

Part I

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 12:15–13:45 (Room 00.13.009A)
Thu 10:15–11:45 (Room 00.04.011, HS2)
- ▶ Webpage: <http://www14.in.tum.de/lehre/2011WS/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
 - ▶ **“Discrete Probability Theory”**
 - ▶ “Diskrete Wahrscheinlichkeitstheorie” (DWT)

The Lecturer

- ▶ Harald RÄd'cke
- ▶ Email: raecke@in.tum.de
- ▶ Room: 03.09.044
- ▶ Office hours: (per appointment)

Tutorials

- ▶ Tutor:
 - ▶ Chintan Shah
 - ▶ chintan.shah@tum.de
 - ▶ Room: 03.09.059
 - ▶ Office hours: Wed 11:30–12:30
- ▶ Room: 00.08.038
- ▶ Time: Tue 14:14–15:45

Assessment

- ▶ In order to pass the module you need to
 1. pass an exam, and
 2. obtain at least 40% of the points in the assignment sheets.

- ▶ Exam:
 - ▶ Date will be announced shortly.
 - ▶ There are no resources allowed, apart from a hand-written piece of paper (A4).
 - ▶ Answers should be given in English, but German is also accepted.




Assessment

- ▶ Assignment Sheets:
 - ▶ An assignment sheet is usually made available on Wednesday on the module webpage.
 - ▶ Solutions have to be handed in in the following week before the lecture on Thursday.
 - ▶ You can hand in your solutions by putting them in the right folder in front of room 03.09.052.
 - ▶ Solutions have to be given in English.
 - ▶ Solutions will be discussed in the subsequent tutorial on Tuesday.
 - ▶ We will probably have 12 assignment sheets. The first one will be out on Wednesday, 26 October.

1 Contents

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

2 Literatur I

-  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 II



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

2 Literatur III



Donald E. Knuth:

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



Uwe SchĂČĂŃning:

Algorithmik,

Spektrum Akademischer Verlag, 2001

2 Literatur IV



Steven S. Skiena:

The Algorithm Design Manual,

Springer, 1998