# Part I

# Organizational Matters

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# Organizational Matters

- ▶ Modul: IN2003
- ▶ Name: "Efficient Algorithms and Data Structures"
  "Effiziente Algorithmen und Datenstrukturen"
- ▶ ECTS: 8 Credit points
- ▶ Lectures:
  - ▶ 4 SWS
    Mon 10:00–12:00 (Room Interim2)
    Fri 10:00–12:00 (Room Interim2)
- ▶ Webpage:
  https://www.moodle.tum.de/course/view.php?id=90411

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- ▶ 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)

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## The Lecturer

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- ▶ Office hours: (by appointment)

# Tutorials

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# 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

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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

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# 2 Literatur

Ronald L. Graham, Donald E. Knuth, Oren Patashnik:
*Concrete Mathematics,*
2. Auflage, Addison-Wesley, 1994

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, 1997

# 2 Literatur

- Donald E. Knuth:
  *The art of computer programming. Vol. 3: Sorting and Searching,*
  3. Auflage, Addison-Wesley, 1997

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

- Uwe Schöning:
  *Algorithmik,*
  Spektrum Akademischer Verlag, 2001

- Steven S. Skiena:
  *The Algorithm Design Manual,*
  Springer, 1998