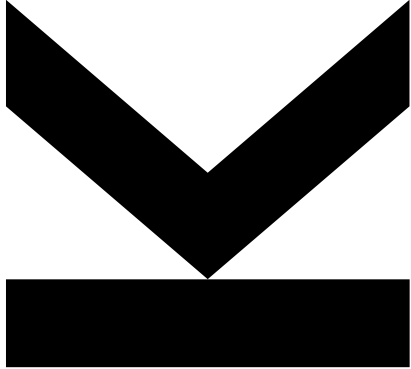
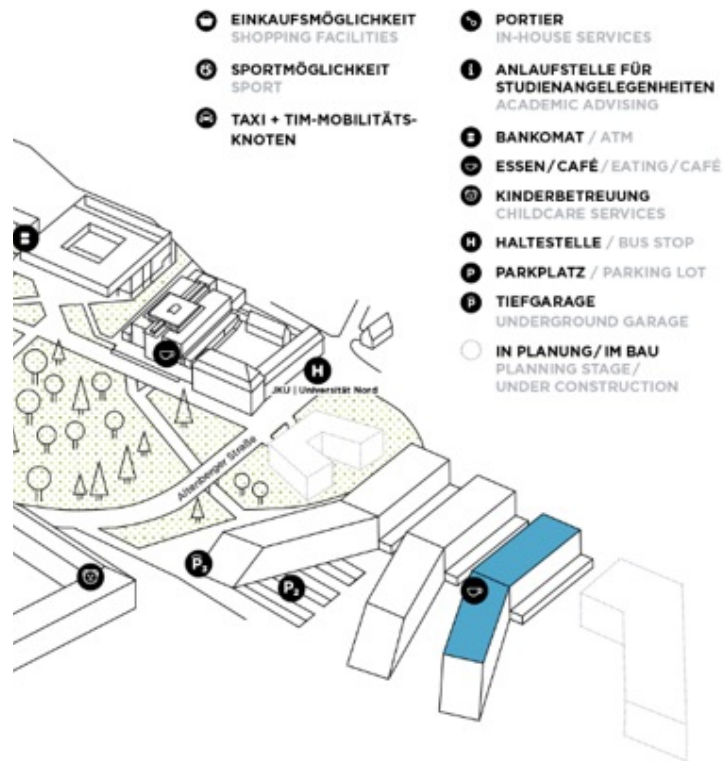


Introduction



Algorithms and Data Structures 2, 340300
Lecture – 2022W
Univ.-Prof. Dr. Alois Ferscha, teaching@pervasive.jku.at

Contact Details



Lecture

Univ.-Prof. Dr. Alois Ferscha

Exercise

DI Martin Schobesberger
Dr. Markus Weninger
Dr. Markus Jäger

Address

Johannes Kepler University Linz
Institute of Pervasive Computing
Altenberger Straße 69, 4040 Linz
Phone: +43 (732) 2468 4760
Science Park 3, 6th floor

Contact

teaching@pervasive.jku.at

Please always mention your student id (8 digits)
and the course id (6 digits) in the subject line!

Course Details

Course	VL Algorithms and Data Structures 2, 340300
Workload	3 ECTS, 2 hpw
Original study plan	Bachelor's programme Computer Science (UK 033/521)
Education level	B2 – Bachelor's programme, 2. year
Language	English; Programming language is Java (34031x) or Python (34032x)
Study material	Slides and additional materials will be available in the course section in Moodle.
Evaluation	Examination at end of term

<https://studienhandbuch.jku.at/125317>

Course Details :: 2022W

How is the content provided?

- Physical Presence in Linz + Live-Stream to Vienna and Bregenz + Zoom
- Recordings in Moodle (for full semester)
- all material online in Moodle

Required days of **physical presence**: 1 (for the exam)

What are the evaluation criteria?

- final exam at the end of the term

Introduction Mon, October 10, 2022

Time & Place Mon, 13.45-15.15, HS 1

Exam Mon, January 30, 2023, 13.45

Exam Details :: Presence Exams

Exam dates

- Main date: Mon, January 30, 2023 13.45-15.15 in Linz/Vienna/Bregenz
- 1st Retry: planned for end of March in Linz/Vienna/Bregenz
- 2nd Retry: planned for mid-May Linz only

Registration

- Registration for the exam in KUSSS is required – please check the deadlines!

Presence exam

- Room allocation in Linz will be announced in Moodle 1 day before the exam.
- Do not forget your JKU card!

Allowed Material

- Printed/written documents such as slides and supplementary material that has been presented in lecture and exercise.

Exam Registration in KUSSS

Aktuelles
News
Diskussionsforen
Meine Daten
Persönliche Daten
Studienbeitrag
Dokumente
Studierzimmer
LVA-Suche
Meine Anmeldungen
Meine LVAs
Stundenplan
Terminexport
Prüfungen
LVA-Prüfungen
Meine StEOP
Fachprüfungen
Kundmachung
Notenauskunft
Ausfällhilfe
Prüfungsraster

LVA-Prüfungen 2016W OK

LVA-Prüfungsübersicht

Aktuelle Prüfungsanmeldungen Alte Prüfungsanmeldungen

Prüfungssuche

Suche Prüfungen für meine LVAs (in allen verfügbaren Semestern):

ODER

Suche nach einer bestimmten Prüfung:

Prüfungsdatum: zw. und i Format: TT.MM.JJJJ, z.B. 21.01.2011

LVA-Nr.: i z.B. 248.781 oder 248781

oder

LVA-Titel: i mind. 6 Zeichen, * als Platzhalter für beliebige Zeichen, z.B. Informat*

oder

Kursklasse: i z.B. 1EIV1K

Suchergebnisse

Auswahl	Prüfung	SKZ
--	Algorithmen und Datenstrukturen 2 (340023,2016W) Maximale TeilnehmerInnenzahl: unbeschränkt • Bisherige Anmeldungen: 0 <small>✖</small> • Abmeldeschluss: So. 22.01.2017 23:59 Anmeldezeitraum: 01.10.2016 00:00 - 22.01.2017 23:59	--

Consider the **deadline** for exam registration!

Lecture Topics

Introduction

Search Trees

- Height Balanced Trees
- Weight Balanced Trees
- Randomized Treaps

Hashing

Double Hashing

Monte Carlo Tree Search

Graphs

- Structure
- Flows

Social Graphs

Community Detection

Community Analysis

PRAM Algorithms

Lecture Schedule

Date	Topic
Mo. 10.10.2022	Introduction
Mo. 17.10.2022	Height Balanced Trees (Video in Moodle, no lecture in classroom!)
Mo. 24.10.2022	Weight Balanced Trees
Mo. 31.10.2022	Randomized Treaps
Mo. 07.11.2022	Hashing
Mo. 14.11.2022	Double Hashing
Mo. 21.11.2022	Monte Carlo Tree Search
Mo. 28.11.2022	Graphs: Structure
Mo. 05.12.2022	Graphs: Flows
Mo. 12.12.2022	Social Graphs
Mo. 09.01.2023	Community Analysis
Mo. 16.01.2023	PRAM Algorithms
Mo. 23.01.2023	(reserved)
Mo. 30.01.2023	Exam

Primary Literature



Ottmann, Thomas; Widmayer, Peter: [Algorithmen und Datenstrukturen](#). Berlin/Heidelberg: Springer, 6. Auflage, 2017. ISBN: 9783662556504

- Behandelt sehr fachkundig und leicht verständlich den „klassischen“ Themenkern einer Standardvorlesung „Algorithmen und Datenstrukturen“ (vom Suchen und Sortieren über Adressberechnungsmethoden und Listenstrukturen (Bäume aller Art) bis zu Geometrischen Algorithmen und Graphenalgorithmen.
- Auch in elektronischer Form verfügbar:
https://liss.jku.at/permalink/f/n2r1to/ULI_alma5155435650003340

Goodrich, Michael T.; Tamassia, Roberto; Goldwasser Michael H.: [Data Structures and Algorithms in Python](#), Hoboken, N.J.: Wiley, 2013. ISBN: 9781118290279

Goodrich, Michael T.; Tamassia, Roberto; Goldwasser Michael H.: [Data Structures and Algorithms in Java](#), Hoboken, N.J. [u.a.] : Wiley, 6. Auflage, 2014. ISBN 978-1-118-80836-8

Weiss, Mark Allen: [Data Structures and Algorithm Analysis in Java](#), Harlow: Pearson, 3. Auflage, 2012. ISBN: 978-0-273-75211-0

Secondary Literature



R. Sedgewick: [Algorithms in Java](#), Addison Wesley Professional, 2007.

T. Cormen, C. Leiserson, R. Rivest, C. Stein: [Introduction to Algorithms](#), MIT Press, 3. Auflage, 2009.

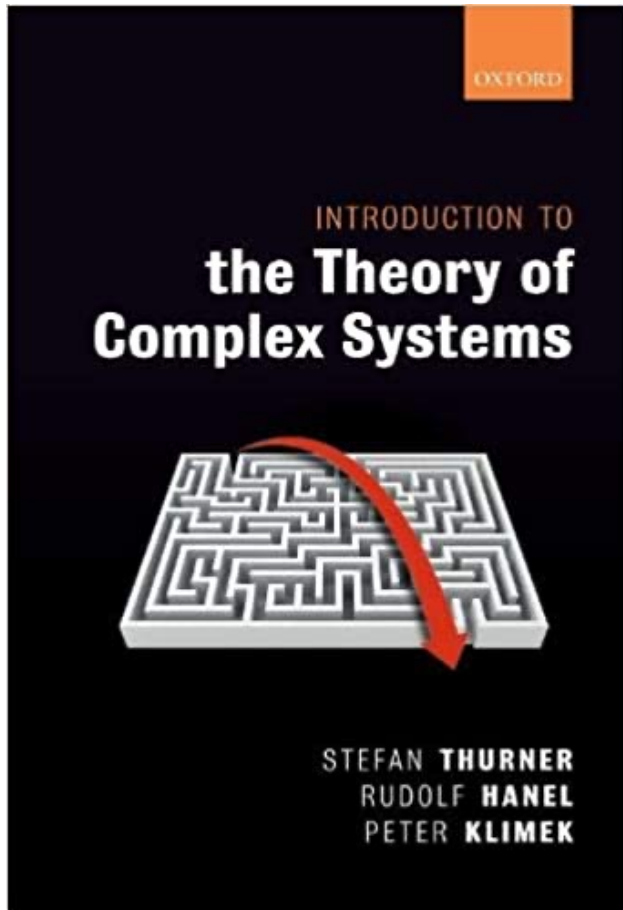
N. Wirth: [Algorithmen und Datenstrukturen](#), Stuttgart, Teubner, 3. Auflage, 1991.

A.V. Aho, J.E. Hopcroft, J.D. Ullman: [Data Structures and Algorithms](#), Addison Wesley, 1987.

Donald E. Knuth:
[The Art of Computer Programming. Volume 1 / Fundamental Algorithms.](#)
[The Art of Computer Programming. Volume 2 / Seminumerical Algorithms.](#)
Reading, Mass.: Addison Wesley Longman, 1997.

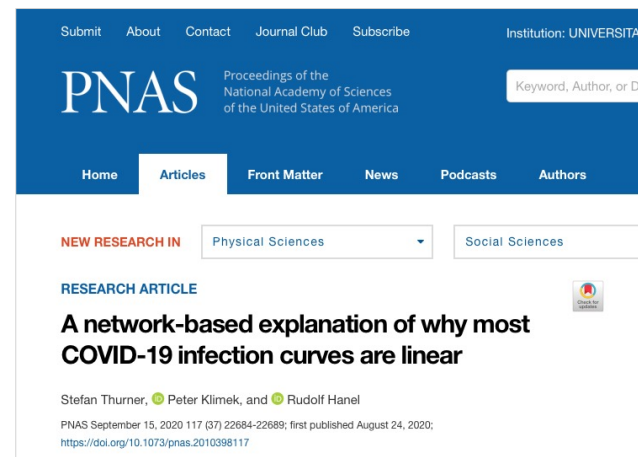
- *Frühe Standardwerke in der Informatik Grundausbildung.*

Complexity Science

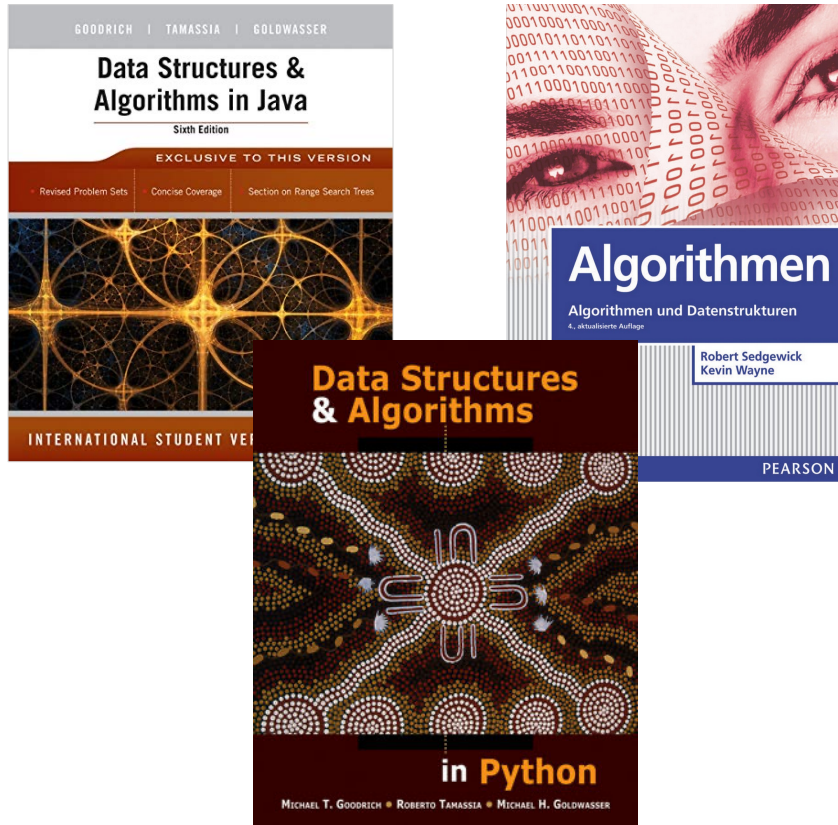


Stefan Thurner, Rudolf Hanel, Peter Klimek: [Introduction to the Theory of Complex Systems](#), OXFORD University Press, 2018.

Stefan Thurner, Peter Klimek, Rudolf Hanel: [A network-based explanation of why most COVID-19 infection curves are linear](#). Proceedings of the National Academy of Sciences Sep 2020, 117 (37) 22684-22689; DOI: 10.1073/pnas.2010398117



Recommended Literature



Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser: [Data Structures and Algorithms in Java](#), Wiley & Sons Ltd, current edition. ISBN 978-1-118-80836-8

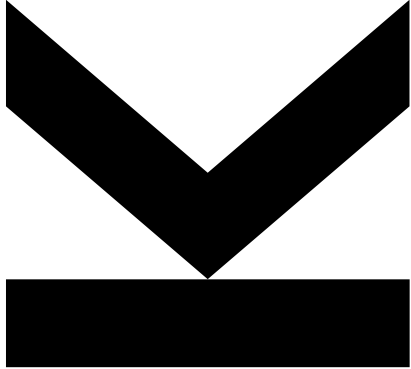
Michael T. Goodrich, Roberto Tamassia, Michael H. Goldwasser: [Data Structures and Algorithms in Python](#), Wiley & Sons Ltd, current edition. ISBN 978-1-118-54958-2

Robert Sedgwick, Kevin Wayne: [Algorithmen und Datenstrukturen](#), Pearson Deutschland, 2014.
[JKU LISSS](#)

Exercise Schedule (preliminary)

Date	Topic
Oct 11/12/13	Introduction
Oct 18/19/20	Trees
Nov 08/09/10	Search Trees
Nov 22/23/24	Hashing
Nov 29/30, Dec 1	Graphs: Structure
Dec 13/14/15	Graphs: Shortest Paths
Jan 10/11/12	Graphs: Network Flows

Introduction



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