Magnus Almgren, Marina Papatriantafilou

DAT300/DIT615: LECTURE 1 ADMINSTRATIVE DETAILS

Support Team

- Examiners
  - Magnus Almgren
  - Marina Papatriantafilou
- Course Support Team
  - Charalampos Stylianopoulos
  - Wissam Aoudi
  - + others depending on project expertise

Details on web page:
http://www.cse.chalmers.se/edu/course/DAT300/

Course Slots

- Always check **Timeedit & web page**
- Mondays, Wednesdays 1000-1145*
  - … in ML3, EL42, EL43
- Some exceptions though:
  - Thursday, 2018-09-06, 1315-1500
  - Thursday, 2018-09-27, 0900-1000
  - ***+ presentation slots in exam week***

Check regularly web page + **SLACK** for up-to-date info:
http://www.cse.chalmers.se/edu/course/DAT300/

*(sometimes shorter)

What is the course about?

Example lectures/presentations

- Olaf Landsiedel, Chalmers: Wireless networks for IoT.
- Vincenzo Gulisano, Chalmers: Intro to Data Streaming.
- Hannah Najdataei, Chalmers: Lidar point cloud processing

- Jimmy Ehnberg (Chalmers): Power Systems
- Pär Johansson, Chalmers: Need for ICT and analysis for buildings.
- Anders Skoogh (Chalmers): Data aspects in production systems

- Göran Ericsson, SvK Head of Research and Development
- Rikard Bodforss: security & water plants
- Ericssonx2, Volvo, ABB, Gothenburg Energy, Etc.

plus presentations by you

SVENSKA KRAFTNÄT

National grid

A modern society needs a good electricity supply in order to function effectively. The national grid (i.e. the system of 400 - 220 kV lines) has been built up in order to transmit large volumes of energy over great distances and functions like a motorway for electrical power.

Only the largest production facilities and the regional grids are connected to the national grid.

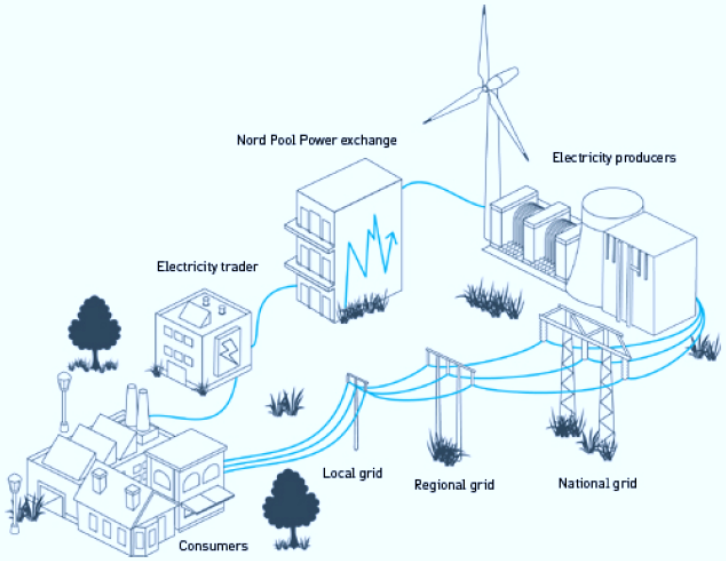
Svenska kraftnät manages Sweden's national grid, which includes about 15, 000 km transmission lines, substations and international 400 and 220 kvV interconnectors. Efficiency, safety and the long-term planning are three primary aims. Expansion planning, maintenance and operational supervision are required to fulfil this.

Download a map of the power transmission network in the nordic countries 2013.

The national grid and other networks

Electricity is transported from the major power stations to the regional electricity networks (40-130 kV) via the national grid (220 kV and 400 kV), which is owned by the Swedish state and managed by Svenska Kraftnät.

From the regional networks, electricity is transported via local networks (40 kV or less) to electricity consumers.



The diagram above shows the route of electricity from the producer (power station) via the national grid, regional network, local network and finally to the electricity consumer. The producers sell their electricity on the Nord Pool power exchange or to electricity suppliers. Suppliers sell the electricity on to the consumer.

The network owner uses the local network to distribute the electricity in the mains to the consumer.

Electricity suppliers and network owners are different kinds of companies. If you have changed your supplier then you get two bills, one from the supplier detailing the cost of the electrical energy, and one from the network owner for transmission of the electricity on the supply system.

Göteborg Energi

Privat | Företag

Text: A A A | Anpassa | English

Om oss | Kontakt | Mina energisidor

Produkter och priser | Projekt och etableringar | Kundservice

Sök

VINN STARTPLATSER TILL LILLA OCH MELLAN GÖTEBORGSVARVET!

Logga in

Mina energisidor

Ok

Vad kan vi hjälpa dig med?

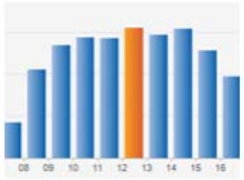
- Har du frågor om fakturan?
- Vill du ha e-faktura?
- Vill du göra felanmälan?
- Dags att flytta?
- Lediga jobb
- Vill du köpa el?

Som Västsveriges ledande energiföretag erbjuder vi **el**, **elnät**, **fjärrvärme** och **gas**.

Bra Miljöval

> När du vill minska din miljöpåverkan

Nu har du genom vårt erbjudande Fjärrvärme märkt med Bra Miljöval möjlighet att ytterligare markera att du vill minska din miljöpåverkan.



> Följ din elanvändning på timnivå

Genom den kostnadsfria tjänsten "Din elanvändning" kan du nu följa din elförbrukning per månad, dygn eller timma

> GoBiGas - en biogassatsning för ett hållbart Göteborg

Här ska vi producera biogas genom förgasning av skogsråvara. Se filmerna och läs mer om projektet här.

> Dags att teckna nytt elavtal?

Hos DinEl kan du sätta ihop ditt eget avtal, efter dina egna preferenser och boendesituation.

Nyheter & pressreleaser

> Fler nyheter

2013-02-27 > Information om rivning och ombyggnation av Rosenlundsverket

2013-02-26 > Vinnare av EM-biljetter i februari

2013-02-26 > Göteborg Energi deltar i nationellt forskningsprogram inom elkrafttekniK

Avbrottsinformation

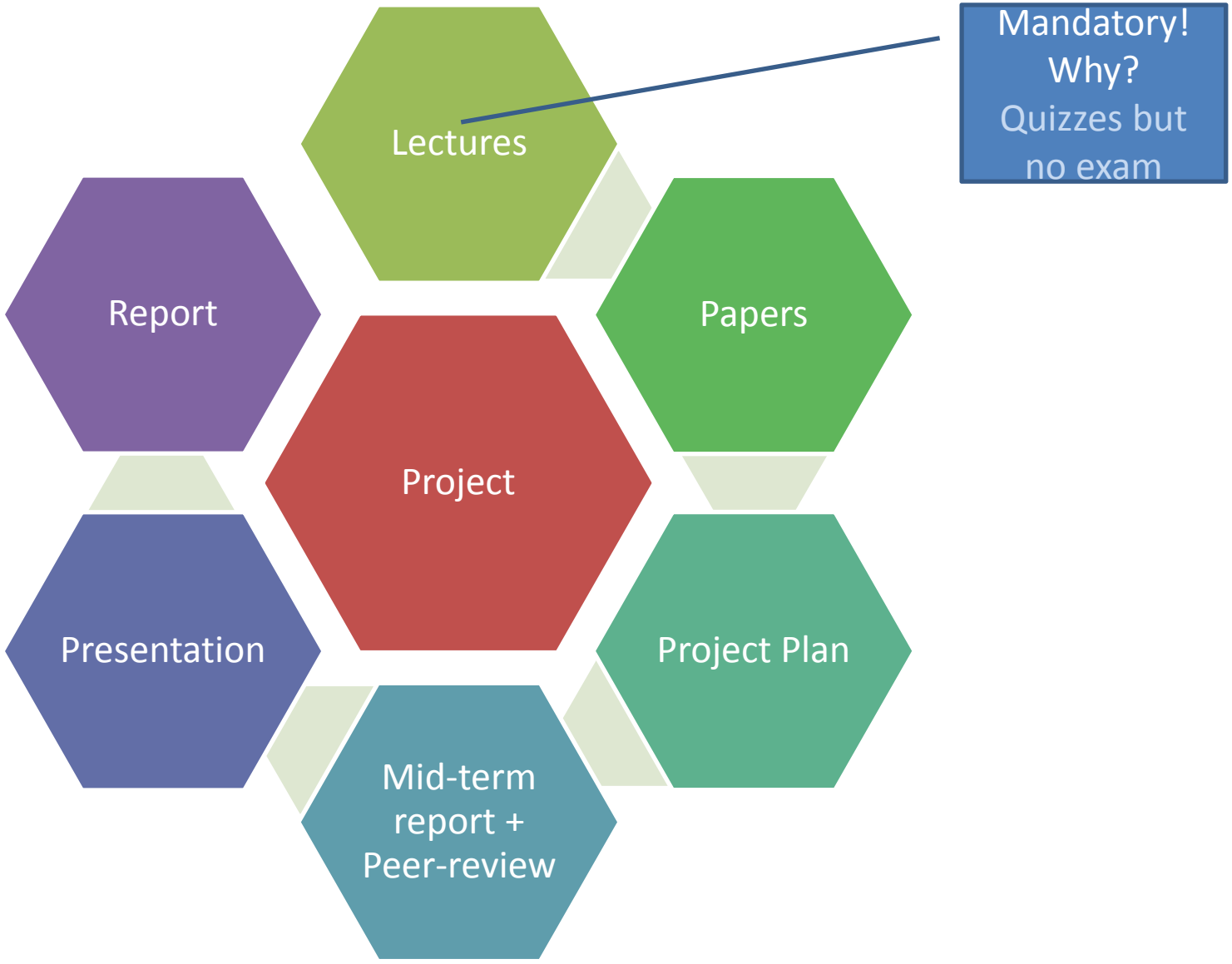
> Elnät

> Fjärrvärme

> Fjärrkyla

> Gas

Course Details



Course Details

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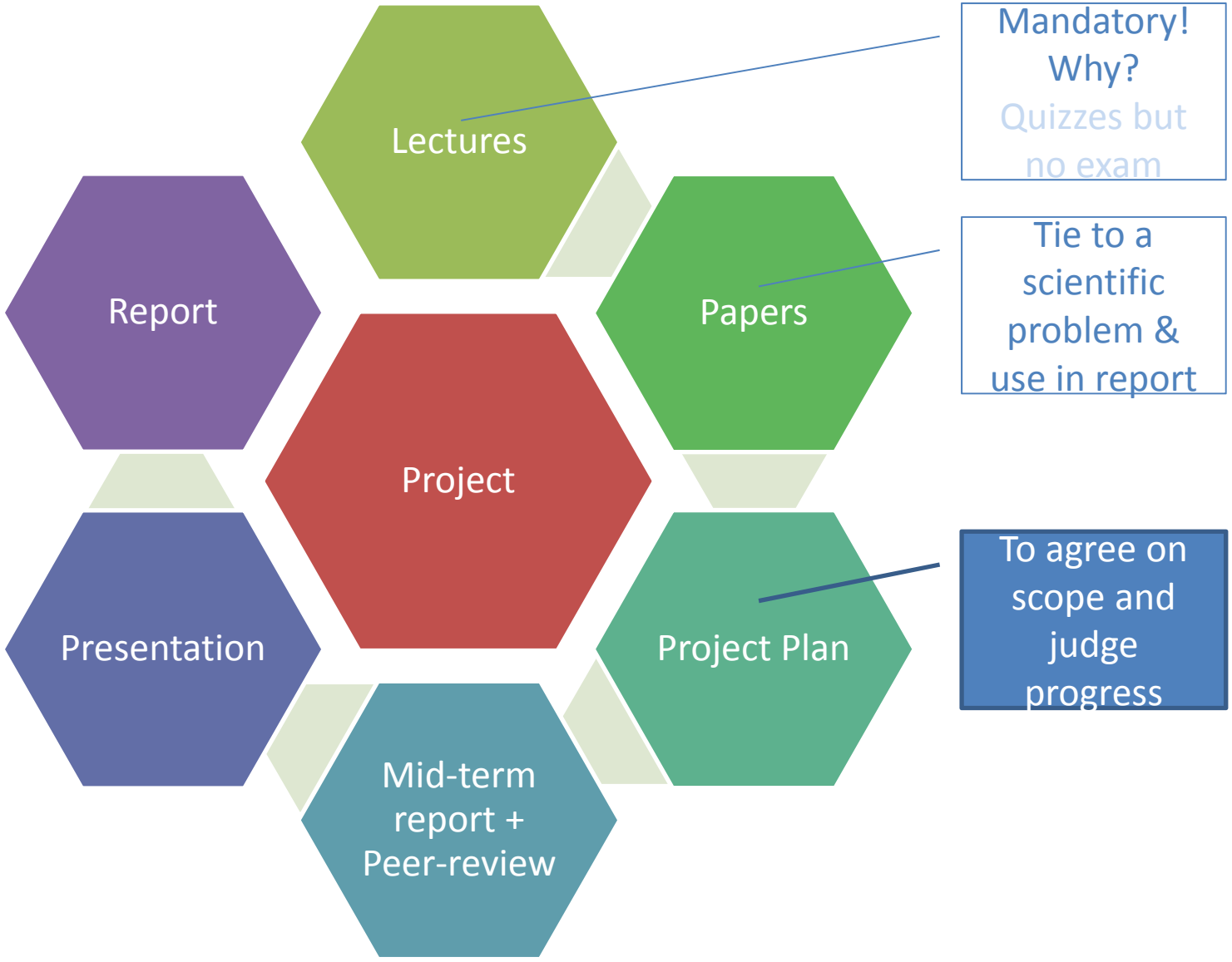

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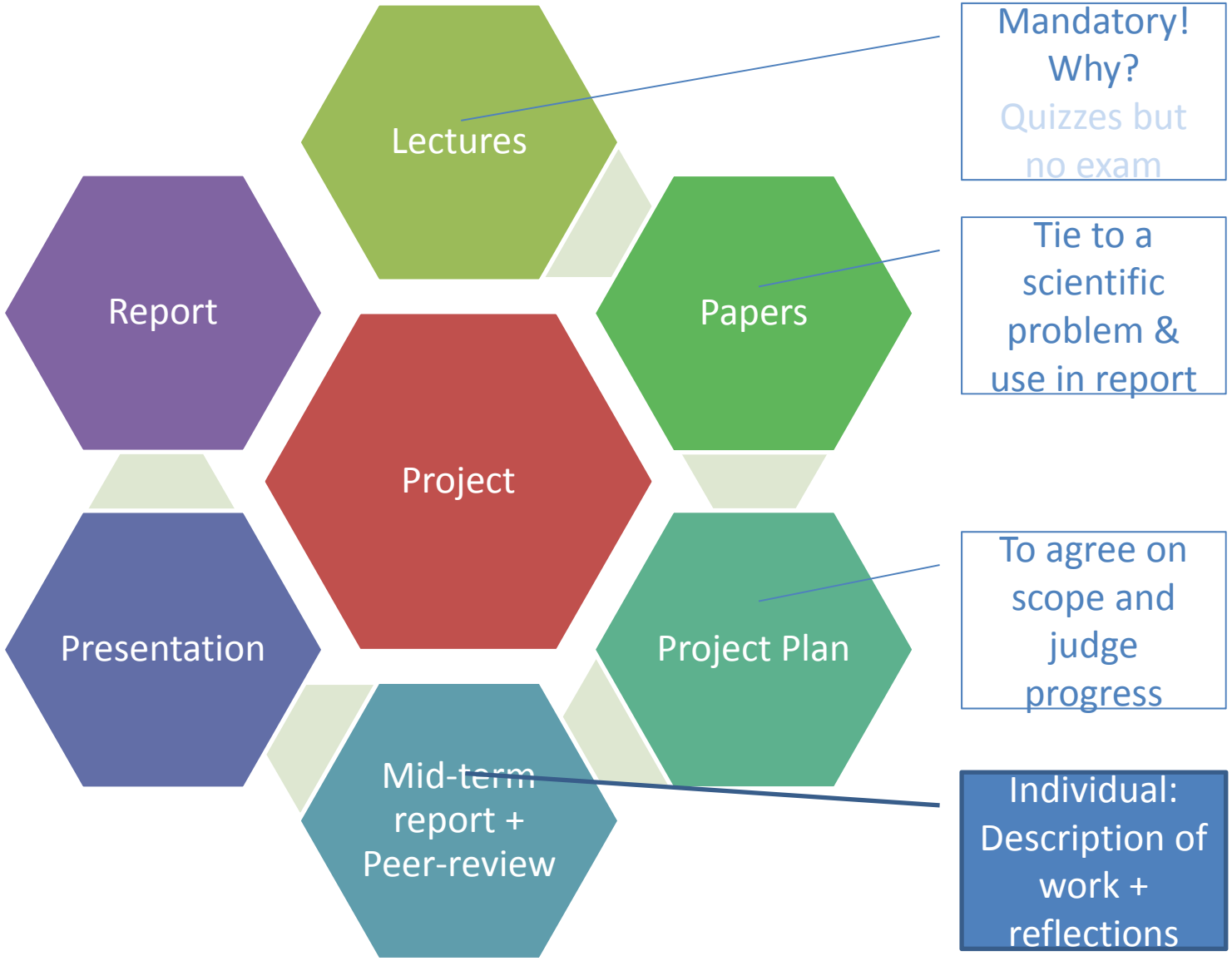

Passing the course

- Major activity: Project
  - Faculty & Industry presentations to give breadth
  - Choosing papers to read to support project work
    - Training in presentation of complex ideas
    - Team work
  - Actively listening and discussing other people's ideas

Passing the course

- Major activity: Project
  - Faculty & Industry presentation
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  - Actively listening and discussing other people's

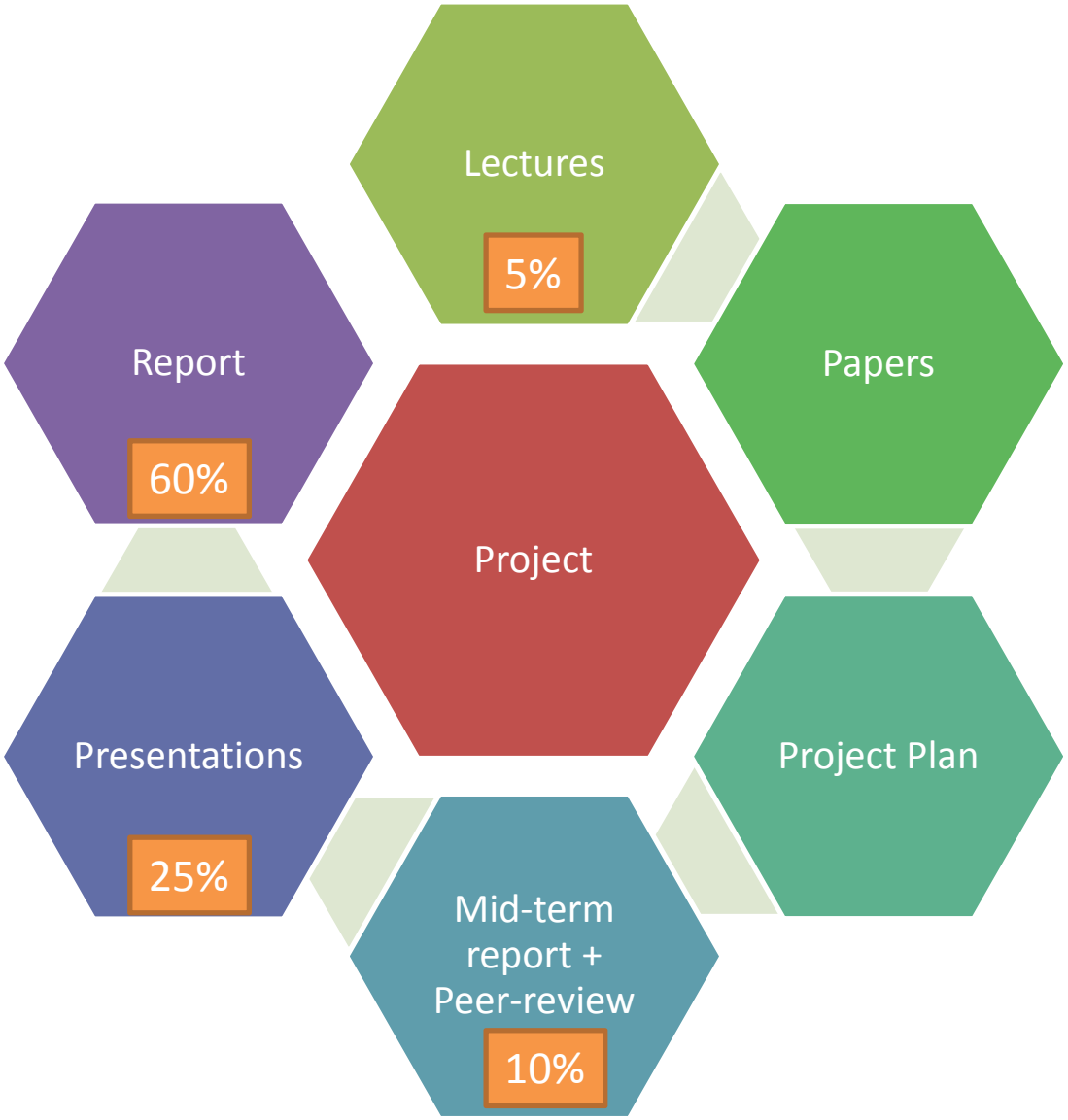
Idea

-- Understand complex ideas
-- Go into depth in the paper
-- Explain to your peers

Mandatory Participation

The active participation is important for the presentations, so we have mandatory lectures. If you miss lectures (or are late), we will ask you to read additional articles and write a report.

Your grade (1)


Lectures
5%
Papers
Report
60%
Project
Presentations
25%
Project Plan
Mid-term report + Peer-review
10%

Your grade (2)

- … will mainly depend on the group activities
  - Completed project and its quality
    - Project report
    - Presentations (final + progress reports)
- … but also on individual efforts
    - Individual mid-term progress report
    - Peer-review of another project
    - Active participation in lectures and presentations (occasional quizzes)

List of deadlines

- Projects
  - W1 Choose group + project
  - W2 Planning report + list of supporting papers (schedule, resources, goals)
  - W4 (**individually)** 1--2 pages: project + reflections; (team) outline of report
  - W5 (**individually)** 2 pages: peer-review
  - end Successfully complete project
    - Written report **DEMO** presentation

List of deadlines

- Projects
  - W1
  - W2 papers
  - W4 reflections;
  - W5
  - end
    - Written report **DEMO** presentation

Descriptions of what we ask for,
or actual examples are on box.com.

- README.txt
- Group Example/*
- Group Example/Submissions/*
- …

List of deadlines

- Other reporting
  - Every week, write a **short** summary of what your team has done and if you **need our help. → BOX**
  - Every other week, we want you to shortly present project status and current challenges.
  - We will also ask for
    - Contribution report for you personally, and for the overall team (more to come later)

Course Tools

- We use **slack** for most communications
  - Sign up at: <write teacher and ask>
- You need to join **box**, and then ask us to allow you access to the course directory
  - Post your email in "sign-up-box" on Slack
- You need access to code repository (**Github**)
  - If different email from the one for box.com, also write that on Slack
- Course submissions should be "dropped"@
  - <write teacher and ask>
  - (see "`Group Example/Submissions/README.txt`")

Projects

- Suggestions on the home page
  - http://www.cse.chalmers.se/edu/course/DAT300/
  - Github repository
  - Video of former project presentation (this Wednesday)
    as an example

DAT300 Students - Box | Projects 2017 | 8 ways to take screensho

www.cse.chalmers.se/edu/course/DAT300/projects-2017.html

Suggested Projects for DAT300, DIT668 (under construction)

See also http://www.cse.chalmers.se/edu/course/DAT300/SLIDESNOTES/L2aboutPrj.pdf

At project start, we will share access with a github for you to look at (and **possibly extend earlier projects**) as well as discuss availabl
git account and send a request to chasty@ (chalmers domain) to register to the course group.

Below we list a number of suggested projects for DAT300. Of course we would be open to hear your suggestions too -- but the projects
The suggestions below are just seed ideas from faculty. If you like an idea, we will connect you with the faculty to develop it further. It
demonstration at the end of the course.

2017:1 Decision support for smart meters and power outages

Göteborg Energi has over a quarter million smart meters, capable of sending power outage alarms, installed in Göteborg. Reporting po
the wireless networks they use to communicate. In this project you can explore how the alarms could be used for real world scenarios

2017:2 Detect attacks against industrial control systems

Attacks on Industrial Control Systems (ICS) are likely to manifest changes in sensors sen
changes in their behavior. A popular approach to tackling this problem is to build a prediction model from the sensor data and use it fo
observed value (the residuals) can then be inspected for la
project is to leverage advances in Neural Networks/Deep
data). The expected outcome of this project is to

- Implement a NN using any of the available toolbox
- Apply and tune the implemented network on time s
- Analyze the residuals and estimate the prediction a

Do you have the right courses?

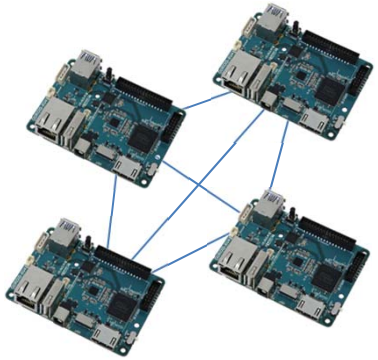
SLACK

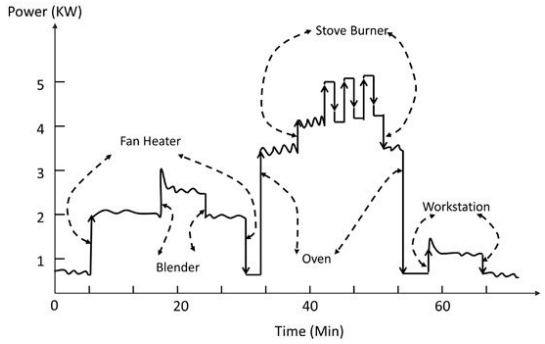
Votes

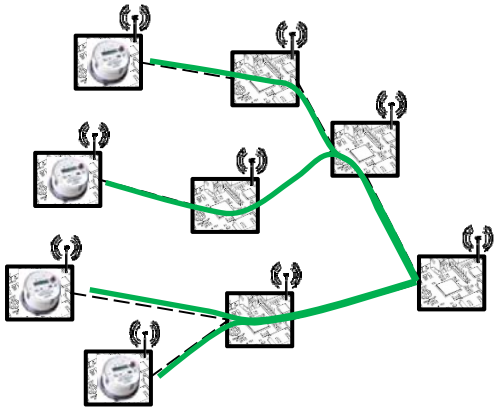
	2017:1	2017:2	2017:3	2017:4a	2017:4b	2017:4c	2017:5	2017:6	2017:7	2017:8	2017:9
Andreas Lindhé		✓				✓	✓	✓			
Christian Roos	✓						✓				
Hassan Ghalayini		✓		✓	✓	✓		✓	✓	✓	
Anders Stigsson		✓					✓		✓		
Malama Kasanda	✓							✓		✓	
Vaios Taxiarchis	✓							✓		✓	
Robert Gustafsson		✓				✓	✓	✓			
Felix Kirchmann						✓	✓		✓	✓	
Romi Zaragatzky		✓					✓	✓			
Lamiya Yagublu		✓					✓	✓			
Francine Mäkelä		✓					✓	✓	✓		
Your name	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘	✓ (✓) ⊘
Total	3	7		1	1	4	★8	★8	4	4	

11 polled users

Many different “types” of projects in different domains







Detecting Sensor Spoofing Attacks on ICS

Anomaly Detection in ICS through One-Class Classification

A multi-parallel, heterogeneous framework for accelerating Network Intrusion Detection in IoT networks

Wireless sensor energy consumption study

Peak Demand Dimensioning in Distribution Systems Using Smart Meter Data

Smart load shedding using Smart Meters

Better Solar Grid Systems

Streaming prediction for the smart grid (in collaboration with GE)

Streaming validation (collaboration with GE)

How reliable is AI in CPS? Artificial Neural Networks and Image recognition in CPS

Unmanned aerial vehicle (UAV) based sensors for facade investigation

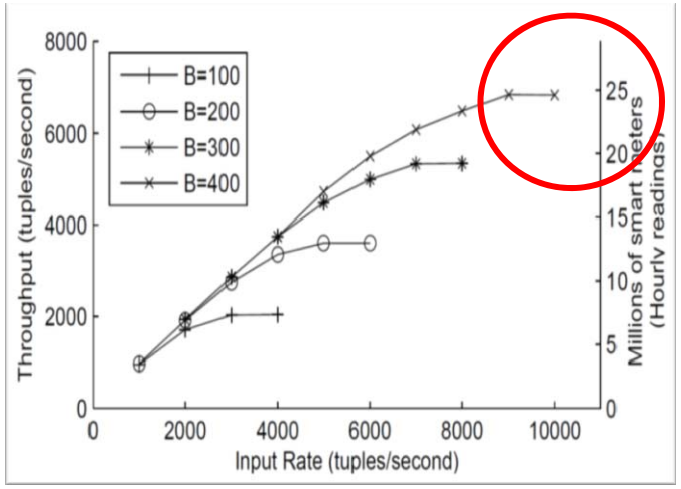
Interpret building photography

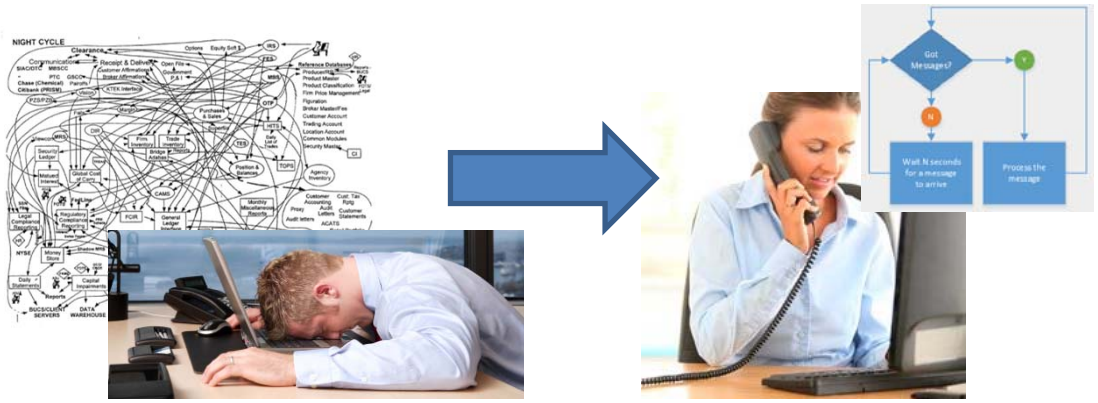
Understanding legacy documents for building codes

Energy-aware computing

Project Ideas 2018

e.g. project 9
On-line (streaming) validation of AMI dat





Streaming Data Validation in Advanced Metering Infrastructures (AMI) [IEEE ISGT 2015]

- Eg scaling to 25 Million meters/hourly readings on mainstream computer platform

Potential:

- Automate
- Improve quality (for GE and customers)
- Reduce time-to-deliver validated data
- In-built upgrade to more advanced validation

+ Prototype implementation in GE systems

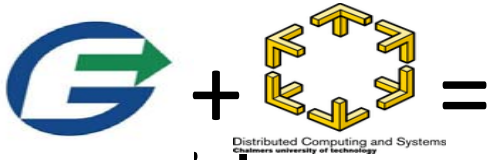
+ new knowledge: front of R&D internationally

Flink

Distributed Computing and Systems
Computer Science and Engineering Department

CHALMERS
UNIVERSITY OF GOTHENBURG

Related: Project 8:
Streaming prediction for the smart grid



Context:

Project 10: how reliable is AI?

How easy/difficult is for an ANN to be misled (eg in presence of missing/unreliable data?

- Co-supervision with Karl Bäckström
- Questions relevant in automated environments: Can a pedestrian be seen as a bike (and vice-versa) ? Can a worker be seen as an automated vehicle (and vice-versa), etc.

For the projects …

… feel free to contact us if you need to discuss. We will also have live discussions when we meet on Wednesday 6/9.