Advantages

- Easy to Use and Understand.
- Highly flexible (Table can be joined in many ways).
- Supports normalization to remove redundancy.
- Easy to query Using SQL.

Disadvantages

- Can be slower than hierarchical / Network models for very complex relationships.
- Requires powerful hardware for very large Database.

Real-Life Example

- Baking System
  A table for Customers (CostomerID, Name, Adress)
  A table for Accounts (AccountNo, Balance, CustomerID)
  Relationship is established Using CostomerID as foreign key.

Comparison table

Aspect	Hierarchical Model	Network model	Relational model
Data Structure	Tree-like (Parent-child	Graph (Node-Edge)	Table (Rows & columns)
Relationship	One to many	Many to many	one to one one to many Many to many
Flexiblity	Low (fixed hierarchy)	Medium (Pointers required	High (Easy to modify tables)
Ease of Use	Simple but rigid	complex to design	very User-friendly (SQL-based)
Redudancy	High	Low	Very User Low (with normalizatio)
	Company Org chart	Airline Reservation System	Banking System (Customers & Accounts)

2. Network Data Model.

In a network data Model, data is organized using nodes and edges like a graph. It supports many to many relationships and Uses pointers to connect data.

Features

- Data is represented as a graph with nodes (records) and edges (Relationships).
- Relationships can be many to many.
- Complex data relationships can be handled.

Advantages

- More flexible than hierarchical model.
- Efficient for complex relationships.
- No data duplication if pointers are Used correctly.

Disadvantages

- Difficult to design and maintain.
- Querying data is more complex.
- Requires understanding of Pointer structure.

Real Life Example

- Airline Reservation System
  A passanger can book Multiple flights.
  A flight can have multiple passangers.
  Many-to-many relationship is handled efficiently.

3. Relational Data Model

In a relational data model, data is stored in tables (relations) with rows (tuples) and columns (attributes). Relationships are defined using keys like Primary Key and foreign Key.

Features

- Data is organized into tables.
- Relationships are established using keys.
- SQL is used for data operations.

Comparison of Different Data Models

Introduction

Data models are a way to represent and organize data in a database. They define how data is stored, connected and manipulated. Three of the most important traditional Data Models are :-

- Hierarchical Data Model
- Network Data Model
- Relational Data Model

1. Hierarchical Data Model :- In a hierarchical data Model, data is organized in a tree-like structure. Each parent record can have multiple child records, but each child has only one parent.

Features

- Data is represented in a tree structure.
- Relationship are one to many.
- Easy to navigate if relationship are clear.
- Data retrival is fast if hierarchichy is known.

Advantages

- Simple and easy to Understand.
- Good for applications with a fixed hierarchy.
- fast access for hierarchical relationship.

Disadvantages

- Complex to re-organize if structure changes.
- Cannot repost many to many relationship easily.
- Data redundancy can occur.

Real-Life Example :-

- Company Organizational structure
A Company has a CEO → Department Heads → Team leaders → Employees.
Here, CEO is the root, Departments are Branches, and employees are leaves.