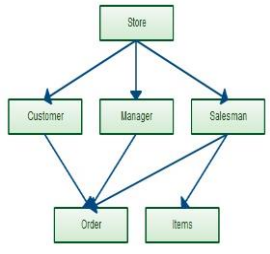
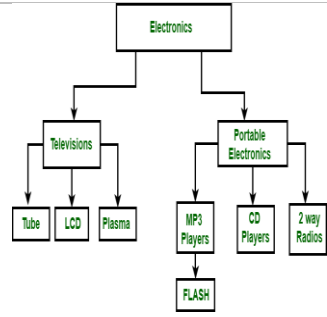


Difference Between Hierarchical Model, Network Model, Relational Model

Feature	Hierarchical Model	Network Model	Relational Model
Structure	Data is stored in a tree structure (parent → child). Each child has only one parent .	Data is stored in a graph structure . Each child can have many parents .	Data is stored in tables (rows & columns) .
Relationship	1-to-Many (one parent, many children).	Many-to-Many (a record can be linked with many records).	Relationship Based on keys (primary, foreign) for linking tables.
Navigation	Top-down (start from the root and go step by step).	Can go in any direction (because of graph links).	Can access data using SQL queries directly.
Flexibility	Less flexible → changing structure is difficult.	More flexible than hierarchical but still complex.	Very flexible → structure can change easily.
Ease of Use	Hard for end users, easy for programmers.	Complex for both users and programmers.	Very easy for users (SQL is simple).
Example	Company → Departments →	Students linked to Courses	Student table, Course table,

	Employees.	(many students can join many courses).	linked by IDs.
Insertion Anomaly	Can't add a child without a parent	Need to create complex links to add new data.	Can't add data if key relation missing.
Deletion Anomaly	Deleting parent deletes all children.	Removing links may lose important connections.	Deleting one row may remove important info.
Update Anomaly	Updating parent may need changes in many places.	If record info is repeated in links, multiple updates needed.	Same data stored in many rows → need multiple updates.
Advantages	Simple, fast for 1-to-many data.	Good for complex relationships .	Easy to use, flexible, supported by SQL .
Disadvantages	Rigid, hard to change structure.	Complex to design and maintain.	Slower for very large data compared to others.
Popularity Today	Rarely used now.	Rarely used now.	Most widely used today.

Diagram



Columns or Fields or Attributes					Domain (FM)
Primary Key	Stu_ID	S_Name	S_Address	Birthdate	Sex
	121	Anita	41, Kendy Av.	15-07-1981	F
	122	Dravid	22, Basant Av.	23-06-1980	M
	125	Shallu	120, St.Thomas Av.	19-09-1982	F
	131	Atul	58, Lwr.Rd.	27-06-1978	M

Rows, Records or Tuples: Indicated by a bracket on the left side of the table.
 Degree (No. of Columns): Indicated by a bracket at the bottom of the table.
 Data Values: Indicated by a bracket at the bottom of the table.
 Cardinality (Rows): Indicated by a vertical arrow on the right side of the table.