

# UV Distributed Information Management

## Introduction

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Salzburg, March 11, 2026

Department of Computer Science  
University of Salzburg

# Agenda

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# 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](mailto: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**<sup>1</sup> (0.5 bonus points/error; max. 5 per student).

<sup>1</sup>No 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**.

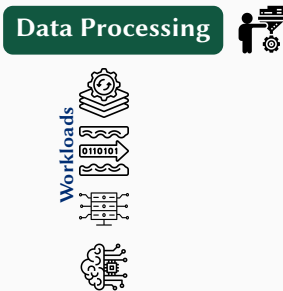
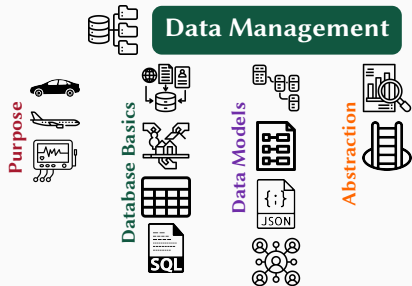
**Many systems** for different scenarios have been developed.

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

## Topic Outline

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# 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.

# Prerequisites

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

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# Where to Find Information

## Website<sup>2</sup>:

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

## Blackboard<sup>3</sup>:

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

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

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

# Where to Find Help

## Slack:

1. **Create an account**<sup>4</sup> for our DBTeaching<sup>5</sup> 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 😊.

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<sup>4</sup>Top right corner in most browsers.

<sup>5</sup>DBTeaching 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](mailto: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. 2                                                                            |                                                                                     |                                                                                     |                                                                                     |                                                                                     |  |                                                                                     |                                                                                     |                                                                                     |                                                                                     |                                                                                     |
|             |                                                                                   |                                                                                   | Ass. 1                                                                            |                                                                                   |                                                                                   |                                                                                   |                                                                                   |  |                                                                                     |                                                                                     | 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%  | Midterm exam<br>Final exam |     |       |
| Assignment 1 | 20% |                            |     |       |
| Assignment 2 | 20% |                            | 20% |       |
| Assignment 3 | 20% |                            | 20% |       |
| 60%          |     | 40%                        |     | 100%  |

# Grading Scheme

| Overall Points <sup>6</sup> | 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” |

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<sup>6</sup>[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      | Instruction(s)    | Time             |
| Concurrency     | Parallelism       | Space            |
| Processor / CPU | Main memory (RAM) | Cache            |
| Efficiency      | Performance       | Transparency     |
| Trade-off       | Virtual machine   | Redundancy       |
| HDD             | SSD               | Memory hierarchy |
| Database system | Query             | Index            |
| Transaction     | Scalability       | Physical level   |
| Declarative     | Terminal          | Compiler         |
| Address         |                   |                  |

Icons (pictograms made by)

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|               |                |             |                |
|---------------|----------------|-------------|----------------|
| mynamepong    | Freepik        | juicy_fish  | Uniconlabs     |
| Smashicons    | Eucalyp        | Elzicon     | Skyclick       |
| Muhammad Atif | surang         | ultimatearm | imaginationlol |
| Pixel perfect | smashingstocks |             |                |

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