

UV Distributed Information Management

Introduction

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Department of Computer Science
University of Salzburg

Agenda

Today's Agenda

1. Introduction
2. Logistics
3. Outlook
4. Discussion

Personal Information, Contact & Lecture Policies

Who Am I? **Daniel Kocher** (Senior Scientist, Database Research Group)

Contact (in this order):

1. **Lecture:** Wednesdays, 11:30 a.m. - 01:30 p.m. CET
2. **Slack:** <https://dbteaching.slack.com/> (**create** an account with your stud email).
3. **Email:** dkocher@cs.sbg.ac.at (as a last resort).

Please **interrupt me** immediately if

- you have **troubles understanding** what I am talking about,
- you have a **question** related to the current topic, or
- there is an **error on my slides**¹ (0.5 bonus points/error; max. 5 per student).

¹No punishment if it is not an error. Typos do not count (unless relevant), but please notify me anyways.

Why You Should Take This Course

The amount of **information** is growing continuously and **needs to be managed**.

Many systems for different scenarios have been developed.

You must be able to **choose the proper system** for your use case.

Topic Outline

Distributed Information Management



Data Management

Data Processing



Distributed Information Management



Data Management

Data Processing



Purpose



Distributed Information Management

Purpose



Data Management

Database Basics



Data Processing



Distributed Information Management

Data Management

Purpose



Database Basics



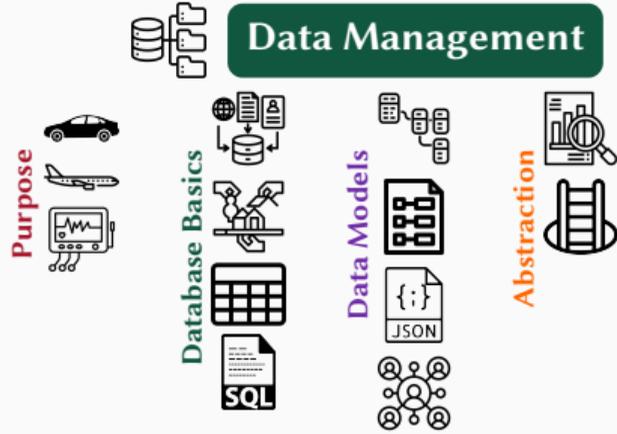
Data Models



Data Processing



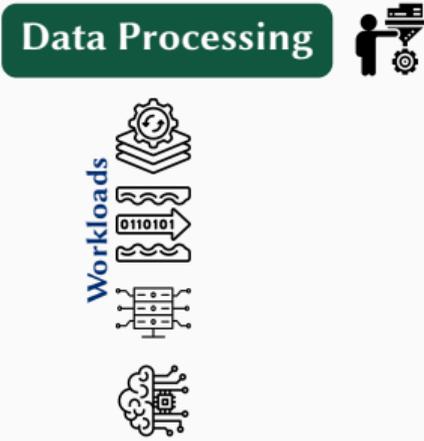
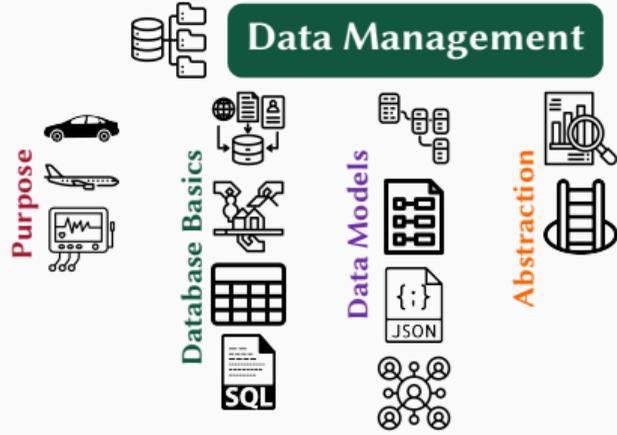
Distributed Information Management



Data Processing



Distributed Information Management



Distributed Information Management

Data Management

Purpose



Database Basics



Data Models



Abstraction



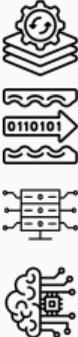
Challenges



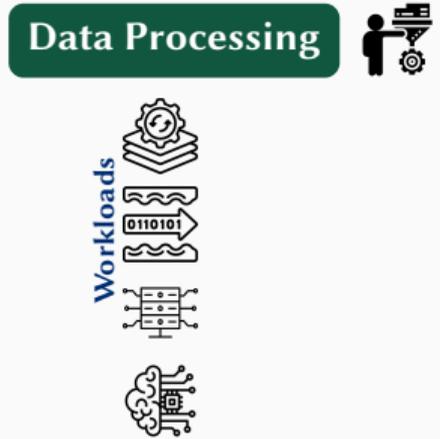
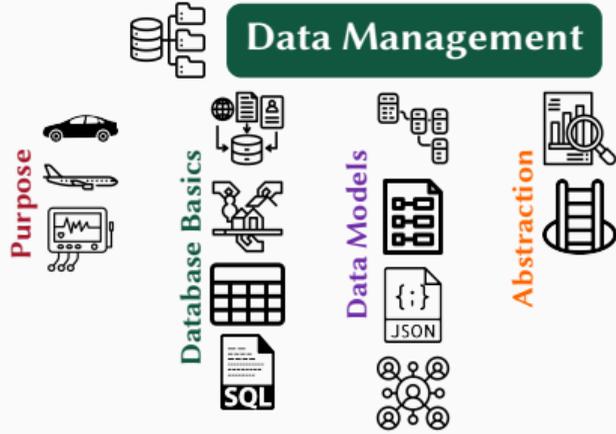
Data Processing



Workloads



Distributed Information Management



Complementary Courses

We will cover some basics of database management systems, but **not the internals in detail**. For internals, we refer to other courses at the Department of Computer Science.

Undergraduate Courses:

- Databases 1 (VO+PS; summer semester)
- Databases 2 (VO+PS; winter semester)
- Database Tuning (VO+PS; summer semester)

Graduate Courses:

- Advanced Databases (VO+PS; winter semester)
- Parallel & Distributed Data Management (UV; summer semester)
- Similarity Search in Large Databases (UV; winter semester)

Course Objectives

- Develop an **intuition** for database systems and their **core principles**.
- **Proper usage of the terminology** that is commonly used in database systems.
- **Tackle simple problems** using database systems.
- Learn to **choose a database system** for a given problem/application context.
- **Hands-on experience** with selected database systems.
- Working in a **team** (organize yourself as a team).
- Learn about the **challenges and limitations** of database systems.

VU “Grundlagen Informatik und Systeme” (512.023)

⇒ **Core principles** of computer science and systems.

UE “Einführung in Programmieren mit Python” (512.024)

⇒ **Basic programming skills** (e.g., in Python3).

Logistics

Where to Find Information

Website²:

- Assignments: schedule, meetings, and late submission policy.
- Detailed grading scheme.
- Learning material: slides, hands-on instructions, and supplementary material.
- Midterms: schedule, topics, and modes.

Blackboard³:

- Announcements (important announcements also via email).
- Assignments: announcement and submission.

²Course website: <https://dbresearch.uni-salzburg.at/teaching/2026ss/dim/>

³PLUS Blackboard: <https://elearn.sbg.ac.at>

Slack:

1. **Create an account**⁴ for our DBTeaching⁵ workspace (using your stud email).
2. **Log into** the workspace.
3. Browse the channels and **search** for **channel** #dim-uv.
4. **Join channel** #dim-uv.
5. **Say “Hi”** to the others in the channel 😊.

⁴Top right corner in most browsers.

⁵DBTeaching Slack Workspace: <https://dbteaching.slack.com/>

General Information:

- **Time & Location:** Wednesdays, 11:30 a.m. - 01:30 p.m. CET in HS T03.
- **Mode:** Appointments will be in **in person**.
- **Compulsory attendance:** Attendance will be checked (*“prüfungsimmanent”*).
- **Theoretical background** for the **assignments**.
- Covers all **relevant topics** for the **exams**.

General Information:

- **Groups of 2** students (announcement via email to dkocher@cs.sbg.ac.at).
- **Practical assignments** related to the topics covered in class.
- Submission via **Blackboard** (4.5 weeks per assignment).
- **3 assignments, each of which contributes 20%** to your grade.
- Initial grading per group, but **individual grading** after meeting.
- Please notify me if a student does not contribute to the assignments.

Assignments

Assignments: Typically consist of three parts: (1) A programming task (Python3), (2) a questionnaire, and (3) an after-assignment meeting. Your **submission** (programming task + questionnaire) is worth **50%** of the points. The remaining **50%** of the points are awarded in the **after-assignment meetings**.

After-Assignment Meetings: Short meetings to **discuss your submission** and the **grading**. **One meeting per assignment and group** (max. 15 minutes). Students will need to **answer questions** directly related to the assignment to **receive additional points**. **Every student** must be able to **answer questions without help!**

AI Tools: Allowed in a **defined scope**. That is, you can use AI tools to explain and learn the topic at hand, but you **must solve the assignments yourself** and must also be able to **explain certain aspects of an assignment**.

Assignment 0 – Get Familiar with the Assignment Workflow

Tasks:

1. Find yourself a **team of 2 students**.
2. **Enroll your team** by sending your **names and student IDs** via email.
3. **Test** whether the **virtual machine** runs on your machine.
4. Play around with **Debian Linux** (optional).
5. **Submit the answers** to the questionnaire.

Deadline: March 29, 2026, 11:59 p.m. (aka 23:59) CET

Students without a team after the deadline are **randomly assigned to a group**.

General Information:

- Exams are **open book** and will be held **in person** (justified exceptions may apply).
- **Two hand-written exams**, each of which contributes **20%** to your grade.
- An exam will last **at most 90 minutes**.

AI Tools: **Not allowed** since we follow an open-book philosophy. That is, you receive 0 points on an exam if we prove the usage of an AI tool during the exam.

Tentative Schedule

	March				April				May				June				
CW	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Lecture	✘	✔	✔	✔	✘	✘	✔	✔	✔	✔	✔	✔	✔	✔	✔	▶	✔
Assignments			Ass. 0				Ass. 1			Ass. 2			Ass. 3				
Exams									📖	📖							📖

- CW** Calender week
- ✔ Regular lecture (in person)
- ✘ No lecture
- ▶ Remote lecture or video recording to watch
- 👥 After-assignment meetings
- 📖 Midterm / Final exam
- 📖 Question & Answer session

Grading Scheme

Assignments		Exams		Total
Assignment 0	0%			
Assignment 1	20%			
Assignment 2	20%	Midterm exam	20%	
Assignment 3	20%	Final exam	20%	
60%		40%		100%

Grading Scheme

Overall Points ⁶	Grade
$\geq 87.5\%$	1 – “Sehr Gut”
[75%, 87.5%)	2 – “Gut”
[62.5%, 75%)	3 – “Befriedigend”
[50%, 62.5%)	4 – “Genügend”
$< 50\%$	5 – “Nicht Genügend”

⁶[X%,Y%) means $\geq X\%$ (inclusive; closed interval) and $< Y\%$ (exclusive; open interval).

Q&A



In-class Exercise:

1. Find yourself a group or work alone – **as you prefer**.
2. The next slide lists **28 + 1 terms**.
3. Try to briefly **describe each term** in the **context of computer science**.

Time: 30 minutes – feel free to leave the room and **walk around**.

Afterwards, we discuss these **terms in the plenum**.

Distributed Information Management

Throughput

Concurrency

Processor / CPU

Efficiency

Trade-off

HDD

Database system

Transaction

Declarative

Address

Instruction(s)

Parallelism

Main memory (RAM)

Performance

Virtual machine

SSD

Query

Scalability

Terminal

Time

Space

Cache

Transparency

Redundancy

Memory hierarchy

Index

Physical level

Compiler

Icons (pictograms made by)

mynamepong

Freepik

juicy_fish

Uniconlabs

Smashicons

Eucalyp

Elzicon

Skyclick

Muhammad Atif

surang

ultimatearm

imaginationlol

Pixel perfect

smashingstocks

from <https://www.flaticon.com>