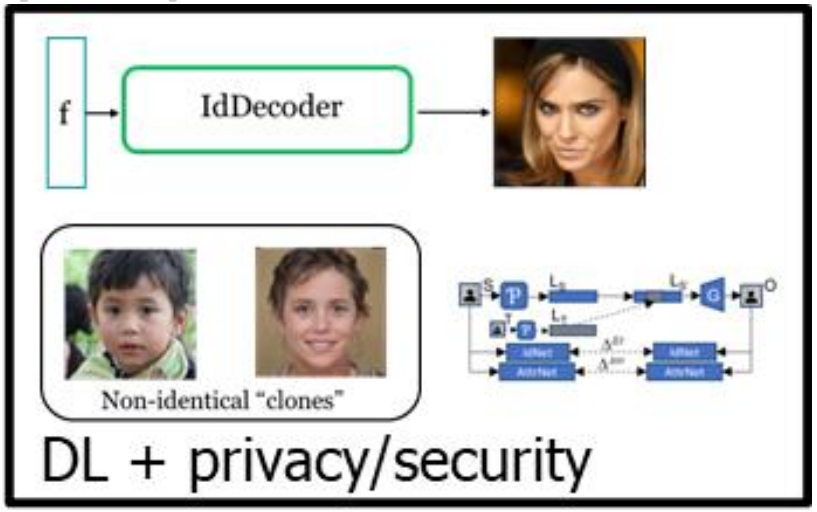

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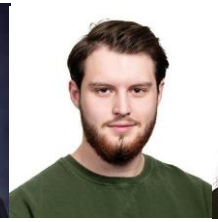
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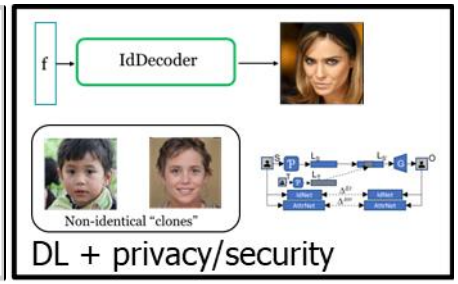

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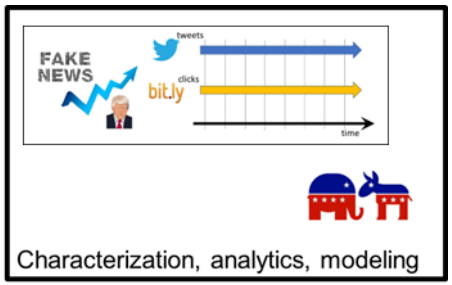


Sehrish

Navya

Sports Analytics Group

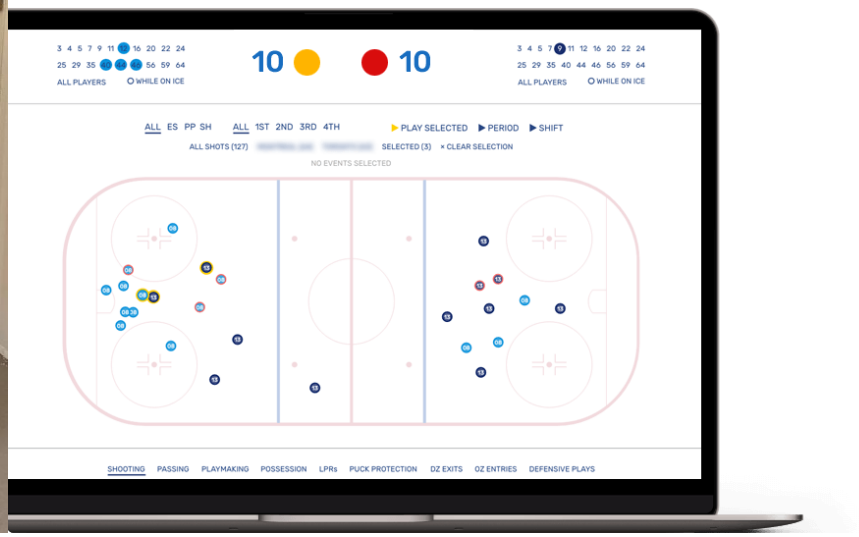
Patrick Lambrix, professor

Niklas Carlsson, professor

Sports Analytics

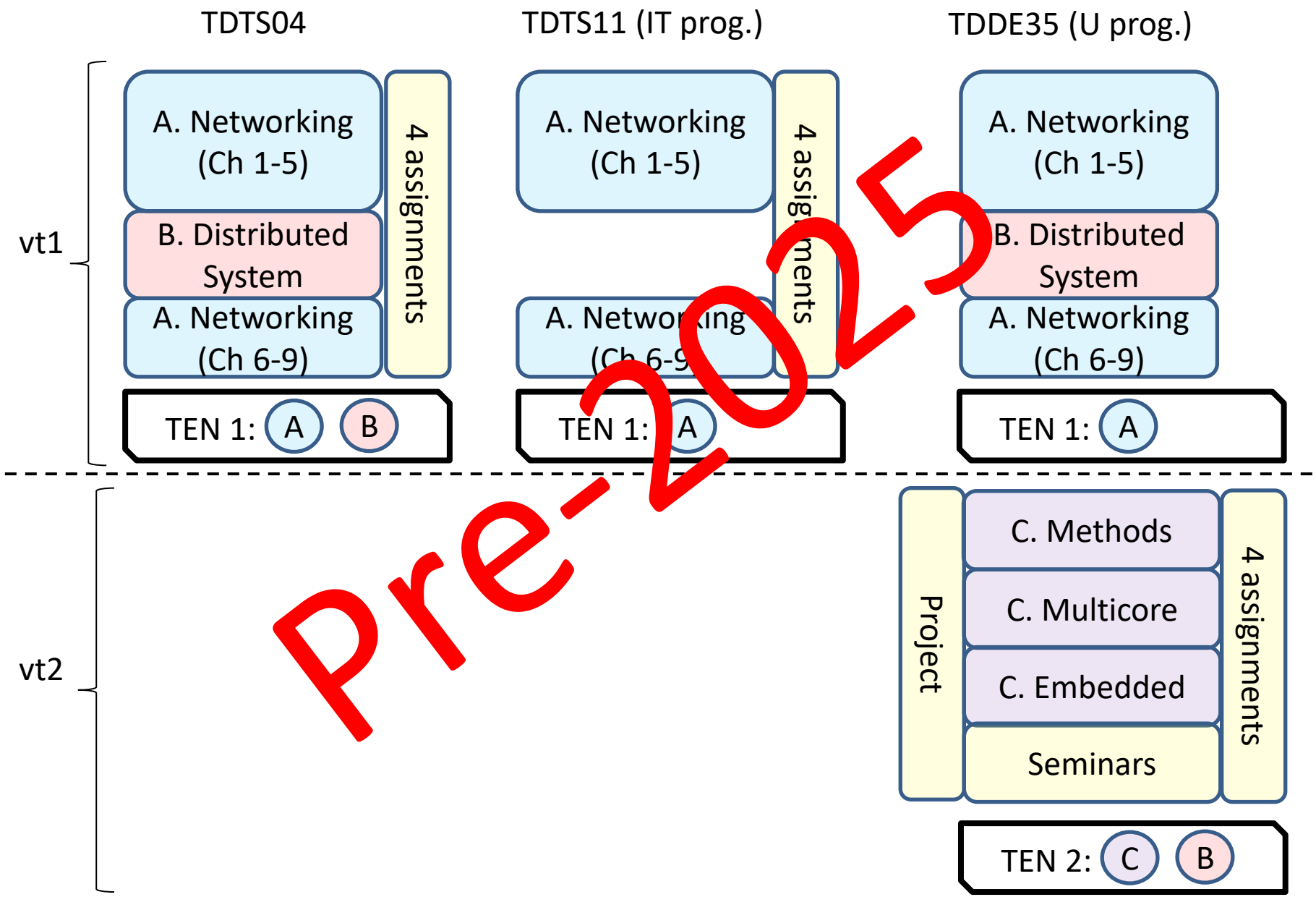
Examples

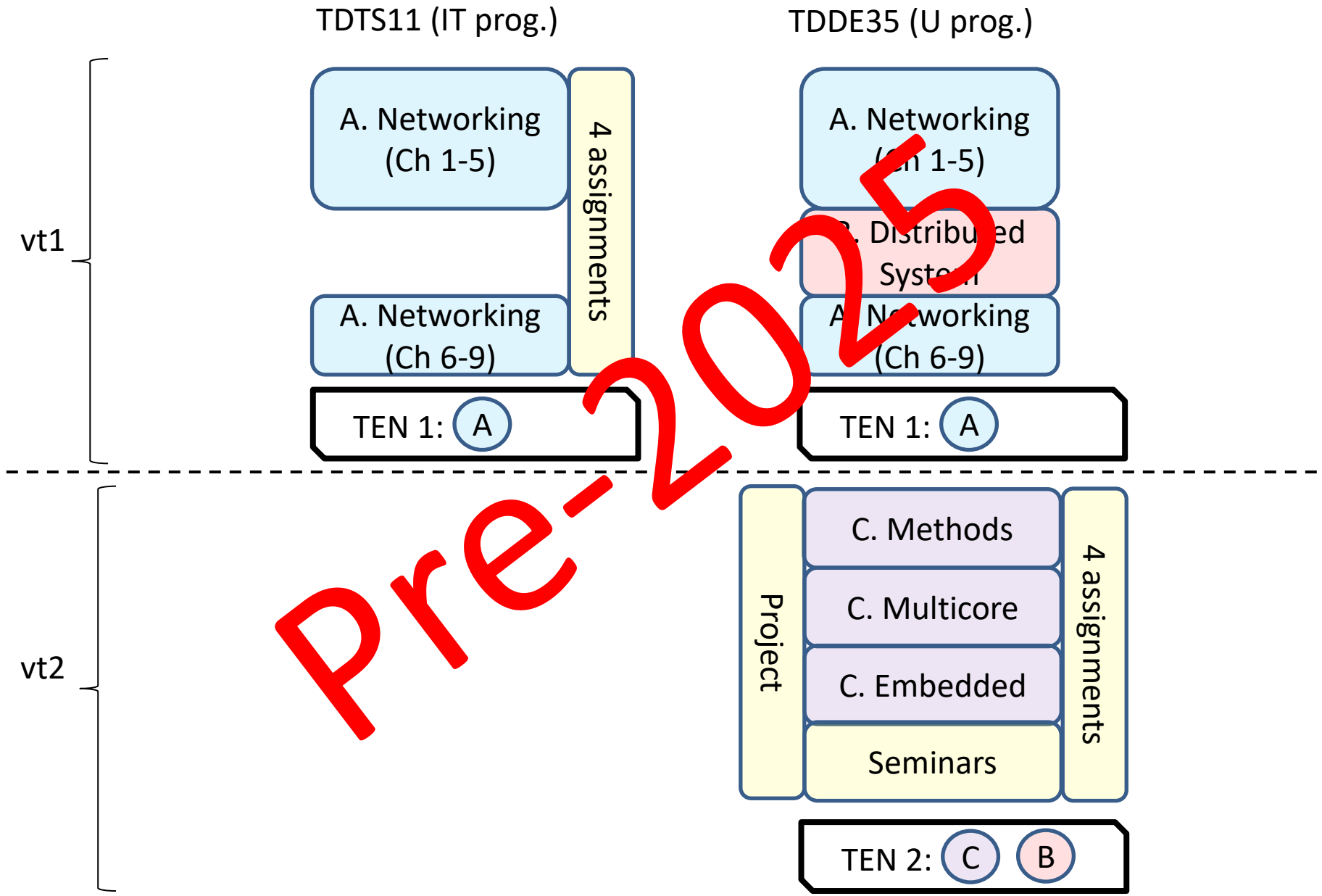
- Player performance (e.g., goal importance)
- Player roles, player combinations, and strategies
- Game and season outcome prediction



LINHAC: Linköping Hockey Analytics Conference

Back to the course …


TDTS04
TDTS11 (IT prog.)
TDDE35 (U prog.)
vt1
A. Networking (Ch 1-5)
B. Distributed System
A. Networking (Ch 6-9)
4 assignments
TEN 1: A B
TEN 1: A
vt2
Project
C. Methods
C. Multicore
C. Embedded
Seminars
TEN 2: C B
Pre-2025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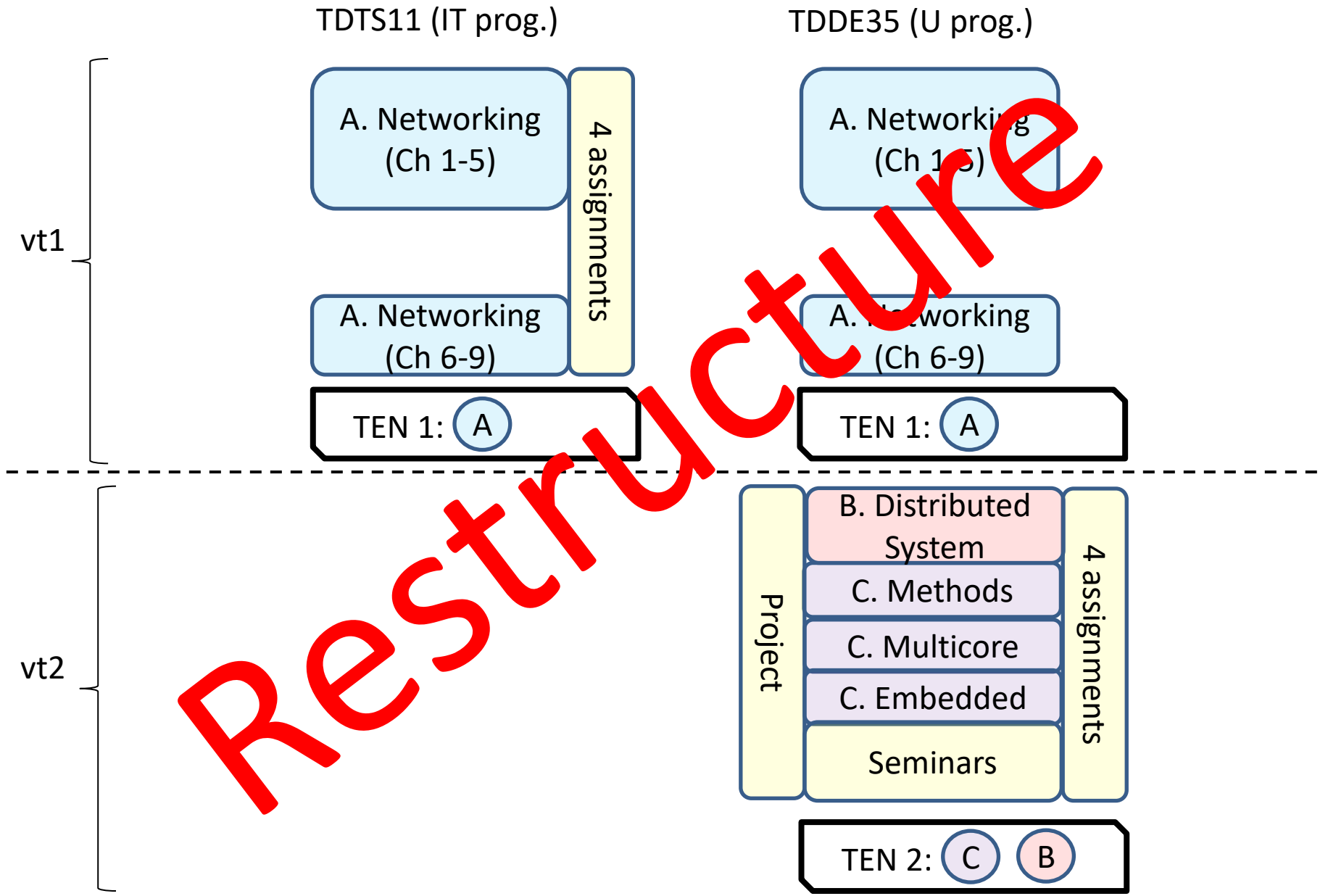
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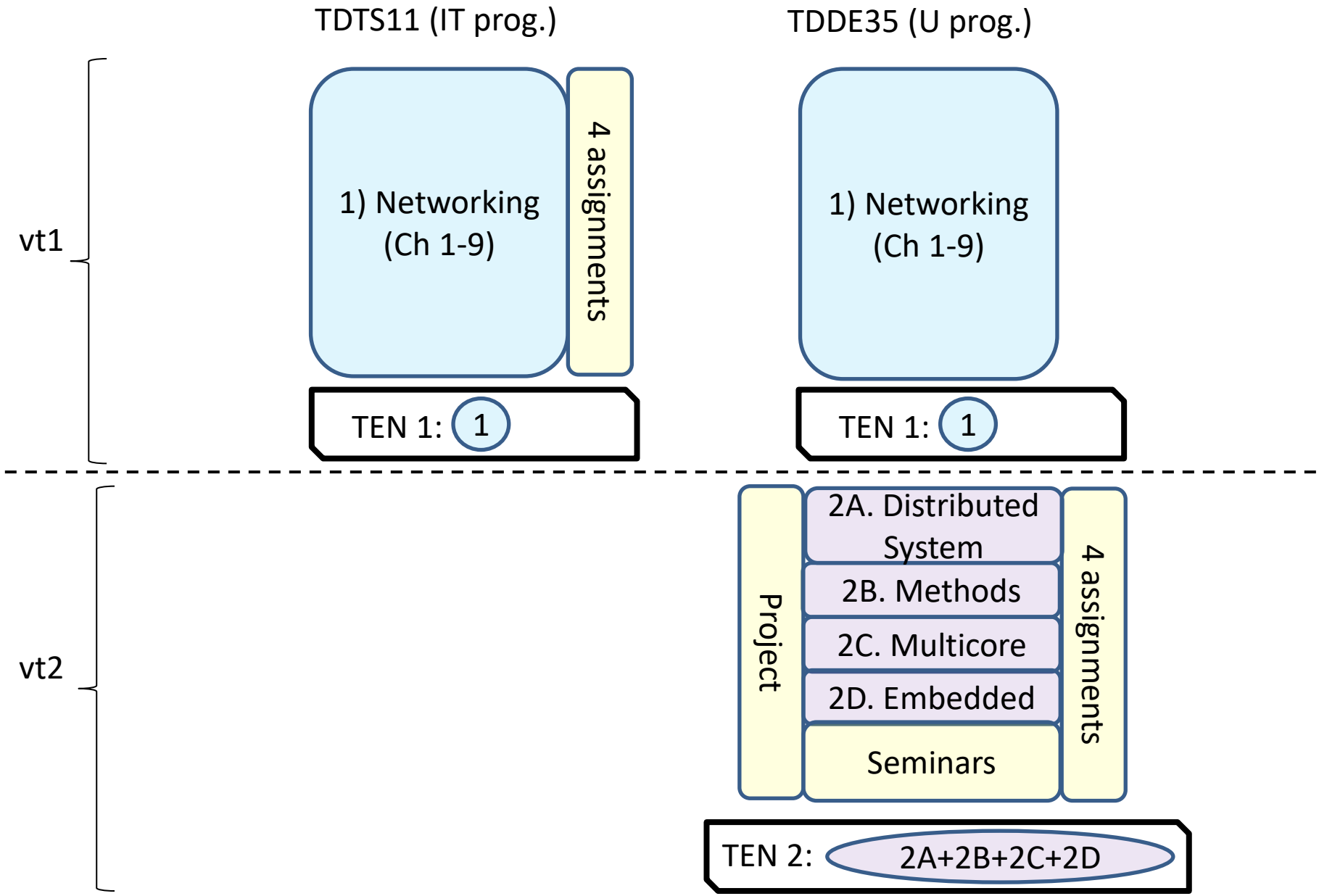
4 assignments
TEN 2: C B


TDTS11 (IT prog.)
TDDE35 (U prog.)
vt1
1) Networking (Ch 1-9)
4 assignments
TEN 1: 1
1) Networking (Ch 1-9)
TEN 1: 1
vt2
Project
2A. Distributed System
2B. Methods
2C. Multicore
2D. Embedded
Seminars
4 assignments
TEN 2: 2A+2B+2C+2D

Course Overview(s)

- Written exam
  - Grads: ‘fail’, 3, 4, 5.
- Four (4) mandatory lab assignments
  - Must pass all assignments
  - Ten (10) lab opportunities + 2 lessons
  - Register on webreg. (Deadline for TDTS11 on Friday!!)
  - TDTS11: One (1) optional assignment
    - Up to 4 bonus marks for exam
- vt1: Thirteen (13) lectures
  - Twelve (12) network “focus” [both groups: IT + U]
  - Last lecture with some exam preparation [based on examiner]
  - Likely guest lecture by Sectra
- See your respective websites for more information ...

Lecture Videos and Slides

- Strongly suggest attending lectures, but complementing material available
- Andrei's recorded lectures from a similar course are available here
  - https://liuonline-my.sharepoint.com/:f:/g/personal/andgu38_liu_se/Eh1nFrZCvgZCqOO9p2hyWzsBSOQ--TXgPqxkb_lZsBmixg?e=nypWek
- Videos and other materials from book authors are available here
  - https://gaia.cs.umass.edu/kurose_ross/lectures.php
  - https://gaia.cs.umass.edu/kurose_ross/online_lectures.htm

Lecturers' Wish List

- Buy/rent and read the textbook
  - Very good textbook, written by highly regarded researchers in the field
  - No time to cover everything during lectures
- Work hard (and smart)
  - Attend lectures
  - Make sure you **understand** the material
  - Start assignments early (some will take time)
  - Ask questions during class + discuss with peers
- Follow deadlines

So let’s start the course …