



Algorithm Design II

Introduction

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# Who am I?

Associate professor at ITU  
PhD, Aarhus University, 2002

Thesis topic: Hashing algorithms

Research since then: Design and analysis of algorithms, focus on:

- Randomized algorithms
- Algorithms for large data
- Database indexing
- Algorithms for data mining
- Algorithms for data streams

Past teaching:

- Introductory algorithms
- Introductory and advanced databases

# Algorithm Design II

## Algorithm design in second gear!

Compared to AD1:

- More emphasis on designing algorithms for new problems.
- No hand-ins. Project, done in small groups, about 50% of work load.
- Oral exam is based on project report.

Lectures (Rasmus + special guest star)

- Lectures present examples of issues and tools.
- Remembering the "curriculum" is not the main thing, but rather that you are able to apply the techniques on other problems.

Exercises (Morten and Rasmus, 30 min. after lecture ends)

- In the first weeks exercises will allow you to practice your algorithm design skills. Often they will be difficult!
- Later on, you may spend exercise time mostly on the project.

# Algorithm Design II

## Course goals

After the course [...] you should be able to:

- Identify and **formulate precisely** (if possible) the algorithmic problem hidden in a given programming task.
- Theoretically **analyze** the performance of a given algorithmic solution, including the analysis of basic **approximation algorithms** and basic **randomized algorithms**.
- At a basic level, evaluate theoretically the performance of an **algorithm in a parallel or distributed setting**, and in situations where there is a massive amount of data.
- Find results in the algorithms **research literature** relevant to a given problem.

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## Schedule and project

- 3 lectures + 1 project kick-off + 3 lectures
- Projects are individual for each group:
  - Select data set(s), see course page for suggestions.
  - Choose a few algorithmic problems you want to work with.
  - Discuss with us.
  - Repeat until process converges.
- You may self-form groups of size 2-3, or tell us that you would like to be put in a group.
  - Should be done no later than the project kick-off.

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## Guest lecture

- It just so happens that for the topic of this week we have a world expert in the house...
- So please welcome special guest star Thore Husfeldt!