



Dear student,

In this chapter, Students acquires knowledge about DBMS models & RDBMS.

### Unit 3: An introduction to Database Management System

## DBMS DATABASE MODELS

### Hierarchical Model

- ✓ In this model each record has information in parent/ child relationship like a tree structure.
- ✓ The collection of records was called as record types, which are equivalent to tables in relational model.

#### Advantages:

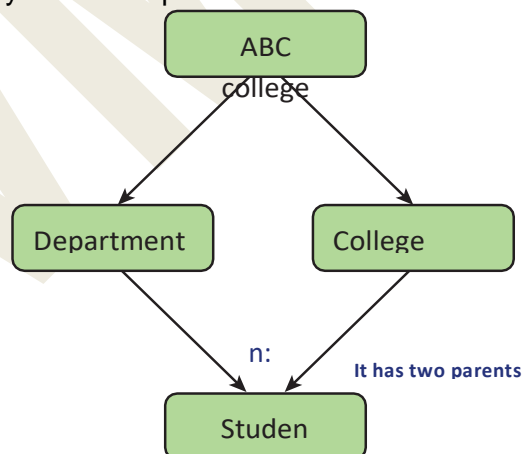
- ✓ less redundant data
- ✓ efficient search
- ✓ data integrity and
- ✓ security

#### Limitations:

- ✓ complex to implement and difficulty in handling many to many relationships

### Network Model

- ✓ The first developed network data model was IDS (Integrated Data Store) at Honeywell.
- ✓ It is similar to Hierarchical model
- ✓ The many to many relationships are handled in a better way.



#### Database components

- ✓ Network schema - defines all about the structure of the database
- ✓ Sub schema - controls on views of the database for the user
- ✓ Language - basic procedural for accessing the database



### Advantage

- ✓ To handle more relationship types,
- ✓ easy data access,
- ✓ data integrity and
- ✓ independence.

### Limitation

- ✓ difficulty in design and maintenance.

### Relational Model

- ✓ Oracle and DB2 are few commercial relational models in use
- ✓ Two terminologies:

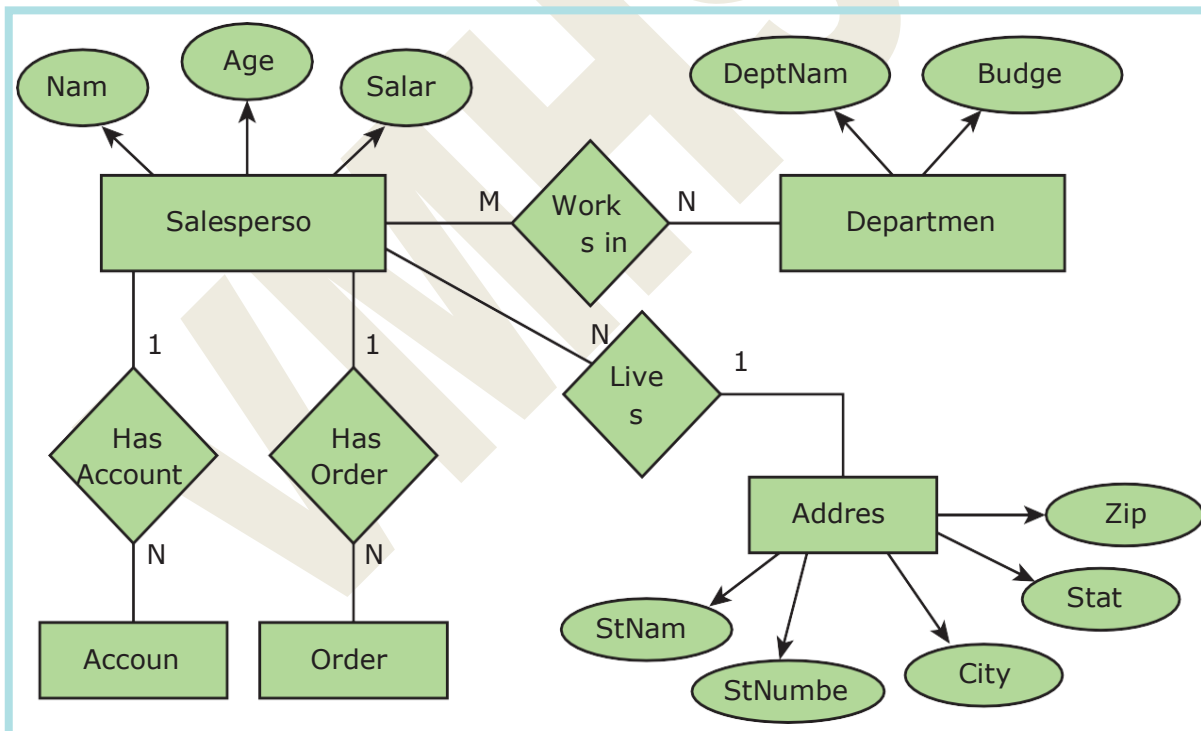
**Instance** – A table consisting of rows and columns

**Schema** – Specifies the structure including name and type of each column.

- ✓ A relation (table) consists of unique attributes (columns) and tuples (rows).

### Object-oriented model

- ✓ This model incorporates the combination of Object Oriented Programming(OOP's) concepts and database technologies.





## RELATIONAL DATABASE MANAGEMENT SYSTEM

### Basic RDBMS concepts

- ✓ A DBMS that **manages the relational database** is known as Relational Data Base Management System.
- ✓ RDBMS is basis for SQL and for all modern database systems like MySQL, oracle and Microsoft Access.

### RDBMS JARGONS

- ✓ The basic RDBMS concept includes **Database, Tables, Tuple, Attribute, Schema and Key** which are discussed in RDBMS Jargons.

### features of RDBMS

- ✓ High Availability
- ✓ High Performance
- ✓ Robust Transactions and support
- ✓ Ease of management
- ✓ Less cost

### Table

- ✓ Table is defined as the collection of **data organized** in terms of **rows and columns**.
- ✓ Table is the simple representation of **relations**.

### Column

- ✓ Table can be divided into smaller parts, in terms of columns.
- ✓ Each column is known as **attributes**.

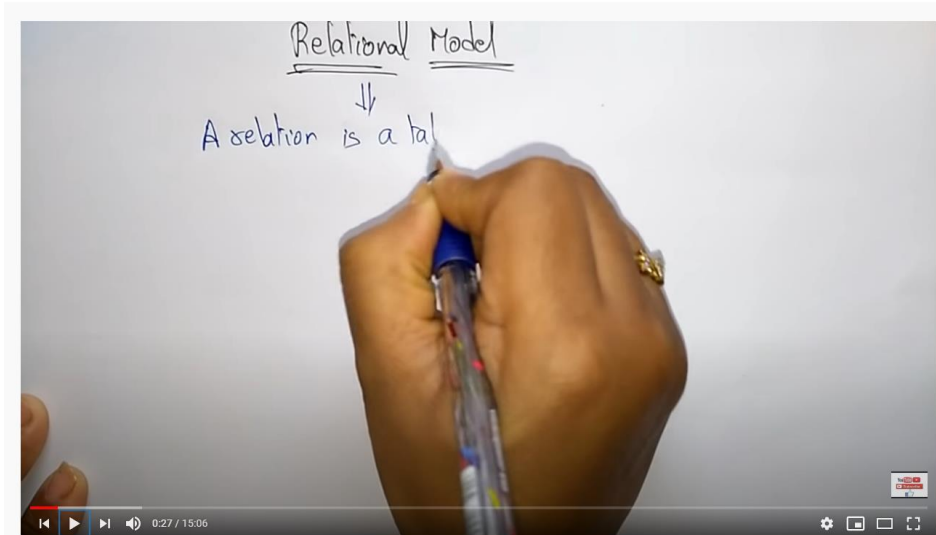
### Row

- ✓ A **single entry** in a table is called as **Row or Record or Tuple**.
- ✓ Set of **related data's are represented** in a row or tuple.
- ✓ The **horizontal entity** in a table is known as Record or row.



Let us see important points in RDBMS through this video link :

[https://youtu.be/P8n\\_rwPzdBc?list=PL0iN7djL7w81YAH-Yqi6-YePCkkVytfcg](https://youtu.be/P8n_rwPzdBc?list=PL0iN7djL7w81YAH-Yqi6-YePCkkVytfcg)



relational model in dbms

### Primary Key

- ✓ The candidate key that is chosen **to perform the identification task** is called the primary key and **any others are Alternate keys**.

### Foreign Key

- ✓ Foreign key is a “copy” of a primary key that has been exported from **one relation into another to represent the existence** of a relationship between them.

### Super Key

- ✓ **An attribute or group of attributes**, which is sufficient to distinguish every tuple in the **relation from every other one** is known as Super Key.

### Composite Key

- ✓ **A key with more than one attribute to identify** rows uniquely in a table is called Composite key. This is also known as Compound Key.



## ER MODEL

- ✓ ER model to know the concept of database design and this model consists of a collection of entities where each of these entities will be interconnected with each other with conditions and dependencies.

### ER Modeling basic concepts

- ✓ An Entity can be **anything a real-world object or animation** which is easily identifiable by anyone even by a common man.

The basic concepts of ER model consists of

- Entity or Entity type
- Attributes
- Relationship
- Entity or Entity type

### Types of Entity

- Strong Entity
- Weak Entity
- Entity Instance

### Strong Entity

- ✓ A Strong entity is the one which doesn't depend on any other entity on the schema or database and a strong entity will have a primary key with it.

### Weak Entity

- ✓ A weak entity is dependent on other entities and it doesn't have any primary key like the Strong entity.
- ✓ It is represented by double rectangle.

### Entity Instance

- ✓ Instances are the values for the entity

### Attributes

- ✓ An attribute is the information about that entity and it will describe, quantify, qualify, classify, and specify an entity. An attribute will always have a single value, that value can be a number or character or string.



### Types of Attributes

- ✓ Key Attribute - describes a unique characteristic of an entity
- ✓ Simple Attributes - The simple attributes cannot be separated it will be having a single value for their entity.
- ✓ Composite Attributes - can be sub- divided into simple attributes without change in the meaning of that attribute.
- ✓ Single Valued Attribute - A single valued attribute contains only one value
- ✓ Multi Valued Attribute - A multi valued attribute has more than one value for that particular attribute

### Relationship Type

In ER Model, **relationship exists between two entities.**

- ✓ One-to-One relationship: one-to-one (1:1) relationship is said to exist in a relational database design
- ✓ One-to-Many relationship: one-to-many (1:N) relationship is said to exist in a relational database design
- ✓ Many-to-Many relationship: many-to-many (M:N) relationship is said to exist in a relational database design

### Relationship Instance

- ✓ Each instance of the **relationship between members** of these entity types is called a relationship instance.

### Degree of Relationship

The **number of entity types** involved is known as Degree of relationship.

- One – Unary,
- Two – Binary,
- Three – Ternary

### Cardinality

- ✓ It is defined as the **number of items** that must be included in a relationship.



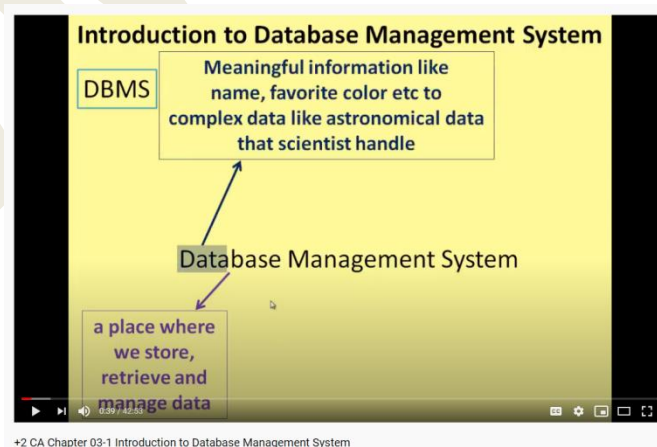
## ER - DIAGRAM

- ✓ ER Diagram **presents data visually on how they are related to each other.**
- ✓ This model follows separate notations for representing data into entities, attributes and relationship between the entities.

Table 3.6 ER diagram Notations		
ER Component	Description (how it is represented)	Notation
Entity - Strong	Simple rectangular box	
Entity - Weak	Double rectangular boxes	
Relationships	Rhombus symbol - Strong	
between Entities	Rhombus within rhombus - Weak	
Attributes	Ellipse Symbol connected to the entity	
Key Attribute for Entity	Underline the attribute name inside Ellipse	
Derived Attribute for Entity	Dotted ellipse inside main ellipse	
Multivalued Attribute for Entity	Double Ellipse	

Let us see the brief explanation through this video:

[https://youtu.be/WjY\\_1ND\\_FIU](https://youtu.be/WjY_1ND_FIU)



Mail your Queries/Clarifications/questions along with your Name, group and Roll Nr. to:

[kanagarajannadar@gmail.com](mailto:kanagarajannadar@gmail.com) for a possible reply from us.

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