

# Introduktion Database

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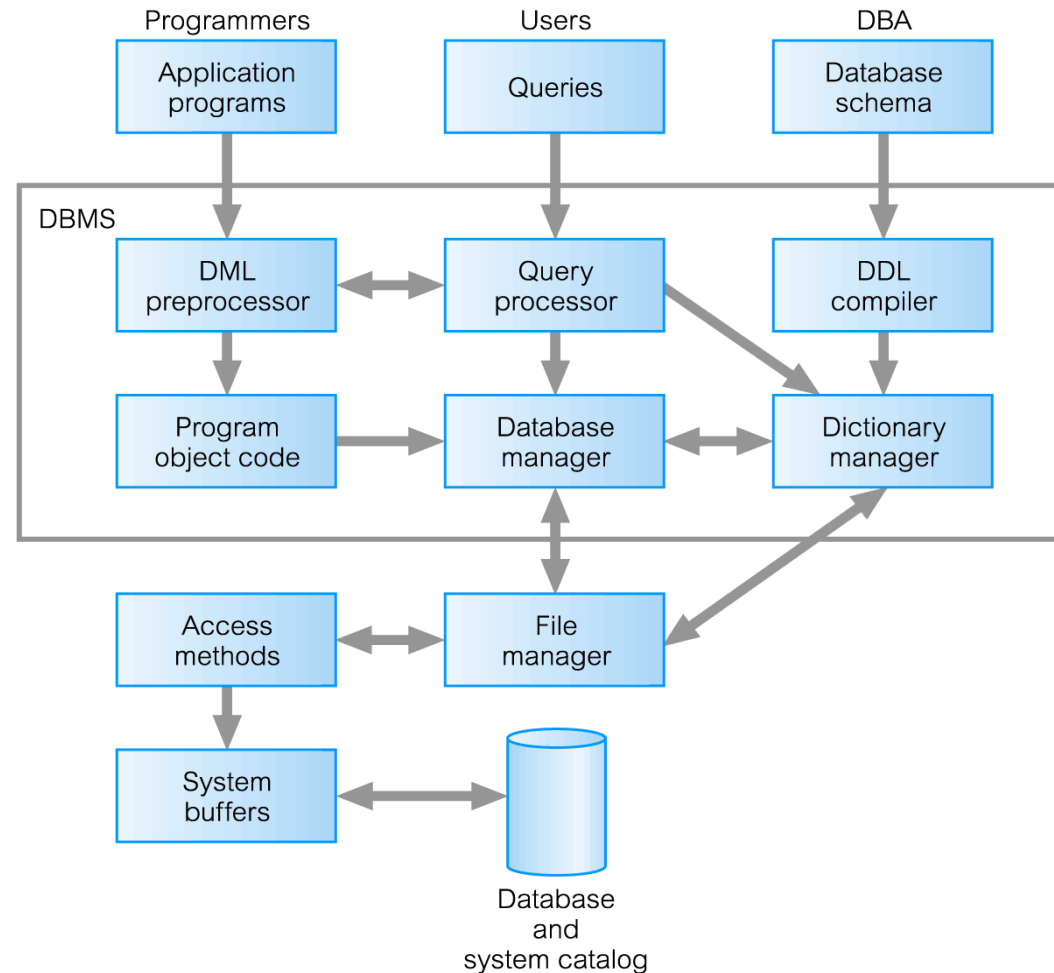
# Functions For a DBMS #1

- Data storage, retrieval and update
- A user-accessible catalogue
- Transaction support
- Concurrency control services
- Recovery services

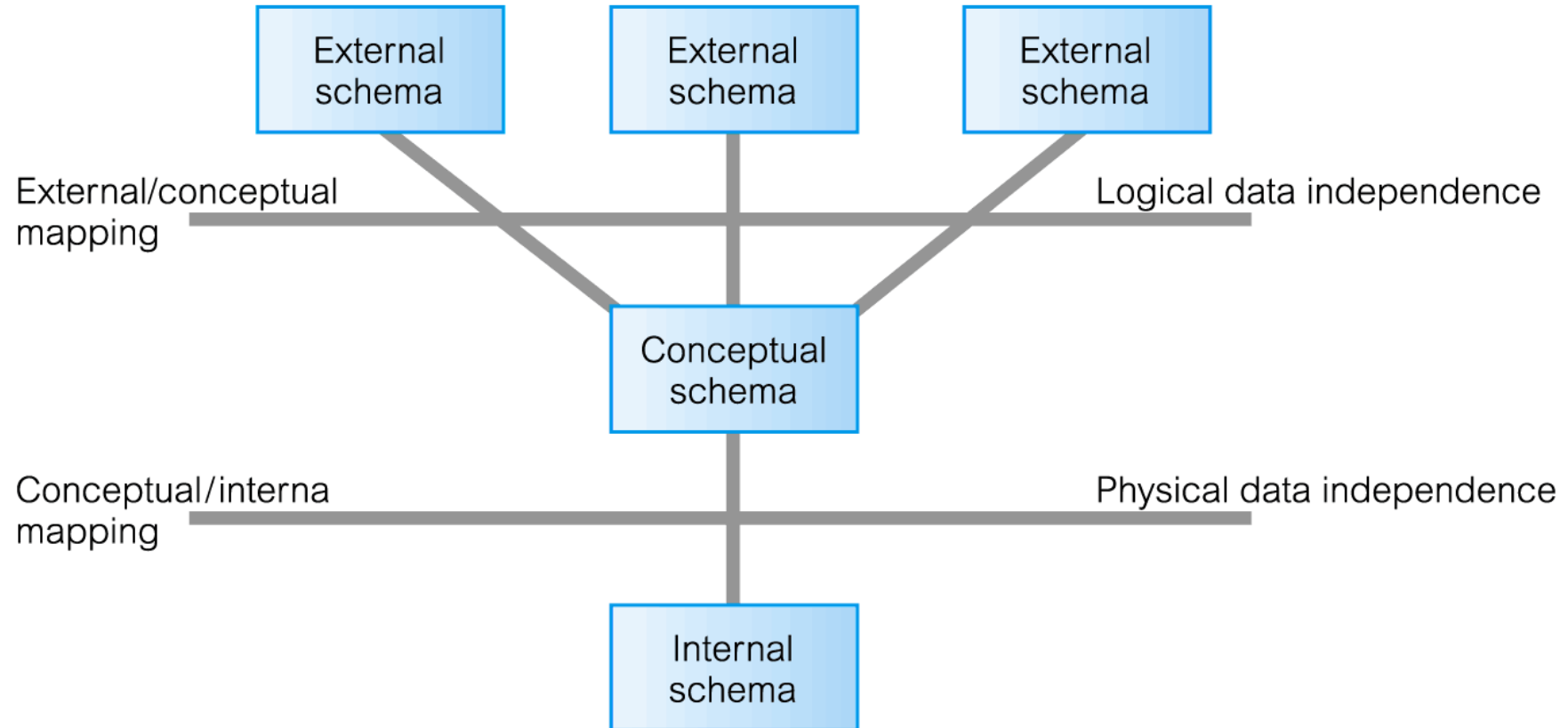
# Functions For a DBMS #2

- Authorization services
- Support for data communication
- Integrity services
- Services to promote data independence
- Utility services

# Database (Server) ~ not a single system

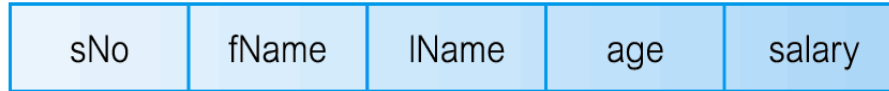


# DBMS: ANSI-SPARC

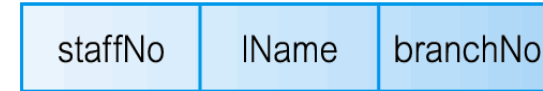


# Example

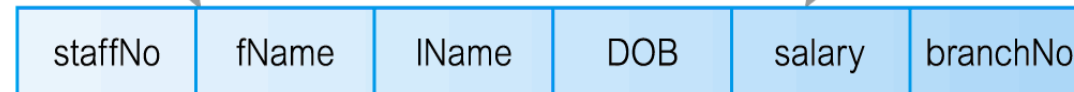
External view 1



External view 2



Conceptual level



Internal level

```
struct STAFF {  
    int staffNo;  
    int branchNo;  
    char fName [15];  
    char lName [15];  
    struct date dateOfBirth;  
    float salary;  
    struct STAFF *next;           /* pointer to next Staff record */  
};  
index staffNo; index branchNo; /* define indexes for staff */
```

# Terminology of the relational model (logical)

**Relation** A relation is a table with columns and rows.

**Attribute** An attribute is a named column of a relation.

**Domain** A domain is the set of allowable values for one or more attributes.

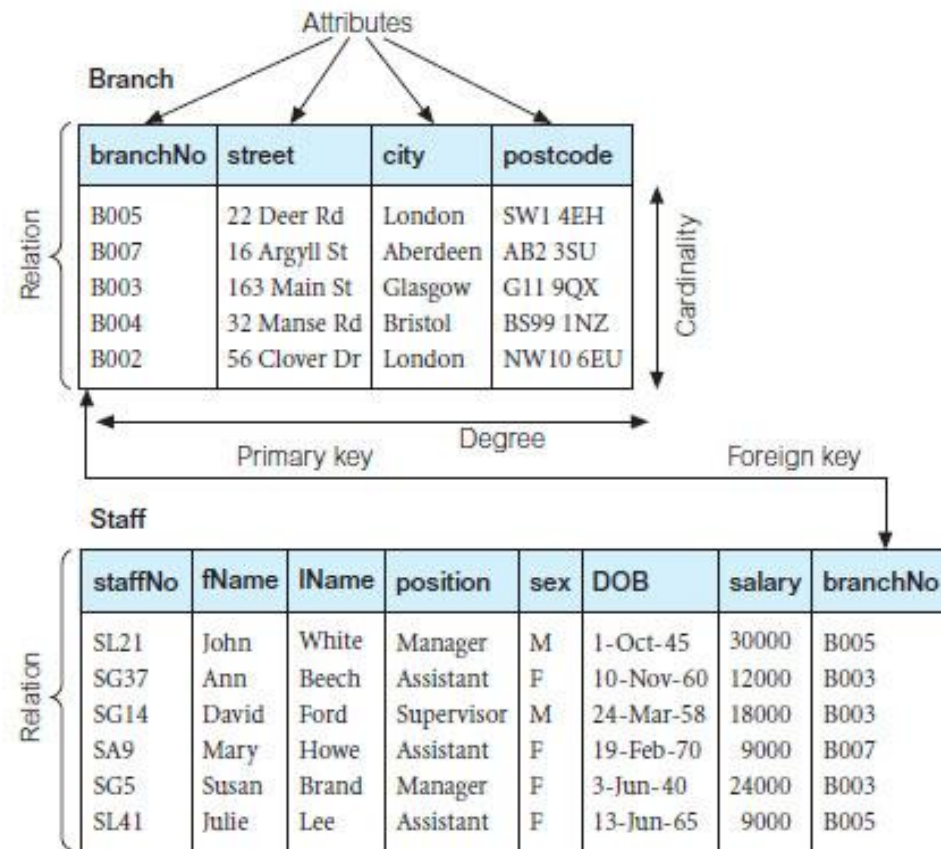
**Tuple** A tuple is a row of a relation.

**Degree** The degree of a relation is the number of attributes it contains.

**Cardinality** The cardinality of a relation is the number of tuples it contains.

**Relational database** A collection of normalized relations with distinct relation names.

# Example of relational terms used



**Figure 3.1**

Instances of the Branch and Staff relations.

Attribute	Domain Name	Meaning	Domain Definition
branchNo	BranchNumbers	The set of all possible branch numbers	character: size 4, range B001–B999
street	StreetNames	The set of all street names in Britain	character: size 25
city	CityNames	The set of all city names in Britain	character: size 15
postcode	Postcodes	The set of all postcodes in Britain	character: size 8
sex	Sex	The sex of a person	character: size 1, value M or F
DOB	DatesOfBirth	Possible values of staff birth dates	date, range from 1-Jan-20, format dd-mmm-yy
salary	Salaries	Possible values of staff salaries	monetary: 7 digits, range 6000.00–40000.00

**Figure 3.2**

Domains for some attributes of the Branch and Staff relations.



# More concepts of relational database

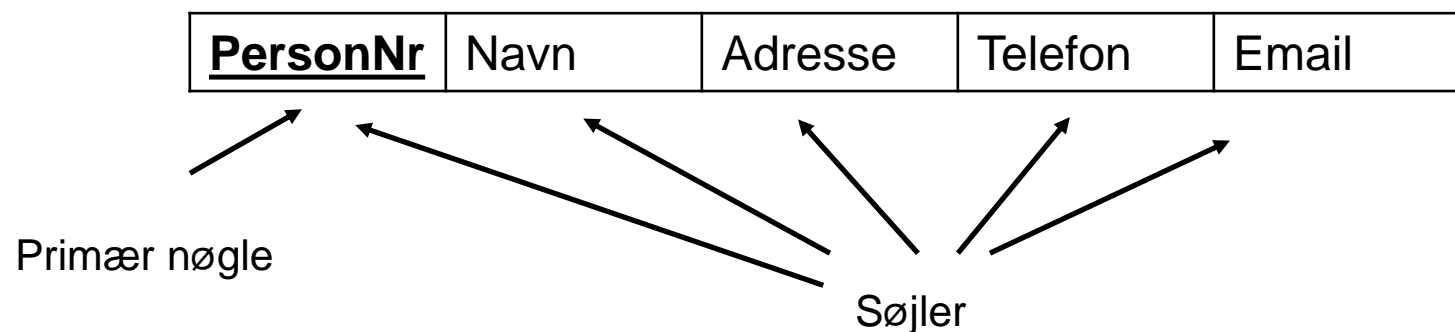
- From *entity* to *table*
- From *tuple* to *record or Row*
- From *attribute* to *field or Column*
  
- **Keys** are fields with specific roles:
  - **Primary key**: uniquely identifies each record in a table
  - **Foreign key**: points from a field in a table to the primary key of another table
  
- Tables can be combined together - this is called **relationships**:
  - **One-to-one** (aka 1:1)
  - **One-to-many** (aka 1:N)
  - **Many-to-many** (aka M:N)

# Omformning fra Klasser til Tabeller (Entiteter)

Klassenavne => Tabelnavne (samt find / tilføj en **Primær nøgle** (PK) )

Attributter => Søjler (Column)

FX: Person



# Omformning fra Klasser til Tabeller (Entiteter)

- Associeringer  
=> Fremmed nøgle

## Course

<u>Id (PK)</u>	Name	Semester	Classroom
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## Student

<u>Cpr (PK)</u>	Name	Address	Email	Phone	CourseID (FK)
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