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COLLEGE OF ENGINEERING AND TECHNOLOGY
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Department of Management Studies

MBA – I Semester

BA4106 Information Management

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UNIT –III

Database Management Systems

DBMS- Types and Evolution

Database Management Systems

- Database is collection of data which is related by some aspect.
- Data is collection of facts and figures which can be processed to produce information.
- ***Example*** *:Name of a student, age, class and her subjects can be counted as data for recording purposes*.
- A database management system stores data, in such a way which is easier to retrieve, manipulate and helps to produce information.
- A Database management system is a computerized record-keeping system

For example, ***Airlines use this software package to book tickets and confirm reservations which are then managed to keep a track of the schedule.***

Database

A database is an organized collection of structured information, or data, typically stored electronically in a computer system.

A database is usually controlled by a database management system (DBMS).

The main purpose of the database is to operate a large amount of information by storing, retrieving, and managing data.

In a database, you can organize the data in rows and columns in the form of a table

There are many databases available like MySQL, Sybase, Oracle, MongoDB, Informix, PostgreSQL, SQL Server, etc.

Types of Database

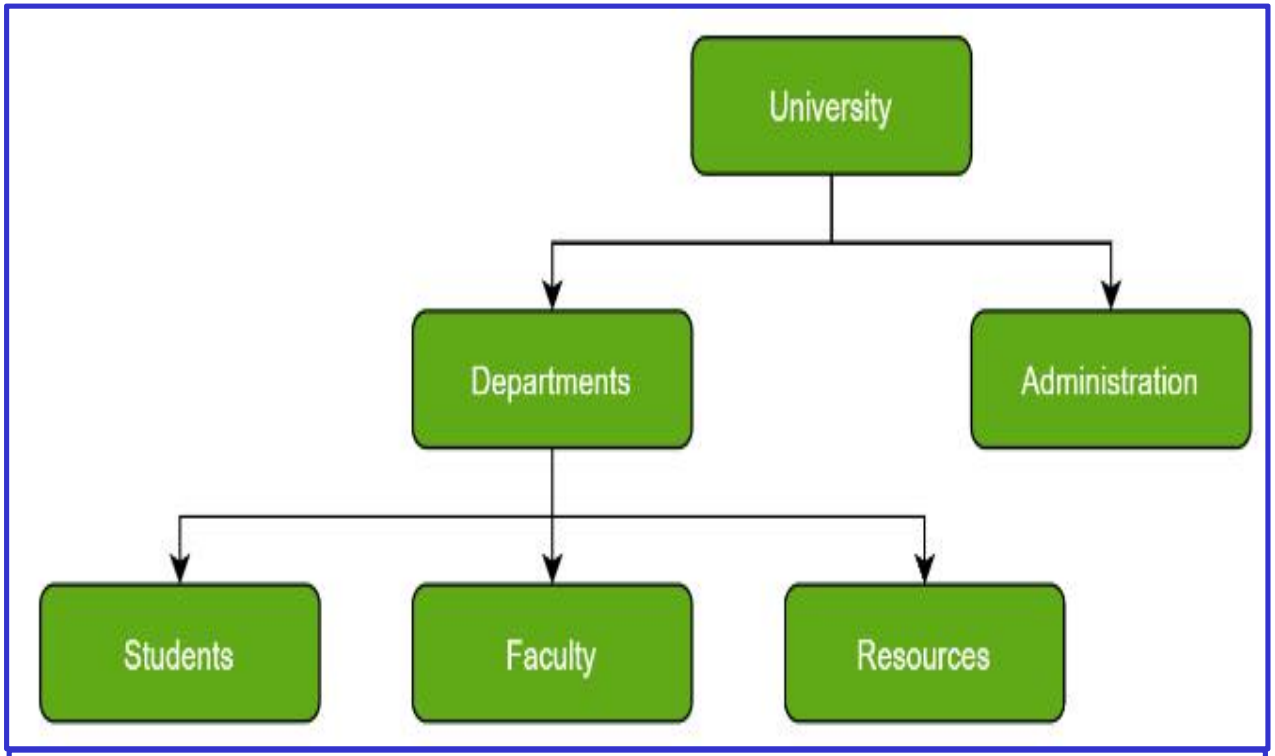
- ❑ Centralized Database
- ❑ Operational Database
- NoSQL databases

- ❑ Distributed Database
- ❑ Data warehouses
- ❑ Open source databases
- ❑ Cloud databases
- ❑ Multi model database
- ❑ Self-driving databases

Hierarchical Databases: (also known as Tree structure.)

When the data stored in the form of records and is connected to each other through links is called hierarchical database

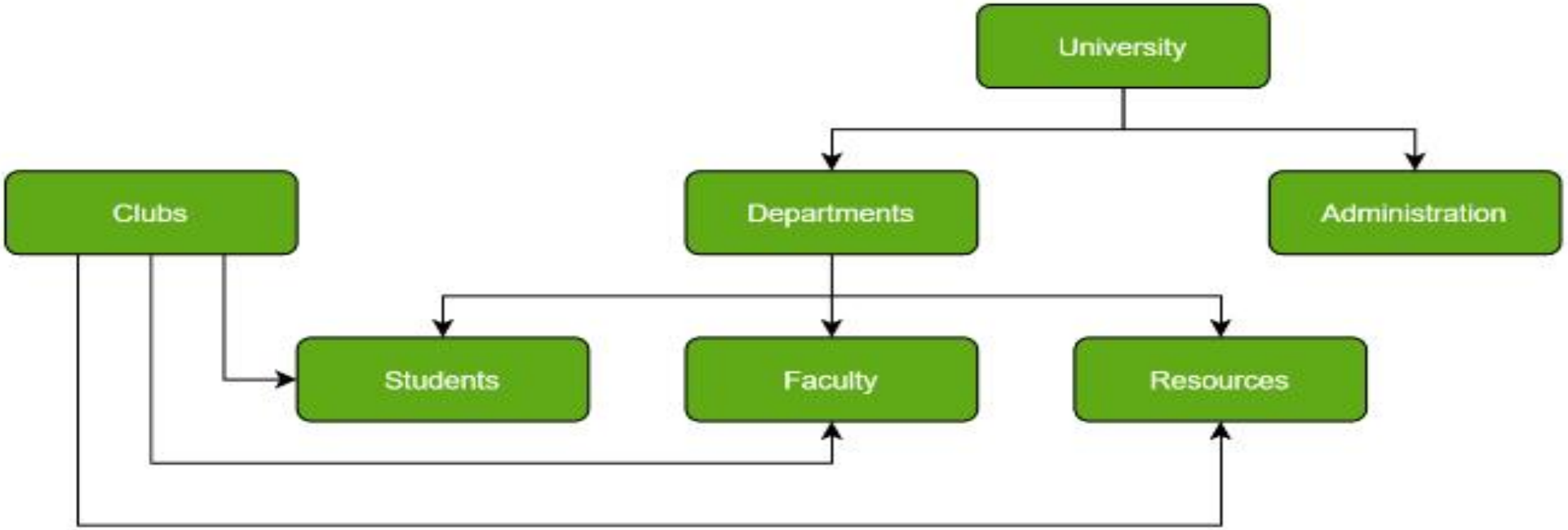
Just as in any hierarchy,
this database follows the progression of data being categorized in ranks or levels, wherein data is categorized based on a common point of linkage.



Departments and Administration are entirely unlike each other and yet fall under the domain of a University. They are elements that form this hierarchy.

Network Database:

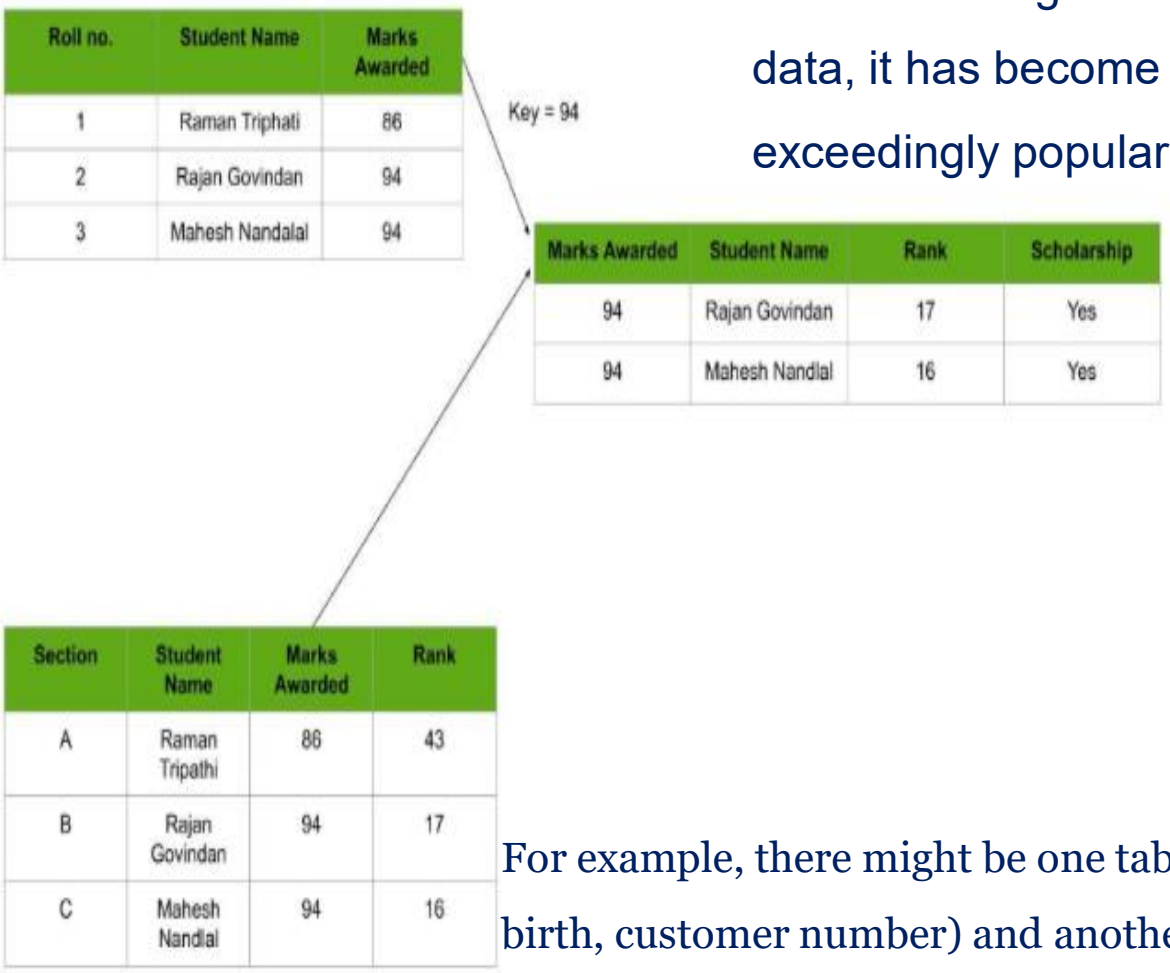
- A network database is based on a traditional hierarchical database, except it allows each object to have multiple parents instead of a single parent
- This allows you to model more complex relationships



The disadvantage lies in the inability to alter the structure due to its complexity

Relational Databases:

- Due to this introduction of tables to organize data, it has become exceedingly popular



Roll no.	Student Name	Marks Awarded
1	Raman Triphati	86
2	Rajan Govindan	94
3	Mahesh Nandalal	94

Key = 94

Marks Awarded	Student Name	Rank	Scholarship
94	Rajan Govindan	17	Yes
94	Mahesh Nandlal	16	Yes

Section	Student Name	Marks Awarded	Rank
A	Raman Tripathi	86	43
B	Rajan Govindan	94	17
C	Mahesh Nandlal	94	16

- In this database, every piece of information has a relationship with every other piece of information
- Note that all data is tabulated in this model.
- Therefore, every row of data in the database is linked with another row using a primary key.
- Similarly, every table is linked with another table using a foreign key.

For example, there might be one table with user information (name, username, date of birth, customer number) and another table with purchase information (customer number, item purchased, price paid). In this example, the key that creates a relationship between the tables is the customer number.

Object Oriented Databases:

- An object-oriented database is a type of database in which the data is organized into objects.
- These objects can have relationships with other objects, similar to the way that objects in a class can have relationships with other objects in that class.
- This allows for more complex data structures and makes it possible to model relationships between objects in the database.
- The object-oriented data model is based on the object-oriented- programming language concept

Object-Oriented Model

Object 1: Maintenance Report

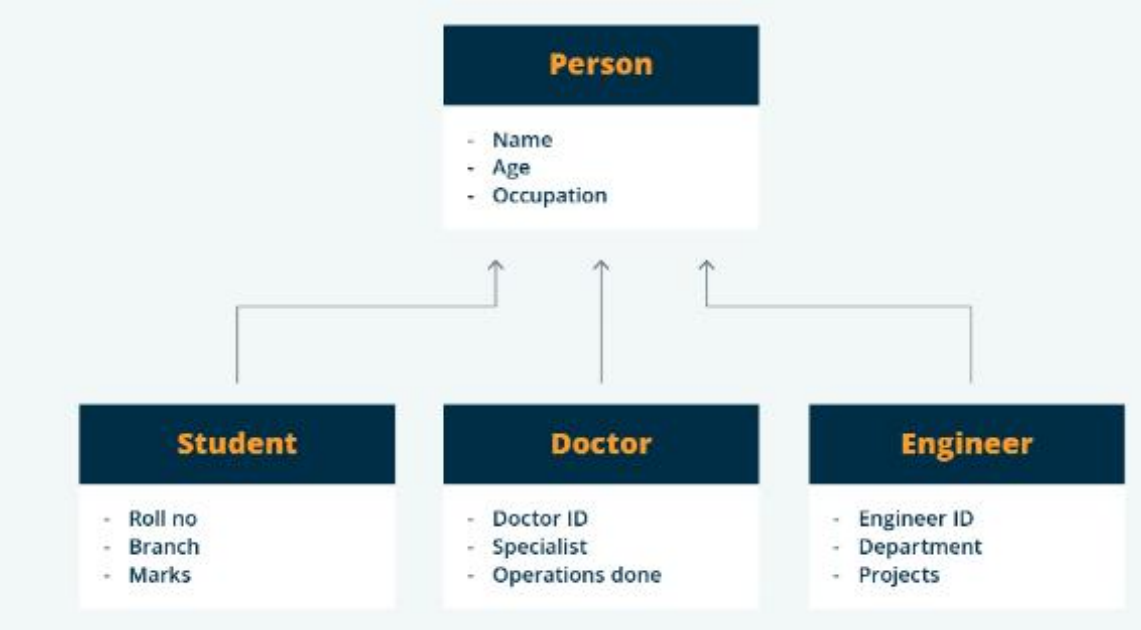
Date	
Activity Code	
Route No.	
Daily Production	
Equipment Hours	
Labor Hours	

Object 1 Instance

01-12-01
24
I-95
2.5
6.0
6.0

Object 2: Maintenance Activity

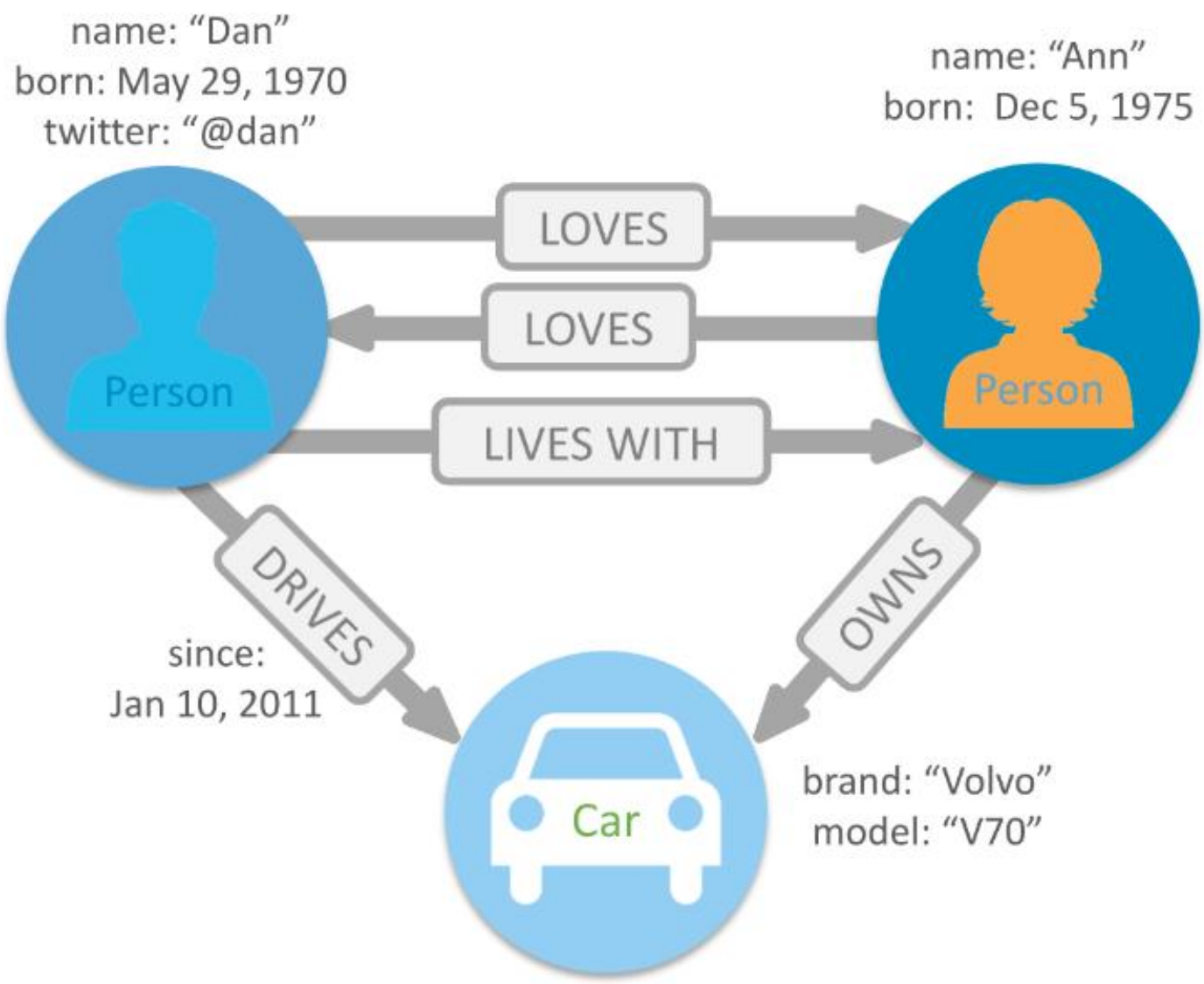
Activity Code	
Activity Name	
Production Unit	
Average Daily Production Rate	



database is integrated with the programming language

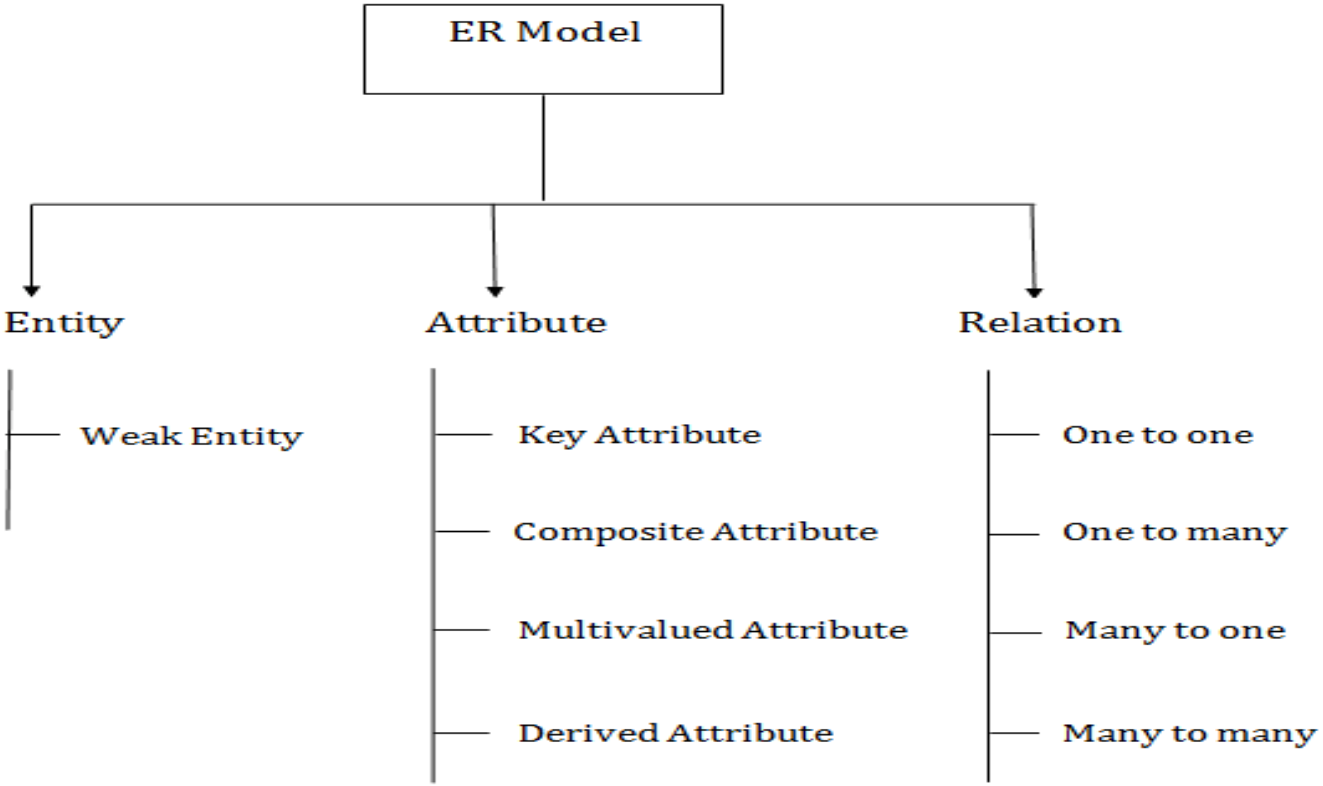
Graph Database:

- It is used for storing vast amounts of data in a graph-like structure. Most commonly, social networking websites use the graph database.



ER Model Database:

The Entity Relational Model is a model for identifying entities to be represented in the database and representation of how those entities are related.



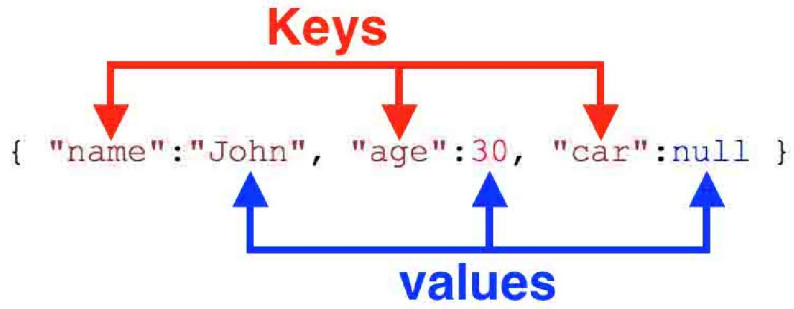
An Entity-Relationship Model represents the structure of the database with the help of a diagram.

Document Database:

JSON stands for JavaScript Object Notation

- A type of database used to store data as JSON-like document.

The example is a JSON string: `'{"name":"John", "age":30, "car":null}'`



Users

Document 1

```
{
  "id": "1",
  "name": "Florian Bouron",
  "isActive": true
}
```

Document 2

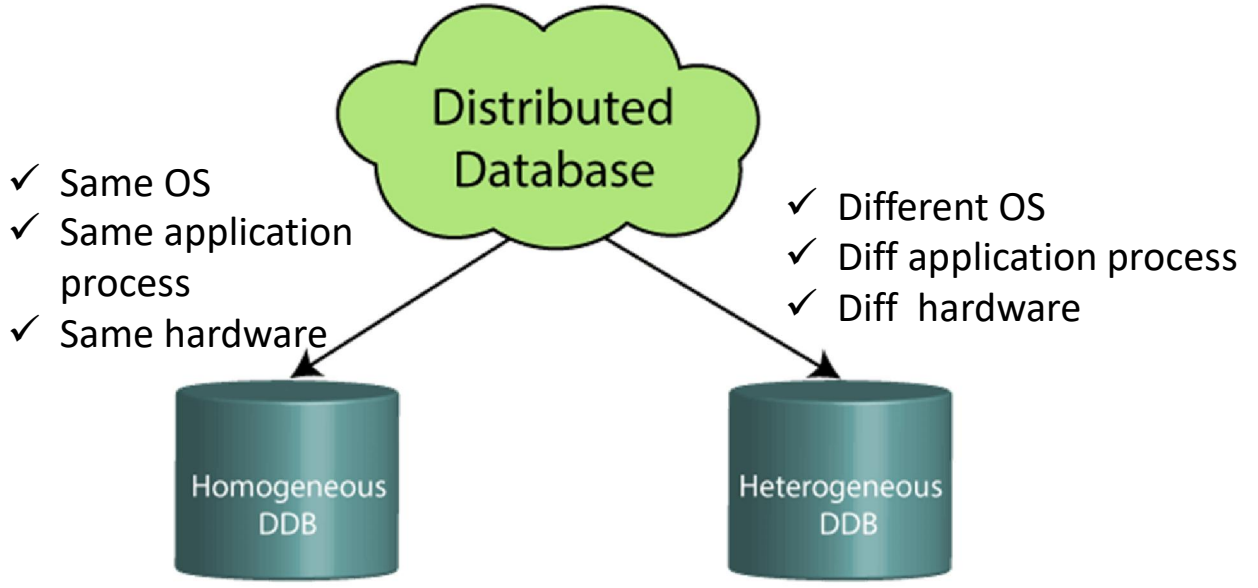
```
{
  "id": "2",
  "fullName": "John Smith",
  "isActive": false
}
```

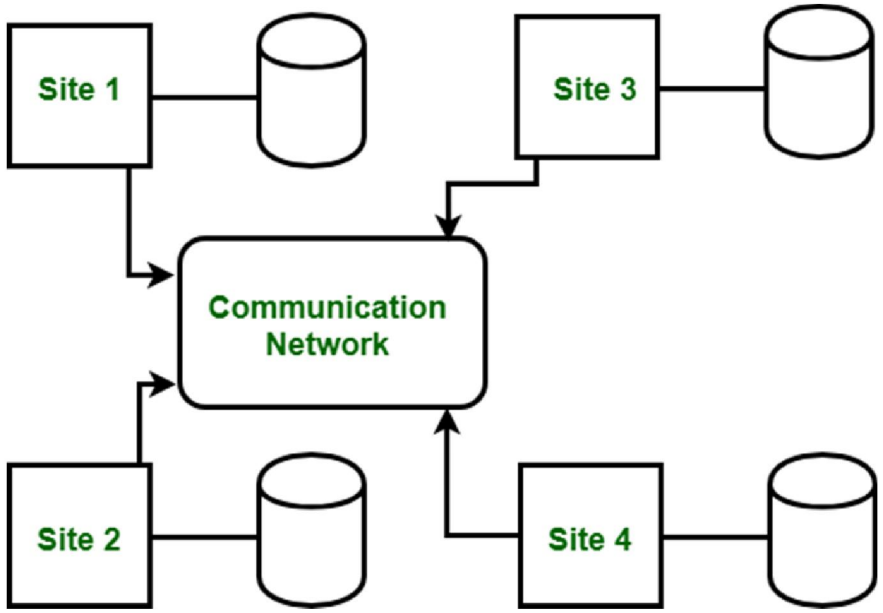
Document 3

```
{
  "id": "3",
  "fullName":
  {
    "first": "Sarah",
    "last": "Stark"
  },
  "isActive": true
}
```

Distributed Database:

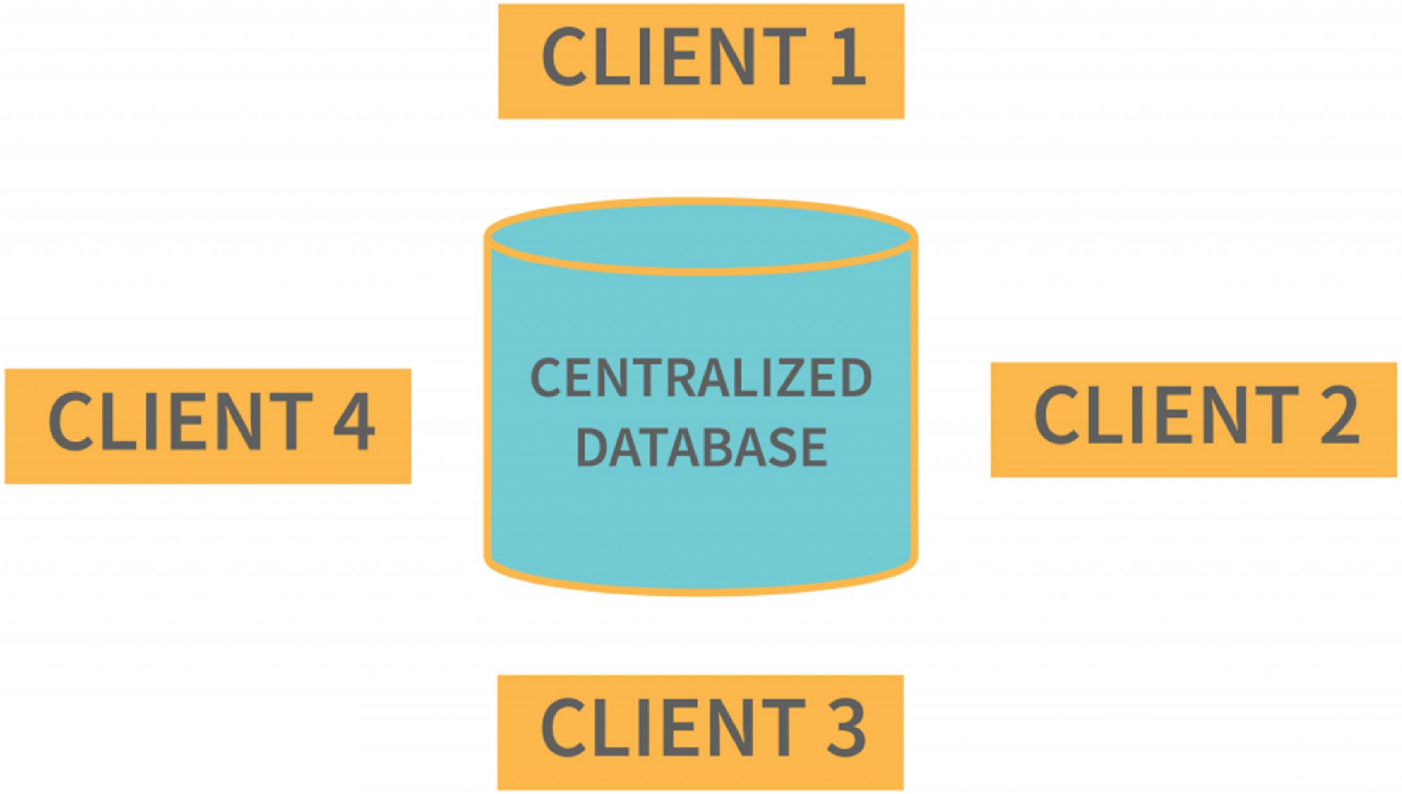
- The distributed database has contributions from the common database as well as the information captured by local computers also.
- The data is not at one place and is distributed at various sites of an organization.
- These sites are connected to each other with the help of communication links which helps them to access the distributed data easily.





Centralized Database:

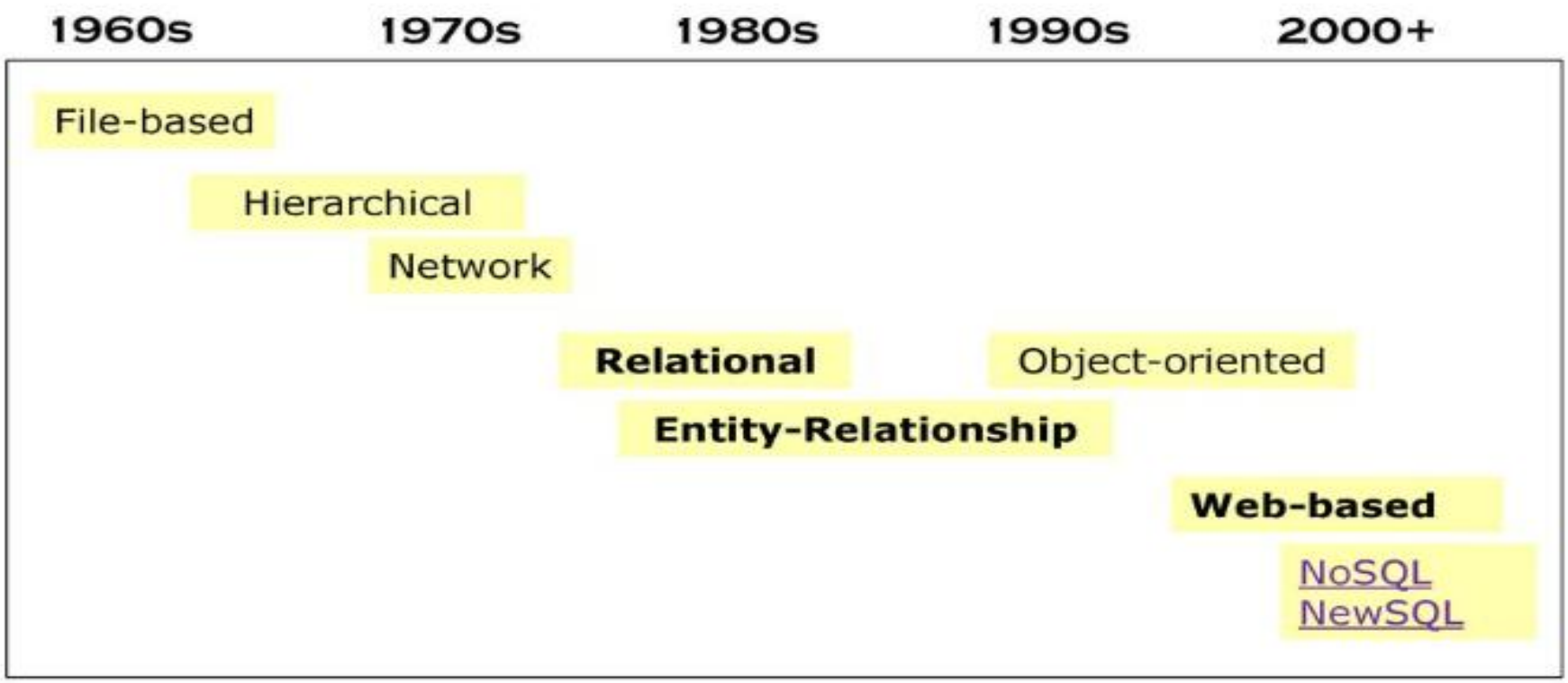
- It is the type of database that stores data at a centralized database system



Operational Database:

- It is used for creating, updating, and deleting the database in real-time and it is basically designed for executing and handling the daily data operation in organizations and businesses purposes.

Evolution of Database



- 1960s:
  - (Electronic) Data collection, database creation, IMS (hierarchical database system by IBM) and network DBMS
- 1970s:
  - Relational data model, relational DBMS implementation
- 1980s:
  - RDBMS, advanced data models (extended-relational, OO, deductive, etc.)
  - Application-oriented DBMS (spatial, scientific, engineering, etc.)

- 1990s:
  - Data mining, data warehousing, multimedia databases, and Web databases
- 2000 -
  - Stream data management and mining
  - Data mining and its applications
  - Web technology
    - Data integration, XML
    - Social Networks (Facebook, etc.)
    - Cloud Computing
    - global information systems
  - Emerging in-house solutions
  - In Memory Databases
  - Big Data

New Research Directions (1990's)

- Problems associated with putting multimedia objects into DBMSs: new data types
- Problems involving new paradigms for distribution and processing of information.
- **New uses of databases**
  - Data Mining
  - Data Warehouses
  - Repositories
- New transaction models
  - Workflow Management
  - Alternative Transaction Models (long transactions)
- Problems involving **ease of use** and management of databases.

THANK YOU