Part I

Organizational Matters

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- Modul: IN2003

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- Name: “Efficient Algorithms and Data Structures”
  “Effiziente Algorithmen und Datenstrukturen”

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  - 4 SWS
    Mon 10:00–12:00 (Room Interim2)
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- Webpage: `http://www14.in.tum.de/lehre/2021WS/ea/`

- Required knowledge:

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  - IN0015
    “Discrete Structures”
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  - IN0018
    “Discrete Probability Theory”
    “Diskrete Wahrscheinlichkeitstheorie” (DWT)

The Lecturer

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

Tutorials

1	Monday,	12:00–14:00,	00.08.038	(Michael Laraia)
3	Monday,	14:00–16:00,	02.09.023	(Ruslan Zabrodin)
4	Tuesday,	10:00–12:00,	00.08.053	(Letian Shi)
5	Tuesday,	14:00–16:00,	00.08.038	(Arnor Kristmundsson)
6	Wednesday,	10:00–12:00,	03.11.018	(Abdelrahman Metwally)
2	Wednesday,	12:00–14:00,	online	(Arnor Kristmundsson)
8	Wednesday,	14:00–16:00,	online	(Abdelrahman Metwally)
9	Thursday,	16:00–18:00,	online	(Michael Laraia)
7	Friday,	12:00–14:00,	00.13.009A	(Ruslan Zabrodin)

Registration for Tutorials

Registration Period for Tutorial Sessions:

Saturday, 23 Oct– Tuesday, 26 Oct

via TUMonline; you have to choose at least 3 options...

Registration for Attending the Lecture

- For the following lectures we will do random checks of ca. 10% of the vaccination certificates.

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- Therefore, you must register if you want to attend the lecture inside the lecture hall.
- This is done via Moodle.

Assignment sheets

In order to pass the module you need to pass an exam.

Assessment

Assignment Sheets:

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- You should submit solutions in groups of up to **2** people.

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- Submissions must be handwritten by a member of the group. Please indicate who wrote the submission.

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- Submissions must be handwritten by a member of the group. Please indicate who wrote the submission.
- Don't forget name and student id number for each group member.

Assessment

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- If you obtain a bonus your grade will improve according to the following function

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

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  Examples:

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  - $3.7 \rightarrow 3.3$
  - $1.0 \rightarrow 1.0$
  - > 4.0 no improvement

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Requirements for Bonus

- 50% of the points are achieved on submissions 2–8,
- 50% of the points are achieved on submissions 9–14,
- each group member has written at least 4 solutions.

1 Contents

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

1 Contents

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


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,
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Jon Kleinberg, Eva Tardos:
Algorithm Design,
Addison-Wesley, 2005


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The art of computer programming. Vol. 1: Fundamental Algorithms,
3. Auflage, Addison-Wesley, 1997

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3. Auflage, Addison-Wesley, 1997


Christos H. Papadimitriou, Kenneth Steiglitz:
Combinatorial Optimization: Algorithms and Complexity,
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Uwe Schöning:
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Steven S. Skiena:
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