

Databases

MicroSoft SQL-server

Some walk through

Functions For a DBMS #1

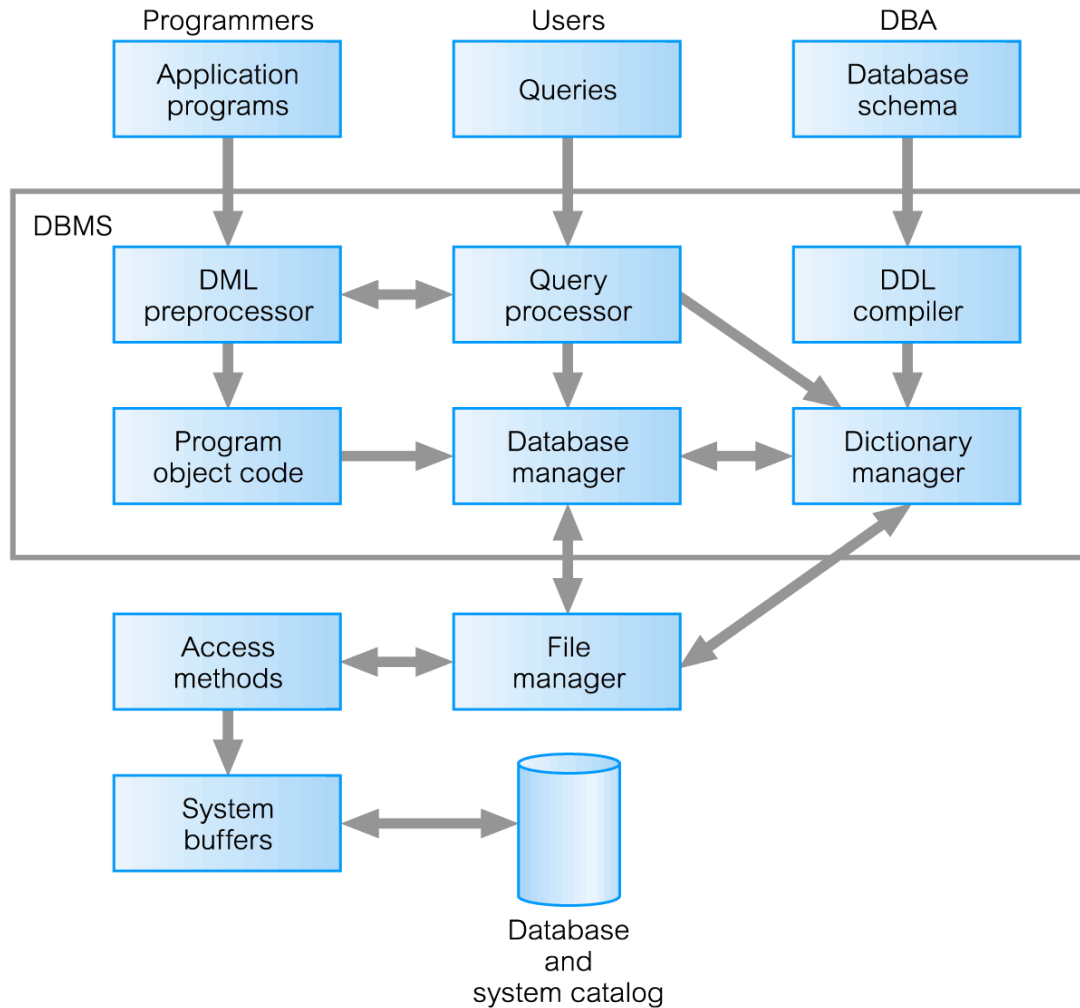
- **Data storage, retrieval and update**
- **A user-accessible catalogue**
- **Transaction support**
- **Concurrency control services**
- **Recovery services**

Functions For a DBMS #2

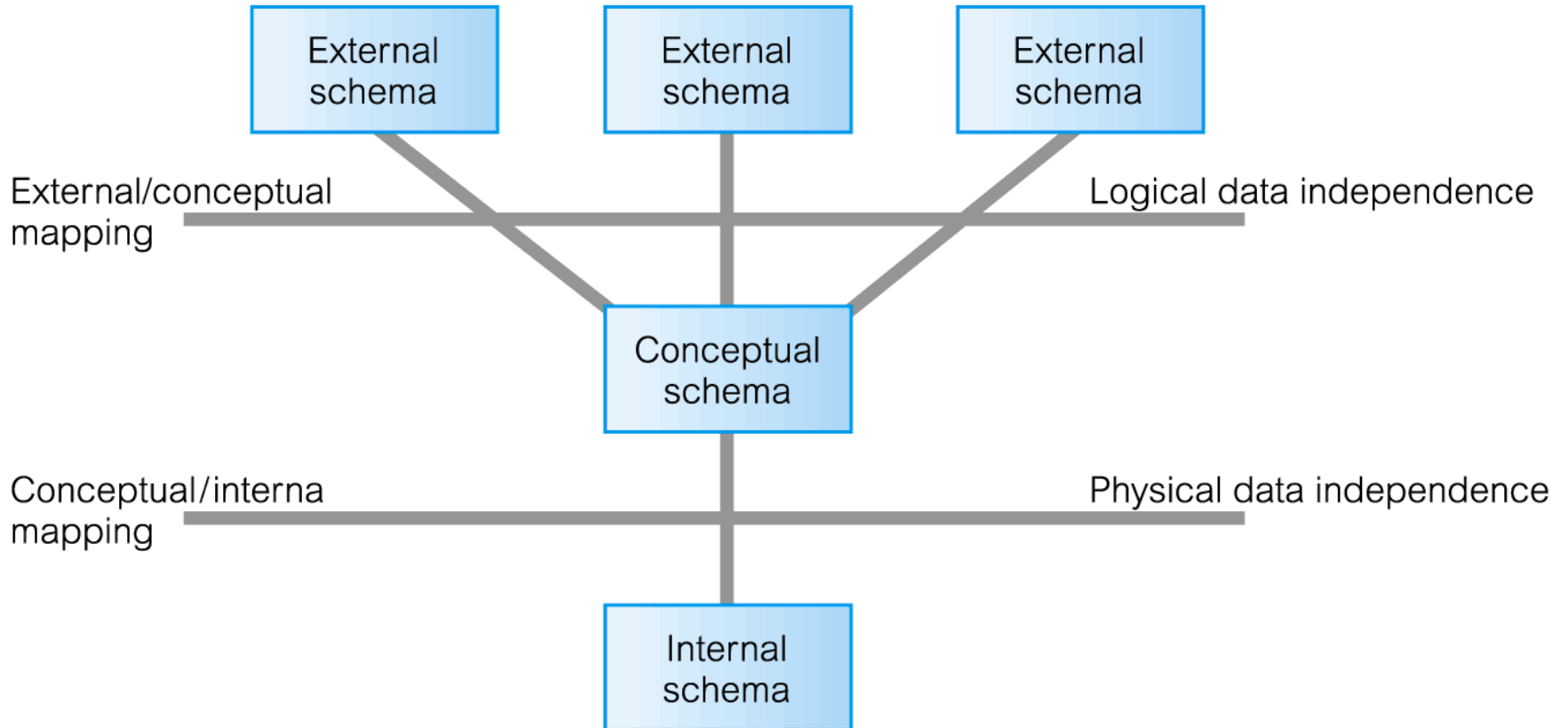
- **Authorization services**
- **Support for data communication**
- **Integrity services**
- **Services to promote data independence**
- **Utility services**

Database (Server)

~ not a single system

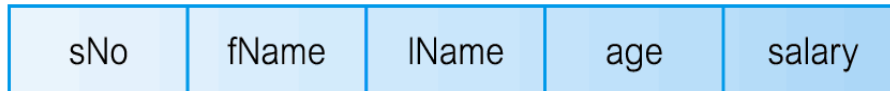


DBMS: ANSI-SPARC

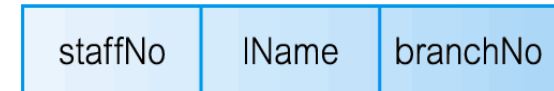


Example

External view 1



External view 2



Conceptual level



Internal level

```
struct STAFF {  
    int staffNo;  
    int branchNo;  
    char fName [15];  
    char lName [15];  
    struct date dateOf Birth;  
    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

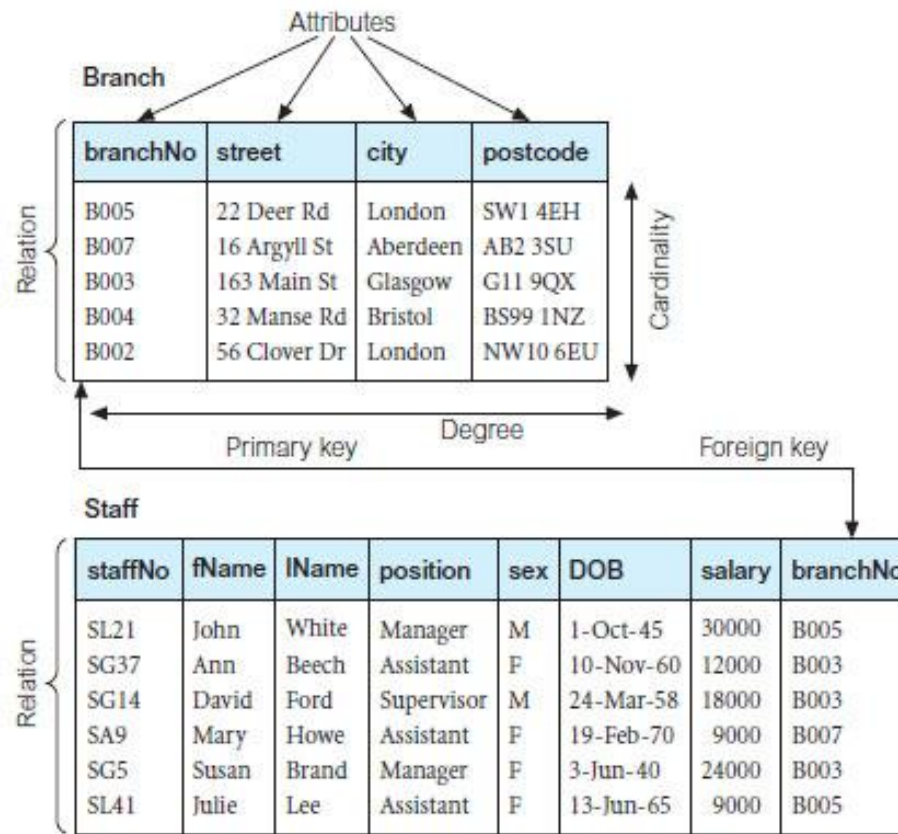


Figure 3.1
Instances of the Branch and Staff relations.

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)

Opgave

Scandic hotel – kæde

Lav en domain model af Hotel-kæden.

Der er flere hoteller. Hvert hotel har flere værelser.

Hotellets kunder kan reservere et eller flere værelser.

Angiv attributter for klasserne og associeringer mellem klasserne.

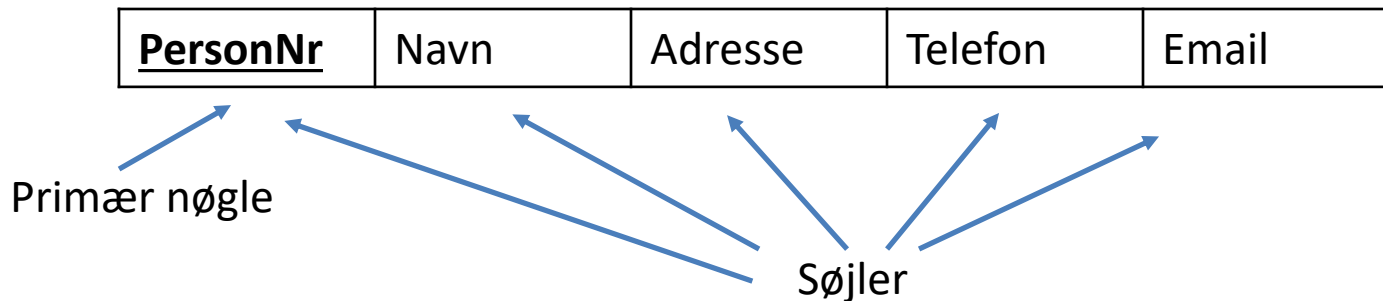
Omformning fra Klasser til Tabeller (Entiteter)

Klassenavne => Tabelnavne

+ Primær nøgle

Attributter => Søjler (Column)

FX: Person



Omformning fra Klasser til Tabeller (Entiteter)

- Associeringer => Fremmed nøgle

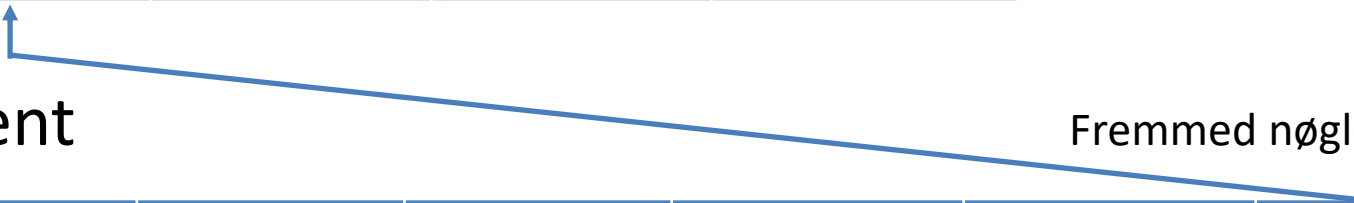
Course

Id (PK)	Name	Semester	Classroom
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Student

Cpr (PK)	Name	Address	Email	Phone	CourseID (FK)
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Fremmed nøgle



Opgave 2

Scandic hotel – kæde – fortsat

Beskriv klasser, attributter og associering som tabeller med primær nøgler, søjler og fremmed nøgler

Normaliseringer

- Problem stilling
 - Insert Abnormalities
 - Delete Abnormalities
 - Update Abnormalities
- Løsning
 - Ingen Gentagelser => normaliseringer

3 Normal Former (3NF)

- 1 NF
 - primær nøgle
 - + kun een værdi i hver søjle
- 2 NF
 - 1 NF
 - + kun hele sammensat nøgle udpeger alle søjler
- 3 NF
 - 2 NF
 - + Ingen andre søjler end primær nøgle kan udpege andre søjler

Opgave 3

Scandic hotel – kæde – fortsat

Undersøg om tabellerne er på 3NF