



# Subject: “Database Management Systems 1”

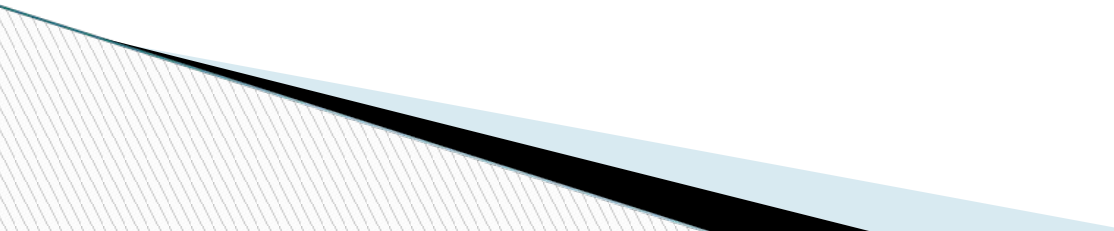
Prerequisite: Programming languages

**Number of credits:** 3 (2/1/0)

**Term:** Spring 2018

**Instructor’s full name:** Lyazat Naizabayeva

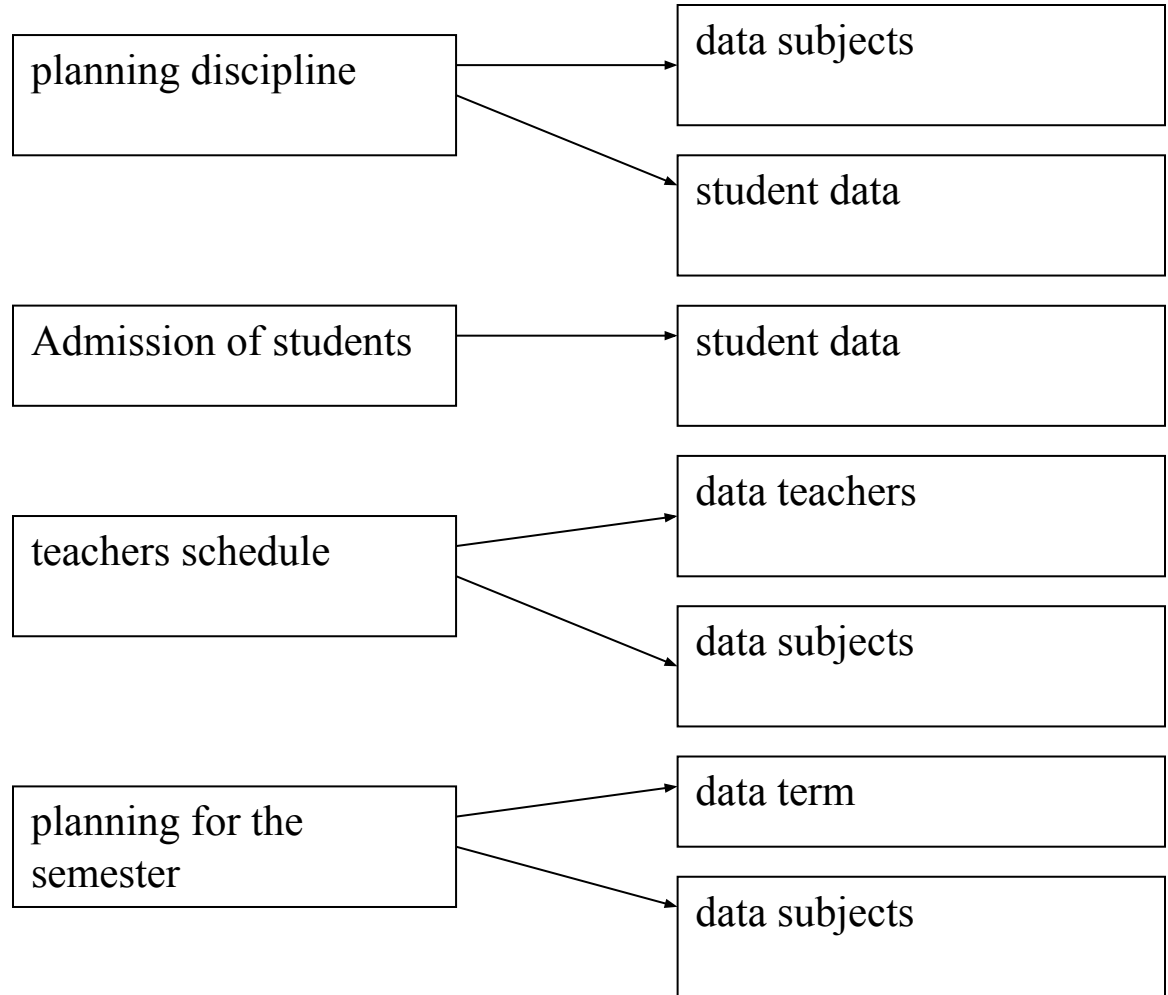
# Lecture 1

- Data Administrator
  - Database Administrator
  - Database designer
    - Database Design Process
  - The architecture of a database management systems
- 

# Why necessary to use a database management system?

**The traditional** approach to data processing has the following drawbacks:

- Duplication of data
- The inconsistency of data.

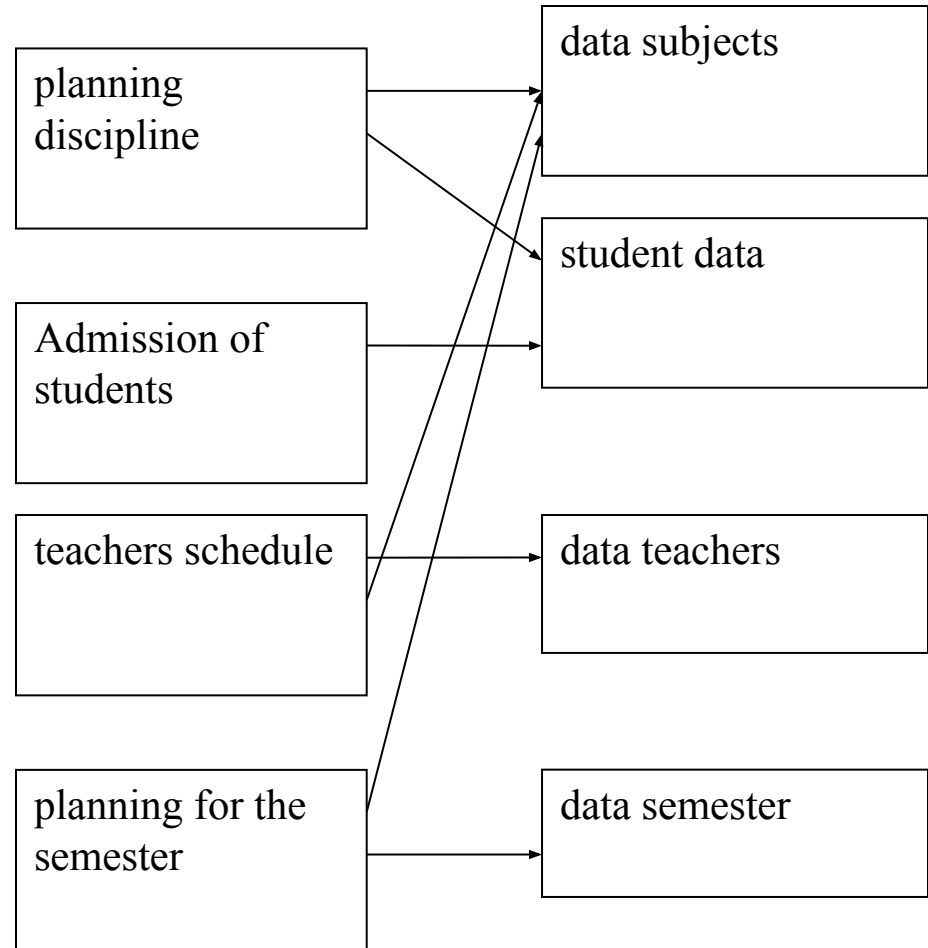


Link between the application and data files.

# Approach using a database management system

## □ Advantages of the approach using a database management system:

- it reduces redundancy;
- eliminates the inconsistency;
- sharing of data;
- comply with the standards;
- introduce security measures;
- supports data integrity.



# 1. Discuss the several major function of data administrator and database administrator.

## *Data Administration:*

A high-level function that is responsible for

- the overall management of data resources in an organization, including maintaining corporate-wide definitions and standards

## *Database Administration:*

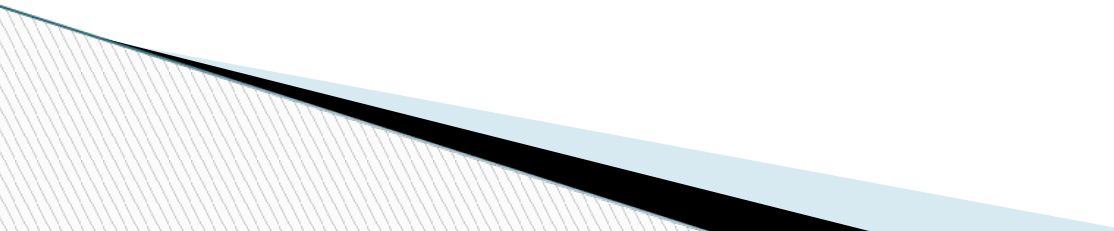
A technical function that is responsible for

- logical and physical database design and for dealing with technical issues such as security enforcement, database performance, and backup and recovery

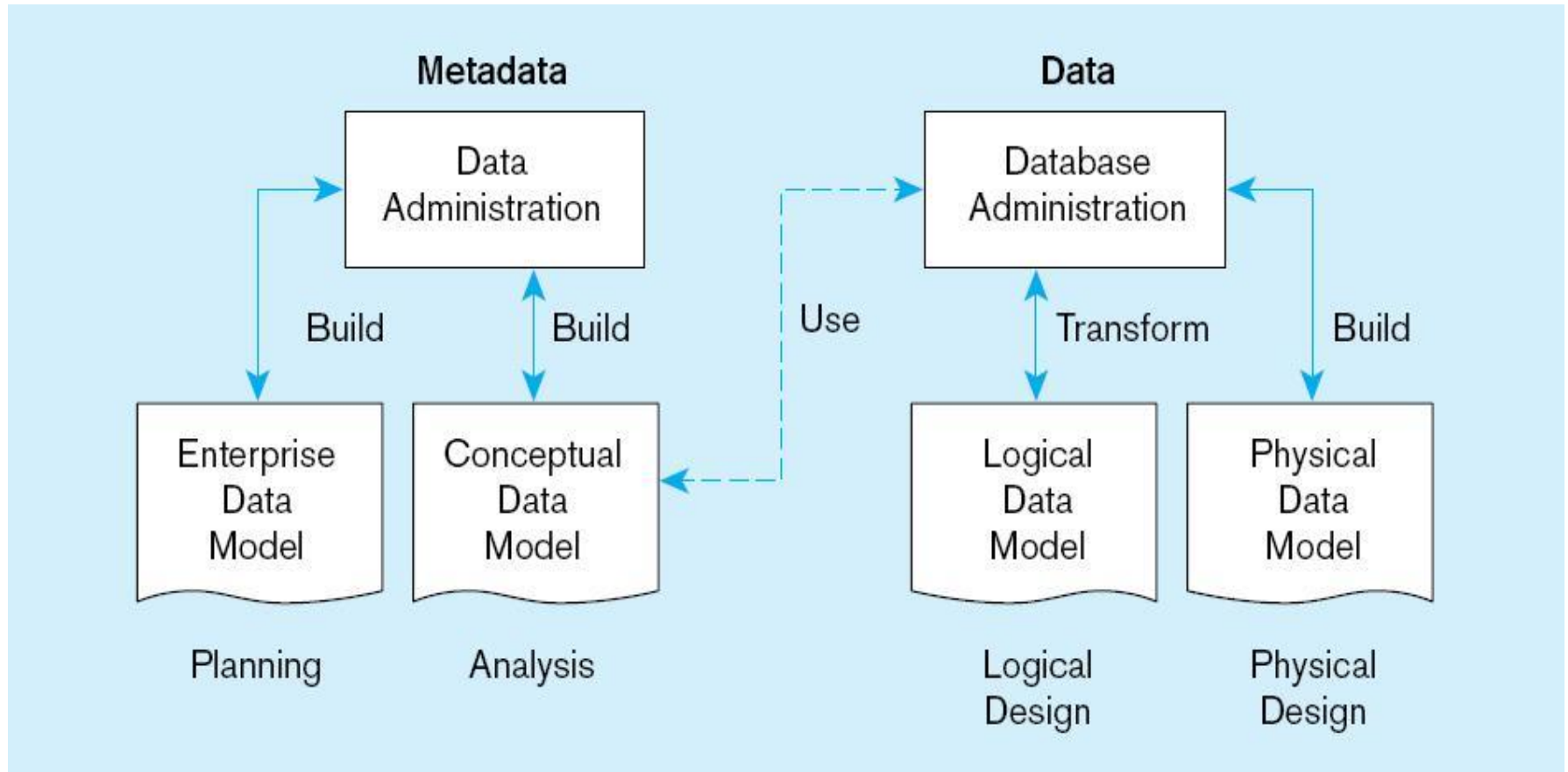
**Data Administrator** is responsible for :

- Specification of organization data.
- The design and maintenance of data management application.
- Validating the data and files.
- Security of files or databases.

**Database Administrator** is responsible for :

- reviewing the contents in the database
  - designing, implementing the database
  - to backed up data regularly
  - prevent from unauthorized access.
- 

# Data modeling responsibilities



## 2. What is the difference between database administrator and database designer?

### **The designer will learn from the applications designers**

- the data types,
- quantities,
- relationships,
- and desired operations (searches, sorts, updates, etc.)
- work with the developers to design a structure/schema

### **Database designer** considering matters such as

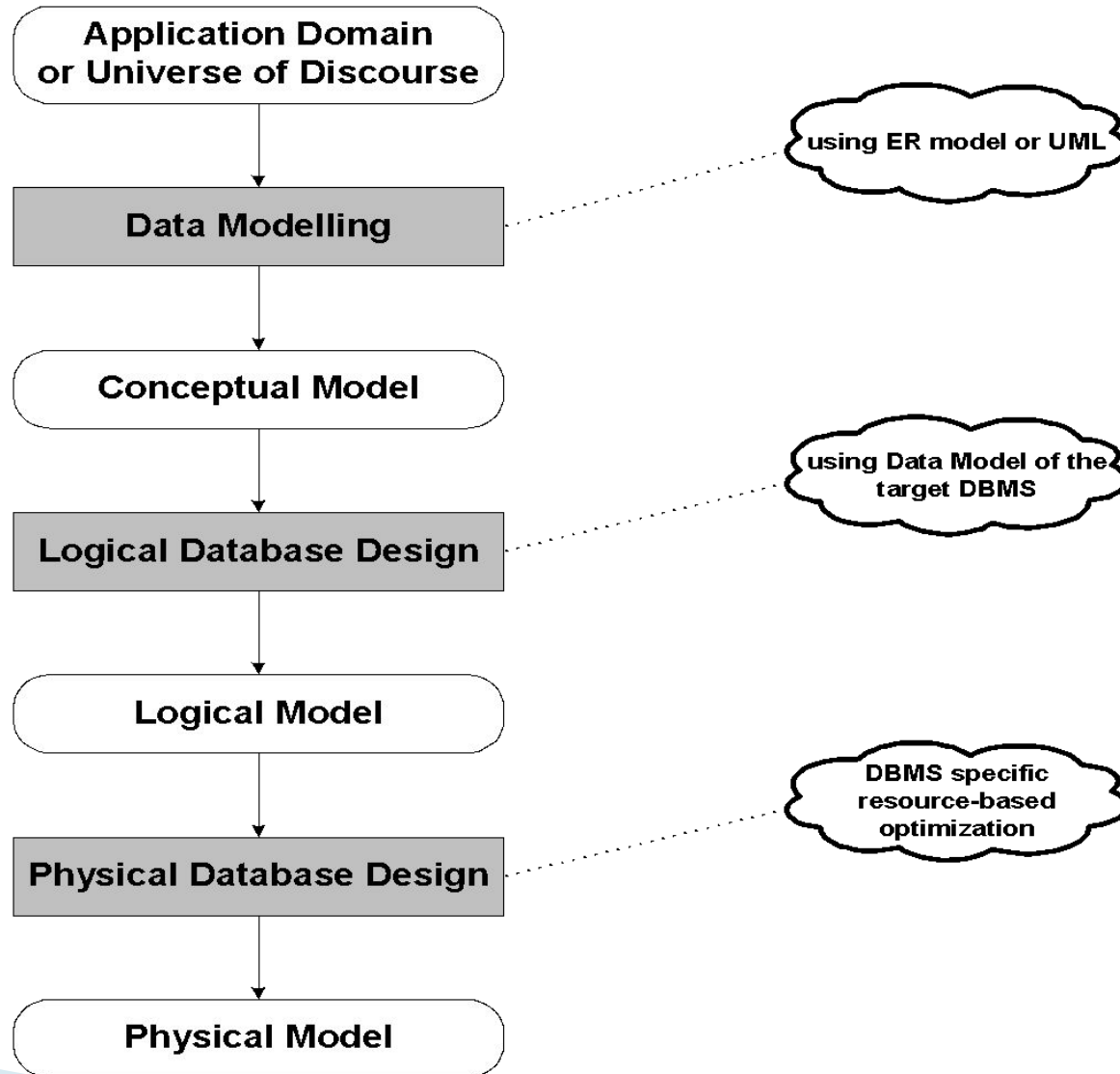
- unique keys, primary and foreign keys,
- data types, counters, naming, table relationships, search and sort elements,
- database normalization, search and sort efficiency, and data integrity.



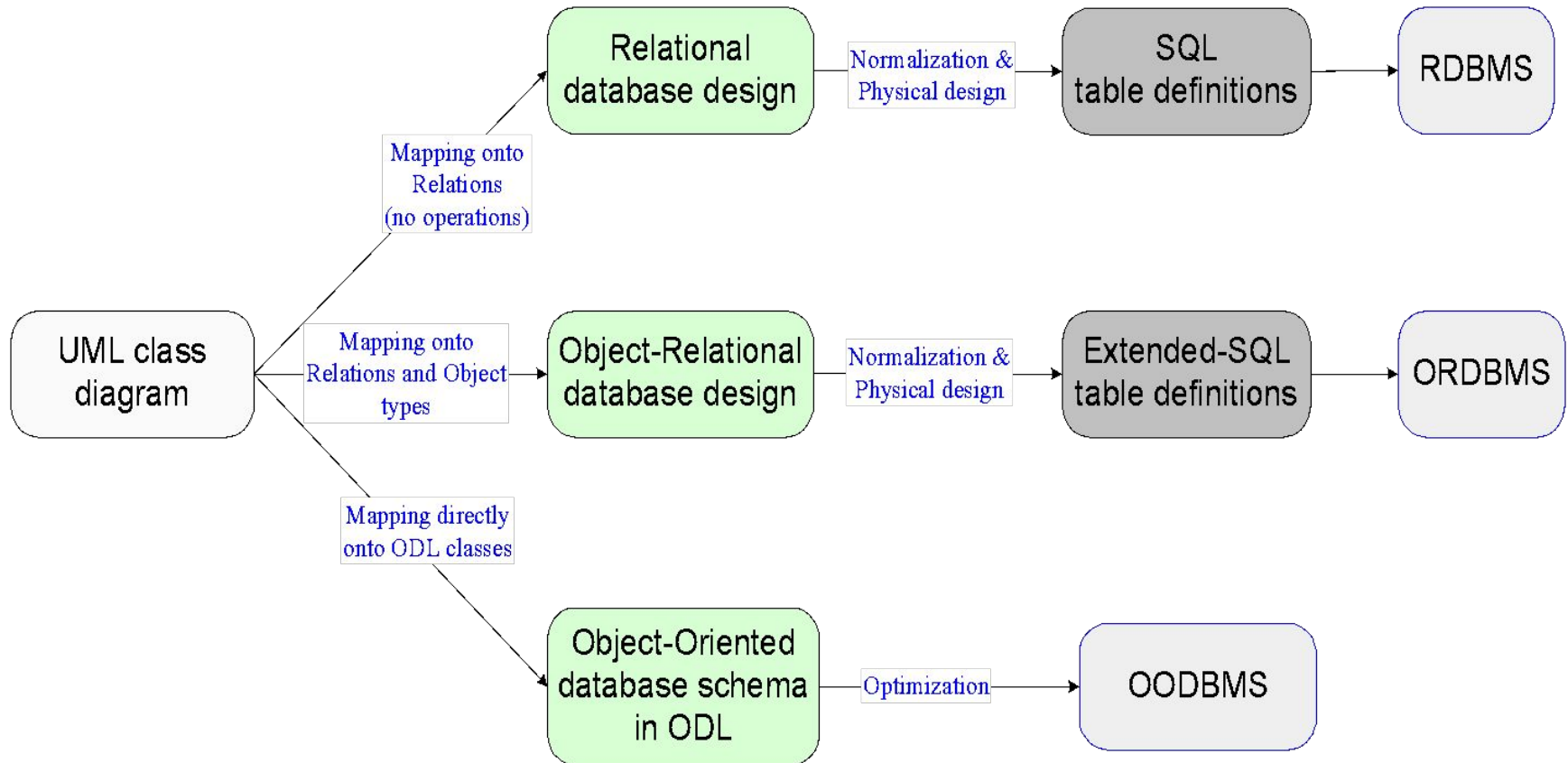
# Design and development of database

- Development and implementation of a database in the organization must be performed in sequence.
  - **Preliminary design**
  - **Analysis of feasibility**
  - **Determine requirements**
  - **Conceptual design**
  - **Implementation**
    - select DBMS and get it,
    - convert the detailed conceptual model in a real model DBMS
    - create a data dictionary,
    - populate the database,
    - develop application programs and to train users.
  - **Testing and maintenance of the database.**

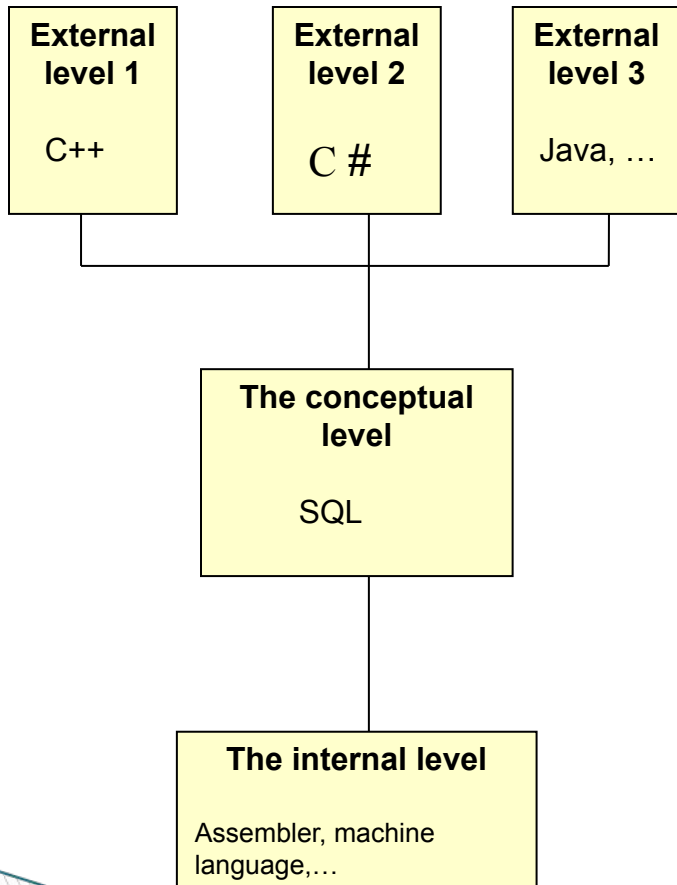
# Database Design Process



# Logical/Physical database design



# Architecture of a database management system



The architecture of a database management system can be divided into three levels:

- The external level: This presentation describes only part of actually existing database.
- The conceptual level: conceptual level represents the entire database as a whole, and is used by the database administrator.
- The internal level: at this level there is a physical data storage, and it is the lowest level in the architecture.

# Examples of levels of database architecture

## *The external level:*

```
cout << "Emp#" << EMPLOYEE_CODE;  
cout << "Dept#" << DEPARTMENT_CODE;  
cout << "Salary" << SALARY;
```

## *The conceptual level:*

```
EMPLOYEE  
EMPLOYEE_CODE CHARACTER 6  
DEPARTMENT_CODE CHARACTER 4  
SALARY NUMERIC 5
```

## *The internal level:*

```
STORED EMPLOYEE LENGTH=18  
PREFIX TYPE=BYTE(6), OFFSET=0  
EMP# TYPE=BYTE(4), OFFSET=6, INDEX EMPX  
DEPT# TYPE=BYTE(4), OFFSET=12  
SALARY=BYTE(4), OFFSET=16
```

# review

- Why need to use a database management system?
  - The major function of data administrator and database administrator.
  - What is the difference between database administrator and database designer?
  - Database Design Process
  - The architecture of a database management system
- 