# **Organizational Matters**



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#### Modul: IN2003

- Name: "Efficient Algorithms and Data Structures" "Effiziente Algorithmen und Datenstrukturen"
- ECTS: 8 Credit points
- Lectures:
  - ► 4 SWS

Mon 10:30–12:00 (Room Interim2) Fri 10:30–12:00 (Room Interim2)

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- Webpage: http://www14.in.tum.de/lehre/2014WS/ea/

#### Required knowledge:

- IN0001, IN0003
   "Introduction to Informatics 1/2"
   "Einführung in die Informatik 1/2"
- IN0007

**"Fundamentals of Algorithms and Data Structures"** "Grundlagen: Algorithmen und Datenstrukturen" (GAD)

▶ IN0011

"Basic Theoretic Informatics"

"Einführung in die Theoretische Informatik" (THEO)

- ▶ IN0015
  - "Discrete Structures"

"Diskrete Strukturen" (DS)

IN0018

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  - IN0011

### "Basic Theoretic Informatics"

"Einführung in die Theoretische Informatik" (THEO)

- IN0015
  - "Discrete Structures"
  - "Diskrete Strukturen" (DS)
- ▶ IN0018
  - "Discrete Probability Theory"
  - "Diskrete Wahrscheinlichkeitstheorie" (DWT)



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## **The Lecturer**

- Harald Räcke
- Email: raecke@in.tum.de
- Room: 03.09.044
- Office hours: (by appointment)



## **Tutorials**

Tutors:

- Chintan Shah
- chintan.shah@tum.de
- Room: 03.09.059
- Office hours: Wed 11:30–12:30
- Dario Frascaria
- frascari@in.tum.de
- Room: 03.09.035
- Office hours: (by appointment)



## **Tutorials**

- Monday 16-18 (MI 00.08.038)
   Chintan
- Tuesday 14-16 (MI 00.08.038)
   Dario
- Thursday 10-12 (MI 00.08.038)
   Dario
- Friday 12-14 (MI 00.13.009A) Chintan



## **Assignment sheets**

#### In order to pass the module you need to pass a 3 hour exam.



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- An assignment sheet is usually made available on Monday on the module webpage.
- Solutions have to be handed in in the following week before the lecture on Monday.
- You can hand in your solutions by putting them in the right folder in front of room 03.09.019A.
- Solutions have to be given in English.
- Solutions will be discussed in the tutorial of the week when the sheet has been handed in, i.e, sheet may not be corrected by this time.
- You can submit solutions in groups of up to **3** people.



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- It will improve by 0.0 or 0.4, respectively. Examples:



Assignment can be used to improve you grade

If you obtain 50% of the points on the first half and 50% on the second half of assignments your grade will improve according to the following function

$$f(x) = \begin{cases} \frac{1}{10} \operatorname{round}\left(10\left(\frac{\operatorname{round}(3x)-1}{3}\right)\right) & 1 < x \le 4\\ x & \text{otw.} \end{cases}$$

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Marald Räcke

- Machine models
- Efficiency measures
- Asymptotic notation
- Recursion
- Higher Data Structures
  - Search trees
  - Hashing
  - Priority queues
  - Union/Find data structures
- Cuts/Flows
- Matchings



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## 2 Literatur

- Alfred V. Aho, John E. Hopcroft, Jeffrey D. Ullman: *The design and analysis of computer algorithms*, Addison-Wesley Publishing Company: Reading (MA), 1974
- Thomas H. Cormen, Charles E. Leiserson, Ron L. Rivest, Clifford Stein:

Introduction to algorithms,

McGraw-Hill, 1990

Michael T. Goodrich, Roberto Tamassia: *Algorithm design: Foundations, analysis, and internet examples,* John Wiley & Sons, 2002



# 2 Literatur



Volker Heun:

Grundlegende Algorithmen: Einführung in den Entwurf und die Analyse effizienter Algorithmen,

2. Auflage, Vieweg, 2003

Jon Kleinberg, Eva Tardos:

Algorithm Design, Addison-Wesley, 2005



Donald E. Knuth:

*The art of computer programming. Vol. 1: Fundamental Algorithms,* 

3. Auflage, Addison-Wesley Publishing Company: Reading (MA), 1997



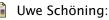
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*The art of computer programming. Vol. 3: Sorting and Searching,* 

3. Auflage, Addison-Wesley Publishing Company: Reading (MA), 1997

 Christos H. Papadimitriou, Kenneth Steiglitz: *Combinatorial Optimization: Algorithms and Complexity*, Prentice Hall, 1982



Algorithmik,

Spektrum Akademischer Verlag, 2001

Steven S. Skiena:

*The Algorithm Design Manual*, Springer, 1998

