Spatial Database

Lecture: 4

M.Sc. Mustafa Yousif

Database is a collection of information that is organized so that it can easily be accessed, managed, and up dated. In one view, databases can be classified according to types of content: bibliographic, full-text, numeric, and images.

In computing, databases are sometimes classified according to them organizational approach. The most prevalent approach is the relational database.

Computer databases typically contain aggregations of data records or files, such as sales transactions, product catalogs and inventories, and customer profiles.

Typically, a database manager provides users the capabilities of controlling read/write access, report generation and analyzing usage.

Databases and database managers are prevalent in large mainframe systems, but are also present in smaller distributed workstation and mid-range systems such as the AS/400 and on personal computers.

SQL(Structured Query Language) is a standard language for making interactive queries from and updating a database such as IBM'sDB2, Microsoft’s SQL Server, and database products from Oracle, Sybase, and Computer Associates.

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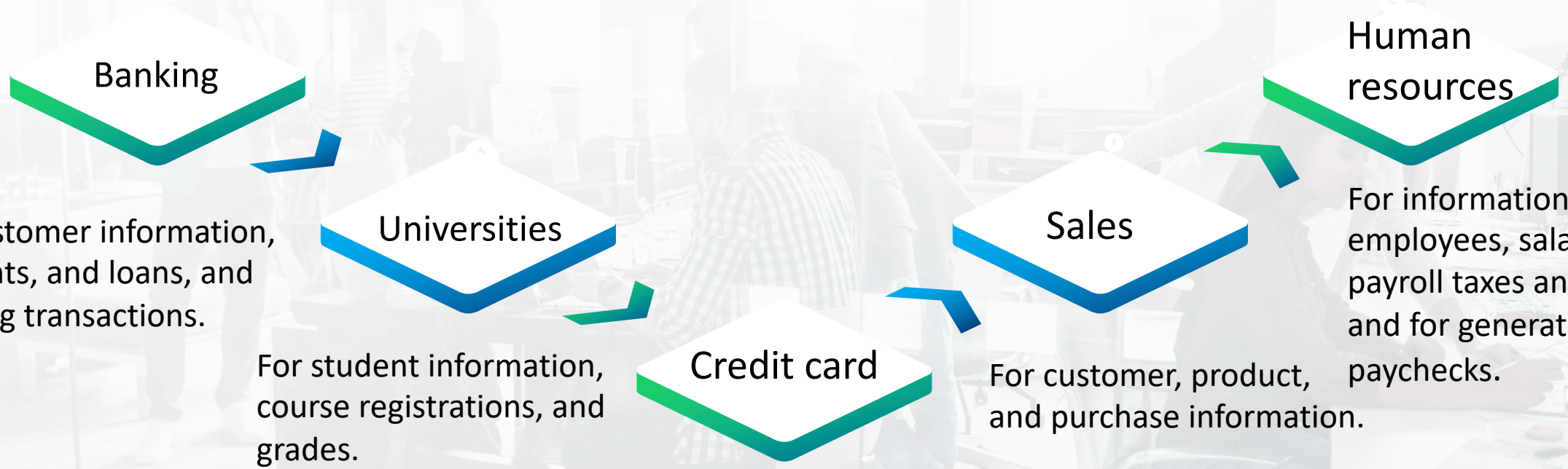
Database System Applications

Database System Applications

Databases are widely used. Here are some representative applications



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Database management system (DBMS)

Database management system (DBMS)

is a collection of interrelated data and a set of programs to access those data. The collection of data, usually referred to as the database, contains information relevant to an enterprise.

- The primary goal of a DBMS is to provide a way to store and retrieve database information that is both convenient and efficient.
- Database systems are designed to manage large bodies of information
- Management of data involves both defining structures for storage of information and providing mechanisms for the manipulation of information
- the database system must ensure the safety of the information stored, despite system crashes or attempts at unauthorized access.
- If data are to be shared among several users, the system must avoid possible anomalous results.


04
Types of Database

SWOT Analysis

Lorem Ipsum is simply dummy text of the printing and typesetting industry

Relational DB

The most prevalent approach

Tabular DB

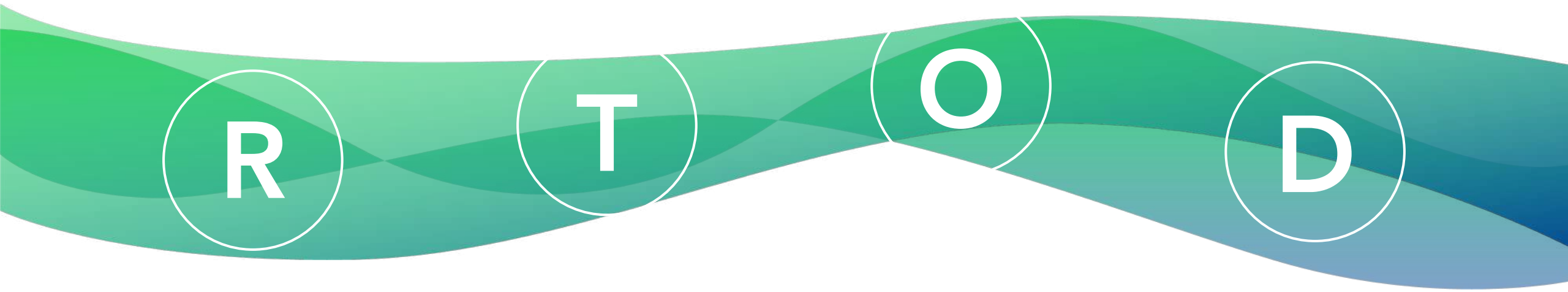
which data is defined so that it can be reorganized and accessed in a number of different ways

Object-oriented DB

database is one that is congruent with the data defined in object classes and subclasses

Distributer DB

can be dispersed or replicated among different points in a network.



Relational Database Management Systems

- Relational database management system (RDBMS) is a collection of tables that are connected in such a way that data can be accessed without reorganization of the tables.

- In the relational model, each table is linked to each other table via predetermined keys

Relational Database Management Systems

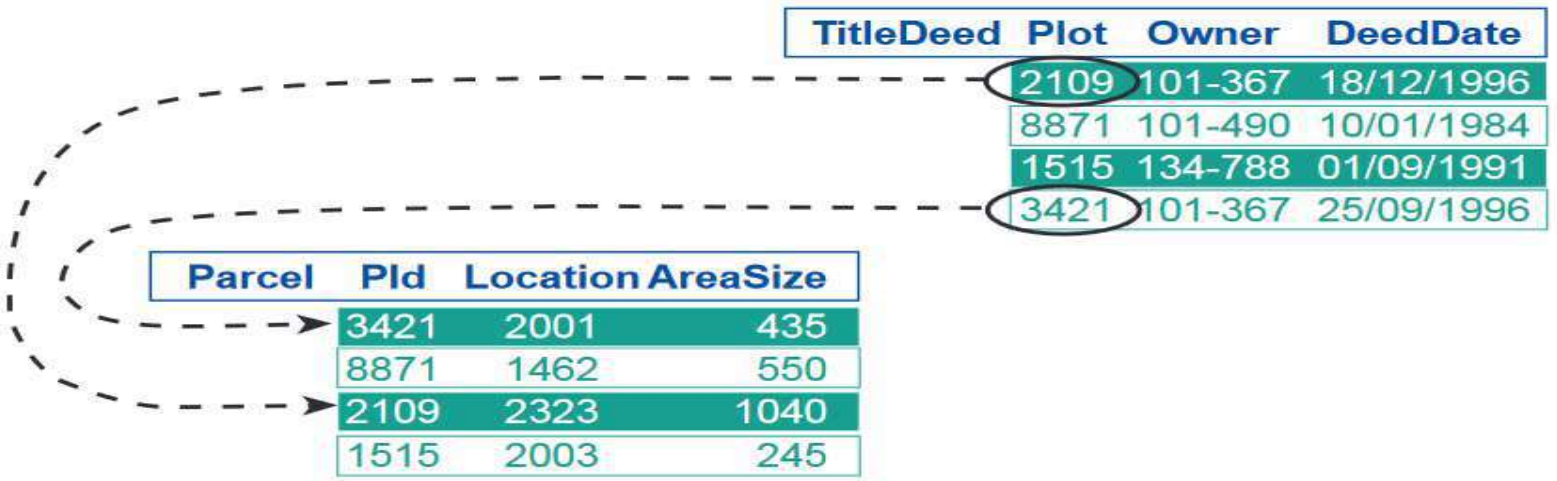
- **primary key**

represents the attribute (column) whose value uniquely identifies a particular record (row) in the relation (table).

- **foreign key**

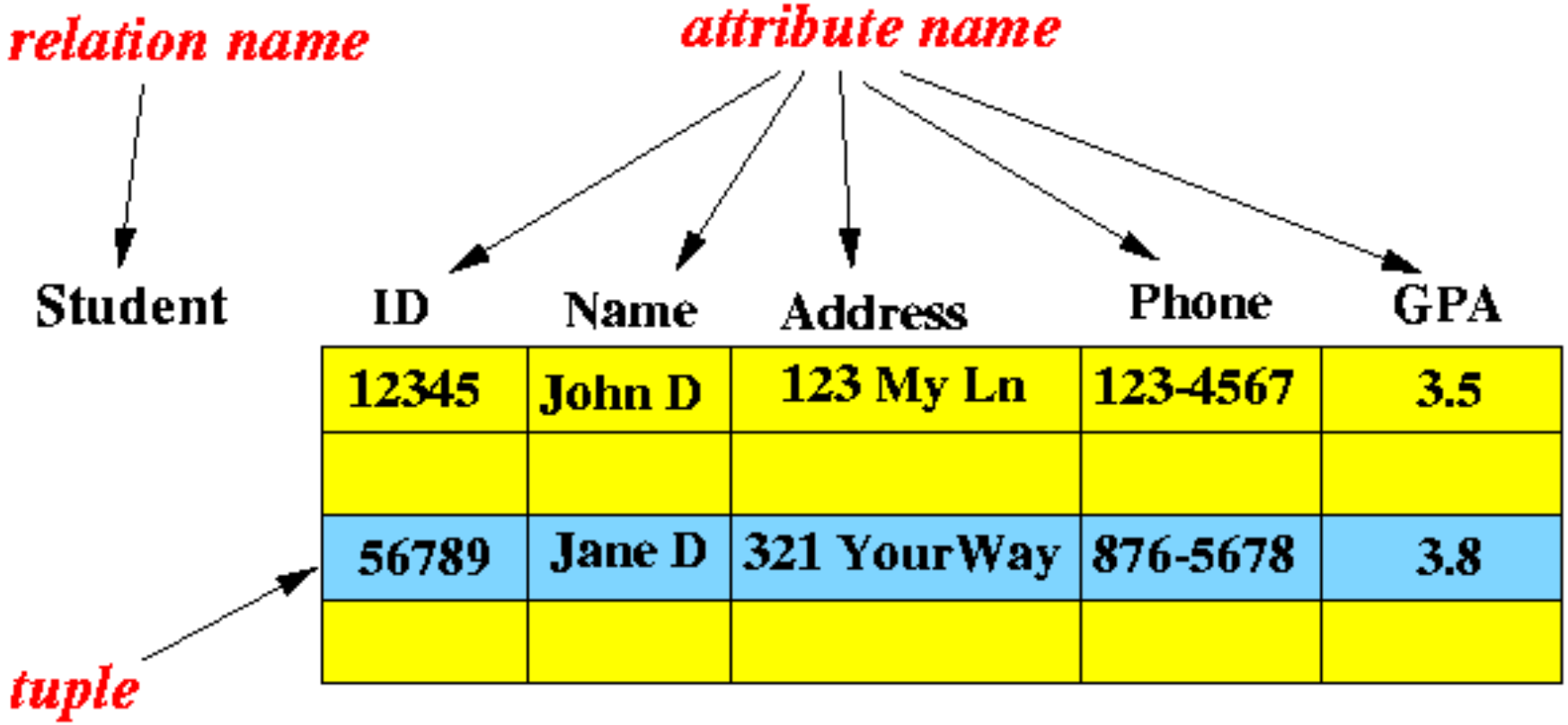
Is the attribute that corresponds to a primary key in an associated table.

Relational Database Management Systems



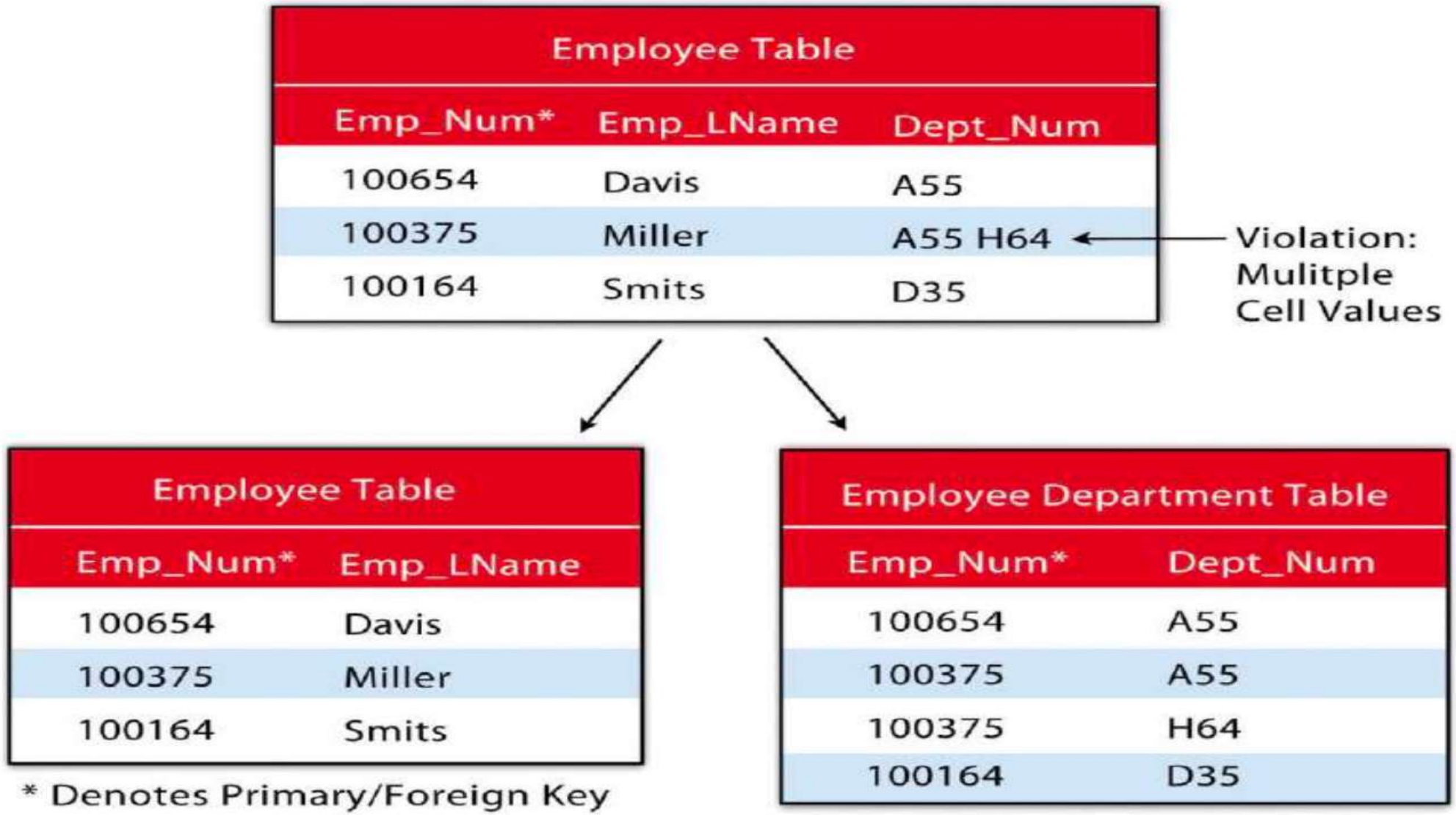
Relations, tuples and attributes

- A **table or relation** is itself a collection of tuples (or records). In fact, each table is a collection of tuples that are similarly shaped.
- An **attribute/ column** is store the attributes of the entity.
- **Tuble** it is a single row in the able. Each row represent a single entity.


relation name
attribute name
Student
ID
Name
Address
Phone
GPA
12345
John D
123 My Ln
123-4567
3.5
56789
Jane D
321 YourWay
876-5678
3.8
tuple

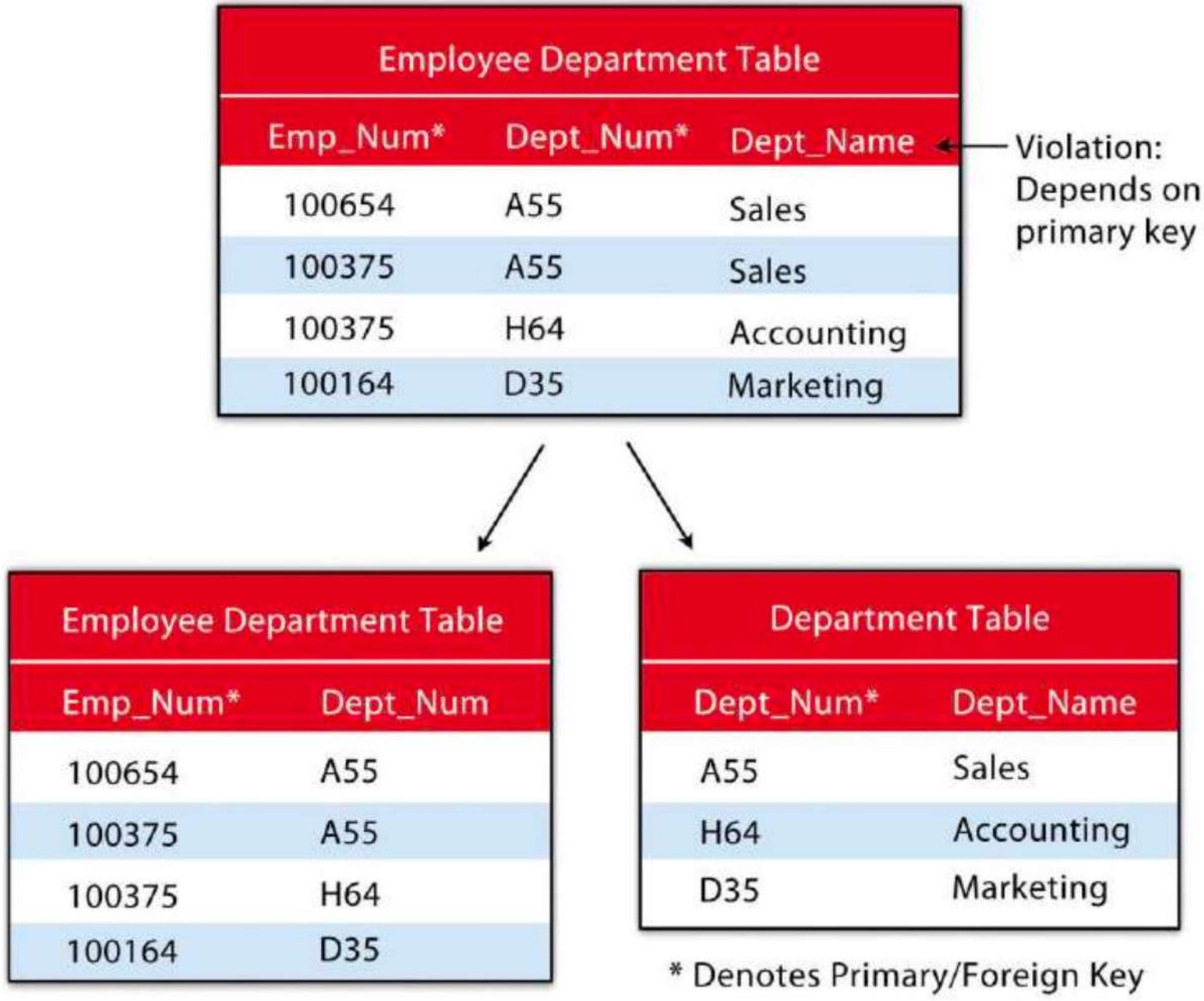
First normal form

The first stage in the normalization of a relational database in which repeating groups and attributes are eliminated by placing them into a separate tables connected via primary keys and foreign keys.


Employee Table
Emp_Num*
Emp_LName
Dept_Num
100654
Davis
A55
100375
Miller
A55 H64
100164
Smits
D35
Violation:
Mulitple
Cell Values
Employee Table
Emp_Num*
Emp_LName
100654
Davis
100375
Miller
100164
Smits
* Denotes Primary/Foreign Key
Employee Department Table
Emp_Num*
Dept_Num
100654
A55
100375
A55
100375
H64
100164
D35

Second normal form

The second stage in the normalization of a relational database in which all non-key attributes are made dependent on the primary key.


Employee Department Table
Emp_Num*
Dept_Num*
Dept_Name
100654
A55
Sales
100375
A55
Sales
100375
H64
Accounting
100164
D35
Marketing
Violation:
Depends on
primary key
Employee Department Table
Emp_Num*
Dept_Num
100654
A55
100375
A55
100375
H64
100164
D35
Department Table
Dept_Num*
Dept_Name
A55
Sales
H64
Accounting
D35
Marketing
* Denotes Primary/Foreign Key

Relational Algebra

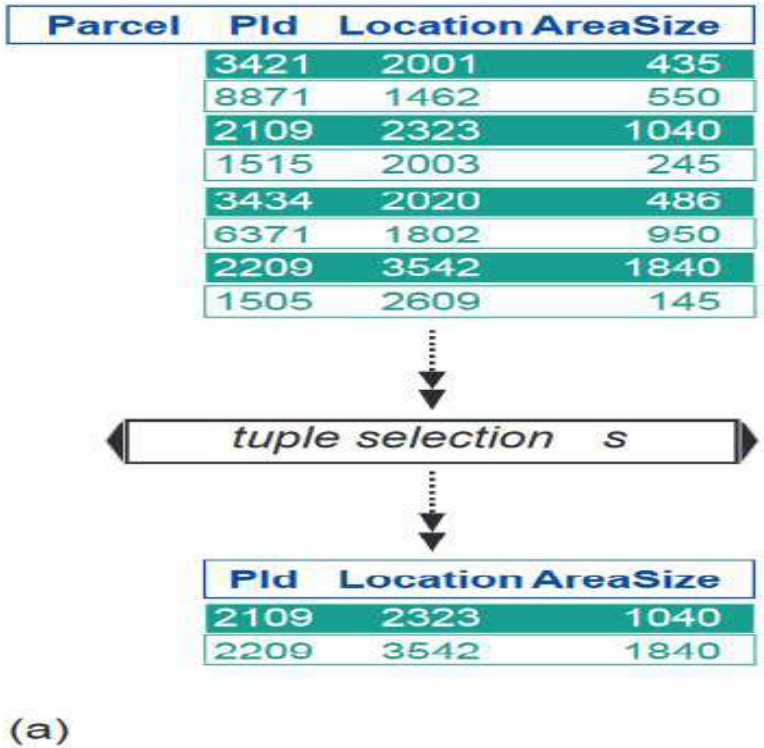
- **Join** is an operation that appends the information of one table into a second table through the use of an attribute or field that is common to both tables.

- **Relates** is an operation that temporarily associates two attribute tables through the use of an attribute or field that is common to both tables while keeping the tables physically separate.

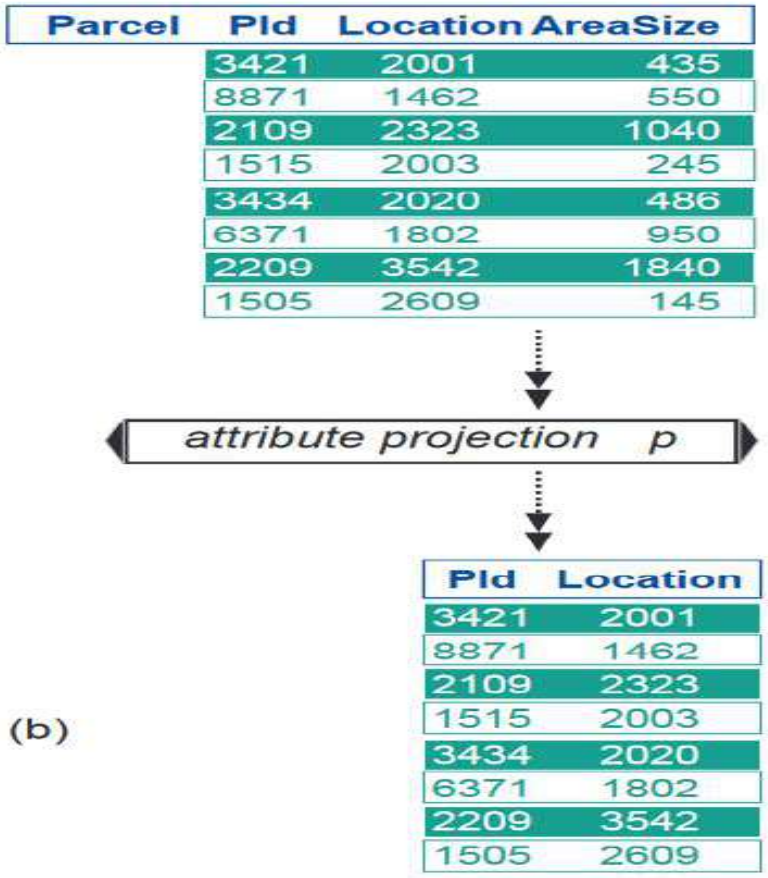
Relational Algebra

- **Project** take a single table and returns the vertical subset of the table
- **Selection** take a single table and returns a horizontal subset of the table. That means it returns only those rows that satisfy the condition

Relational Algebra

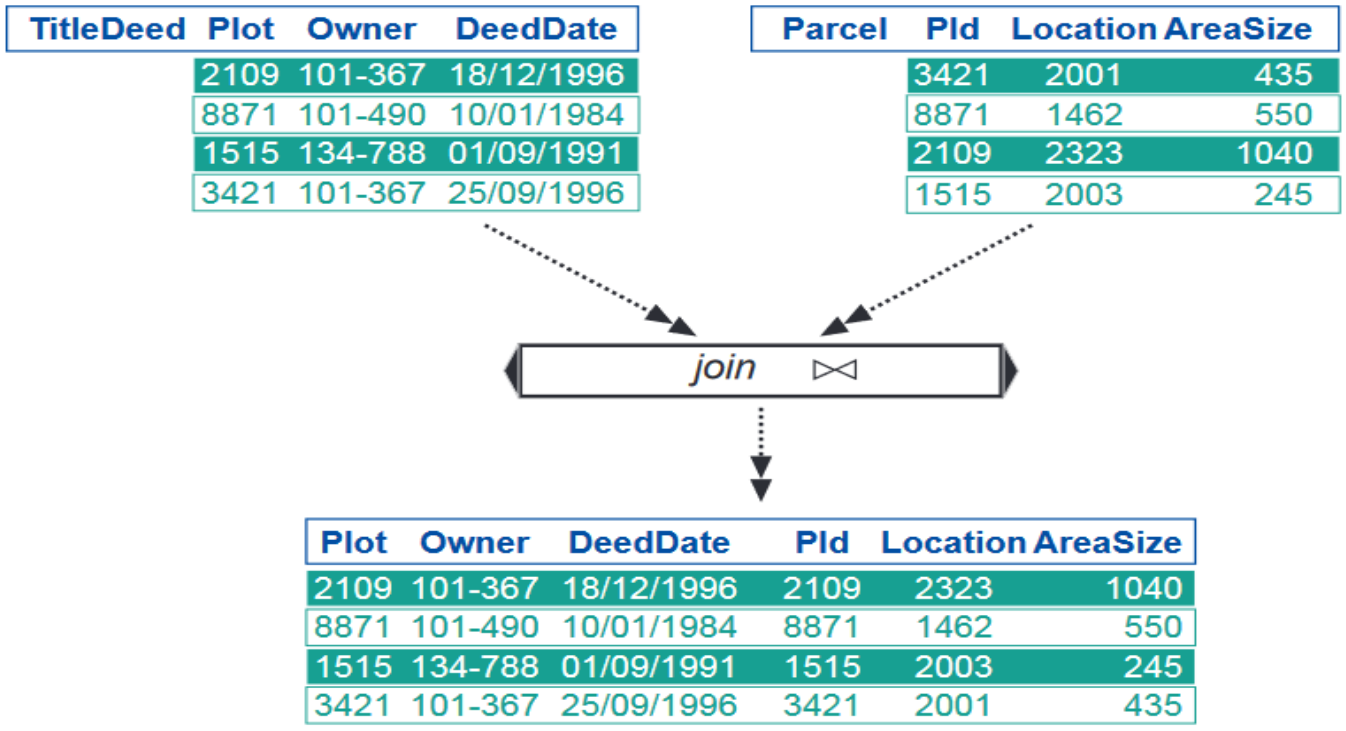


(a)



(b)

Relational Algebra



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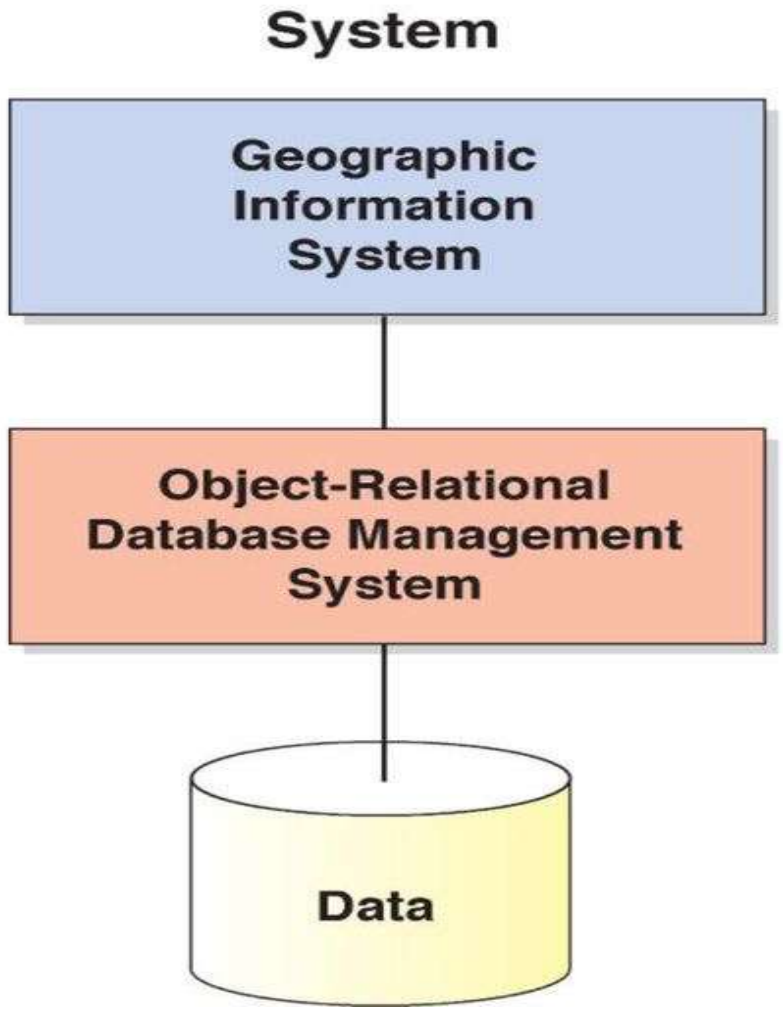
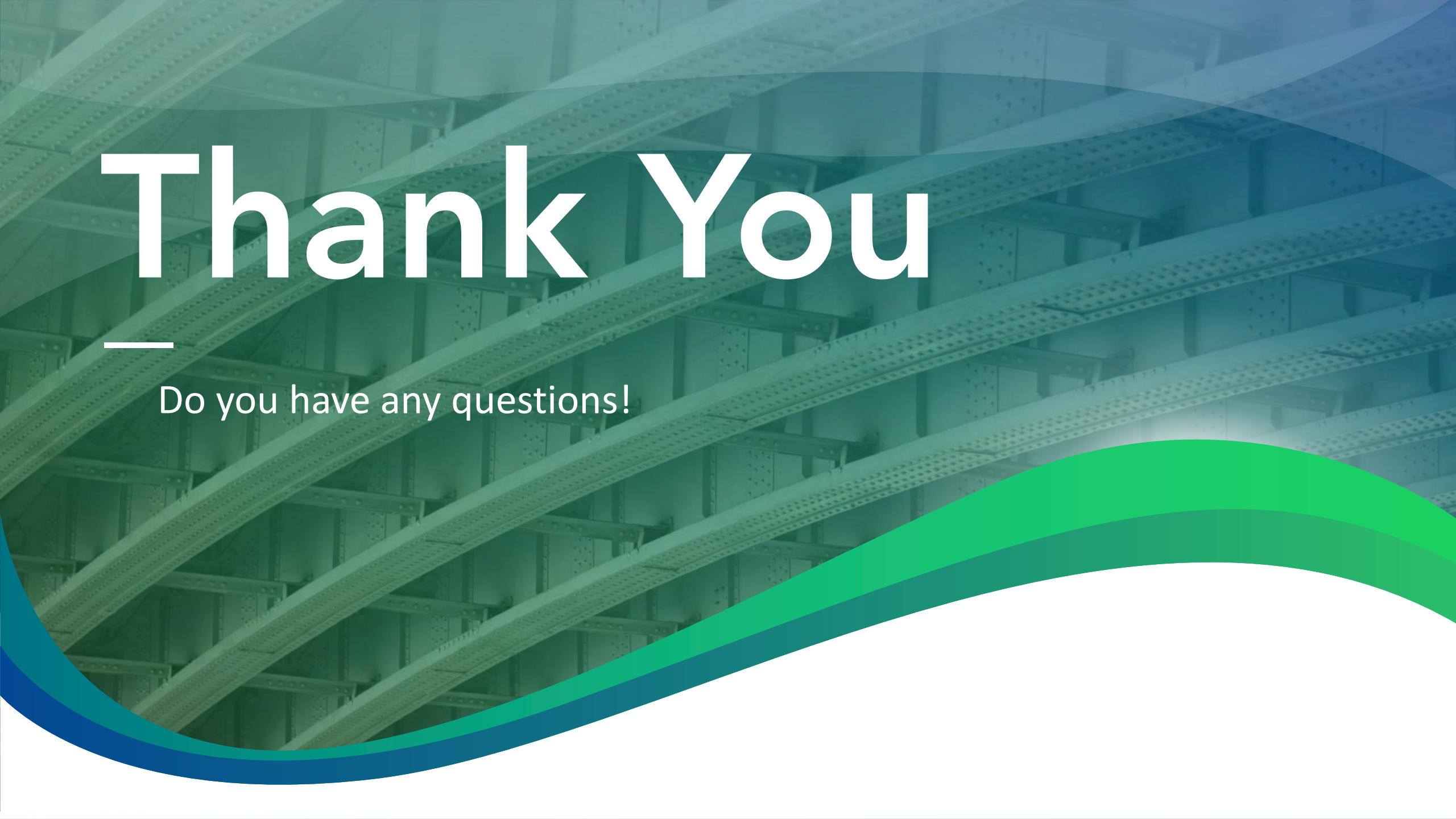
GeoDatabase

The geodatabase is the native data structure for ArcGIS and is the primary data format used for editing and data management. While ArcGIS works with geographic information in numerous geographic information system (GIS) file formats, it is designed to work with and leverage the capabilities of the geodatabase.

The roles of GIS and DBMS




Thank You
Do you have any questions!