



SNS COLLEGE OF ENGINEERING



Kurumbapalayam (Po), Coimbatore – 641 107

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Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ARTIFICIAL INTELLIGENCE AND DATA SCIENCE

**COURSE NAME : 19IT408 - DATABASE MANAGEMENT
SYSTEMS**

II YEAR / III SEMESTER

Unit 1- Introduction

Topic 1 : Data Models



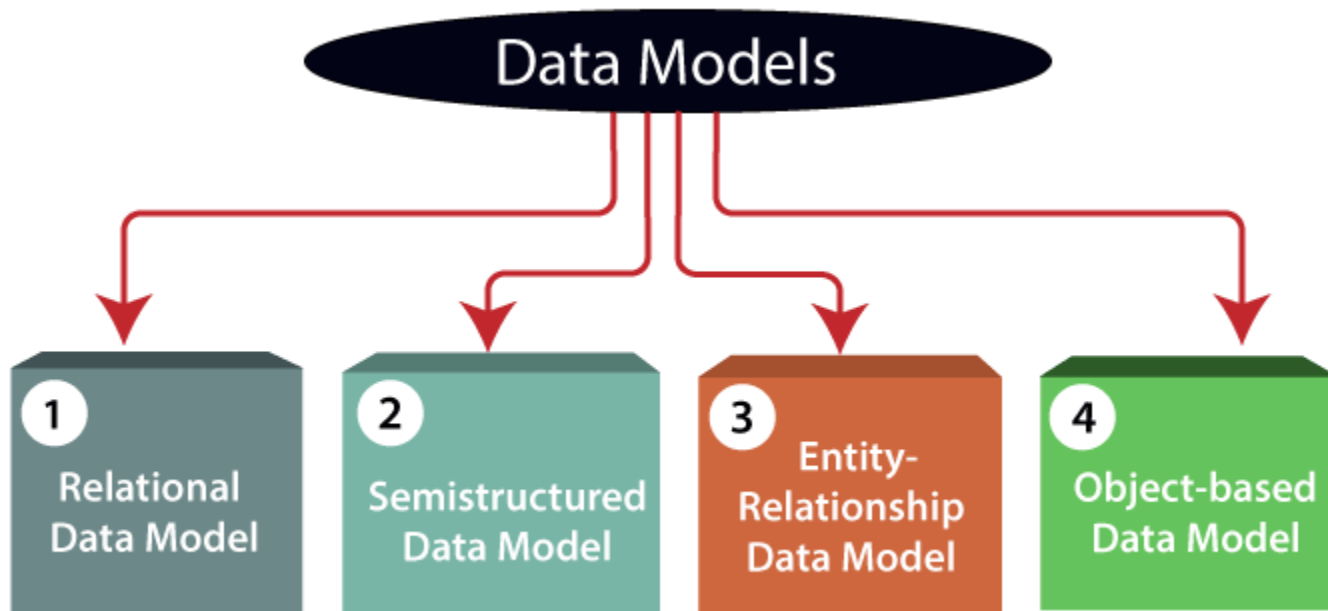
Data Models

It is a collection of conceptual tools for

- ✓ Describing data
- ✓ Relationships among data
- ✓ Meaning of data
- ✓ Constraints
- ✓ Data model is a structure below the database



Different types of Data Models





Different types of data model

- Entity – Relationship (E -R) Model.
- Relational Model
- Object –Based Data Model
- Semi structured Data Model
- Network Model
- Hierarchical data model

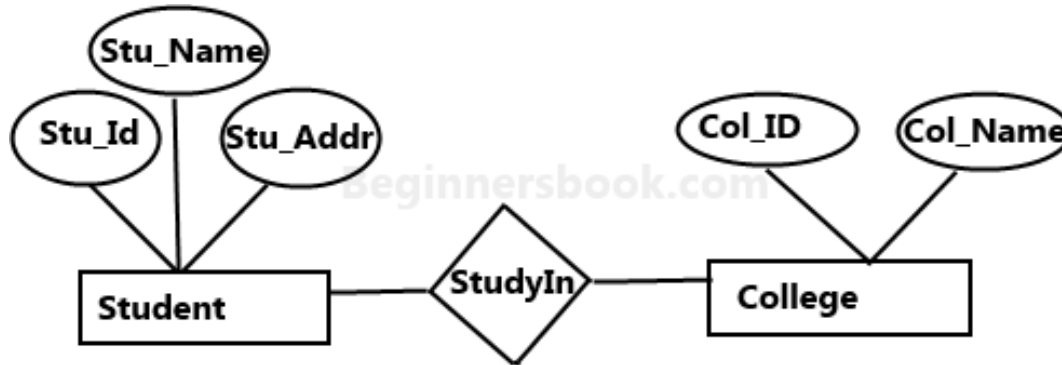


Relational Data Model

- The relational model uses a **collection of tables** to represent both data and the **relationships among those data.**
- It is **record based model**
- Each table contains records (**fields or attributes**)

Entity Relationship Model

- ER Model consists of a collection of basic **objects** called **entities**
- **Relationships** among these objects.



Sample E-R Diagram

Entity Relationship Model (Con...)

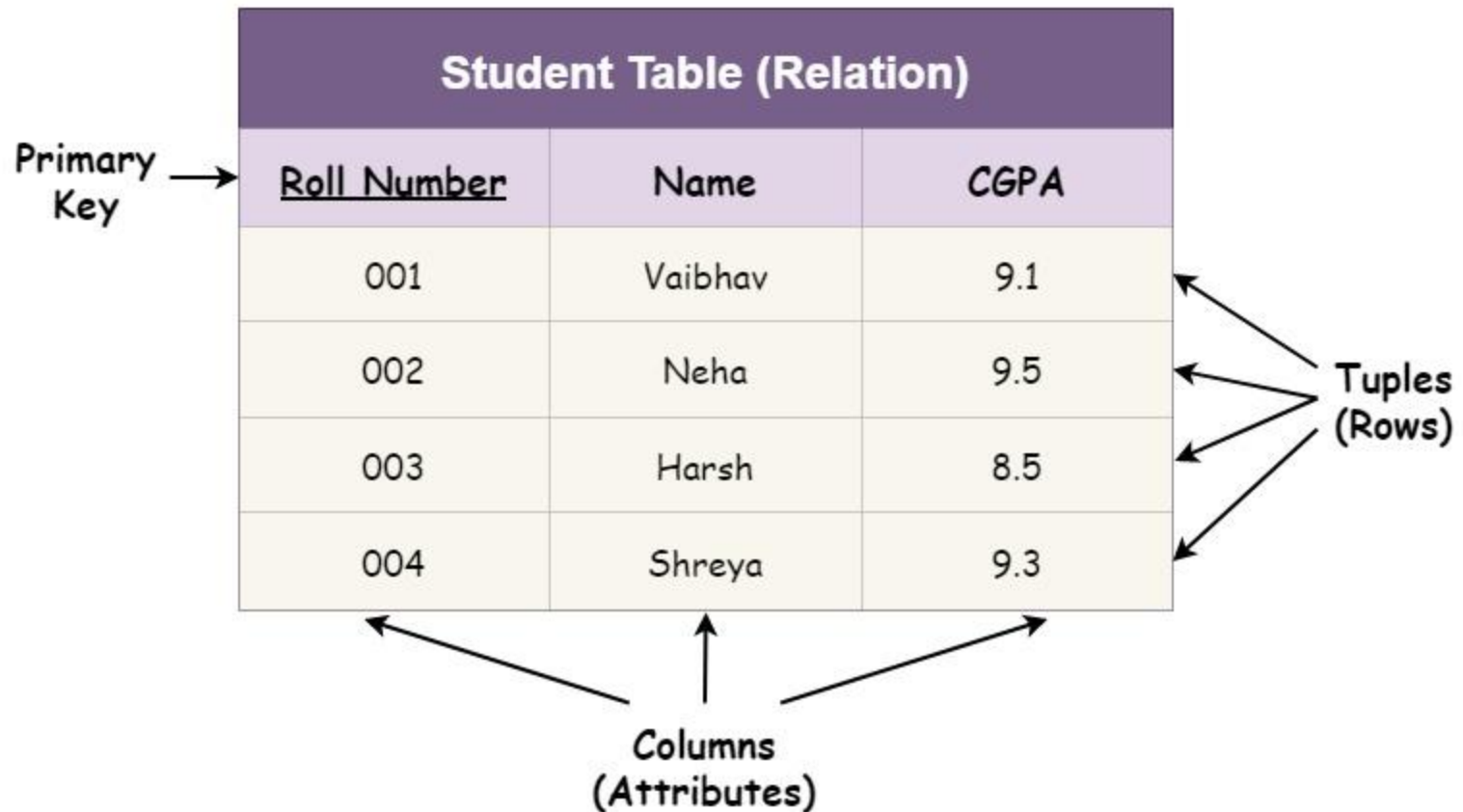
- Advantage :
 - Simple
 - Easy to understand
 - Effective
 - Easy conversion
- Disadvantage
 - Loss information
 - Limited relationship
 - No manipulation



Relational Model

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Relational Model in DBMS





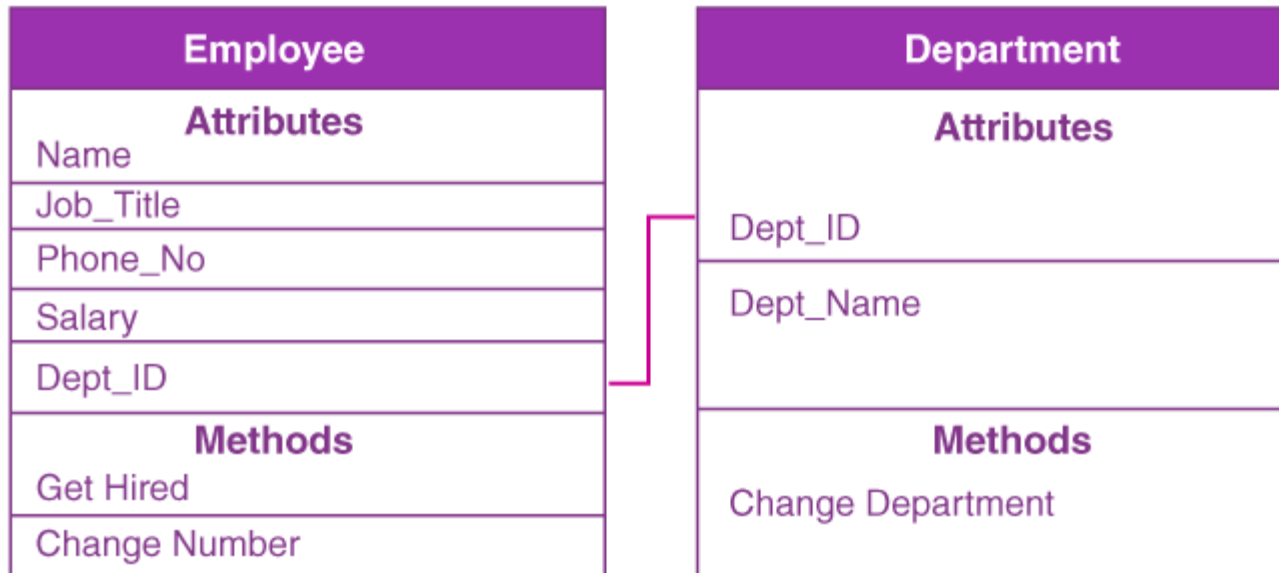
Relational Model (cont...)

- Advantage :
 - Structure independence
 - Conceptual (Theoretical) Simplicity
 - A powerful database management system
- Disadvantage
 - Transaction Process is not efficient
 - Processing time is low



Object –Based Data Model

- The object oriented model can be seen as extending the E-R model with notions of encapsulation methods (**functions**) and **object** identity.



Object Oriented Model



Object –Based Data Model (cont...)

- **Advantage :**
 - Exceptional conceptual simplicity
 - Visual representation
 - Effective communication tool
 - Integrated with the relational database model
- **Disadvantage**
 - Limited constraint representation
 - Limited relationship representation
 - No data manipulation language
 - Loss of information content

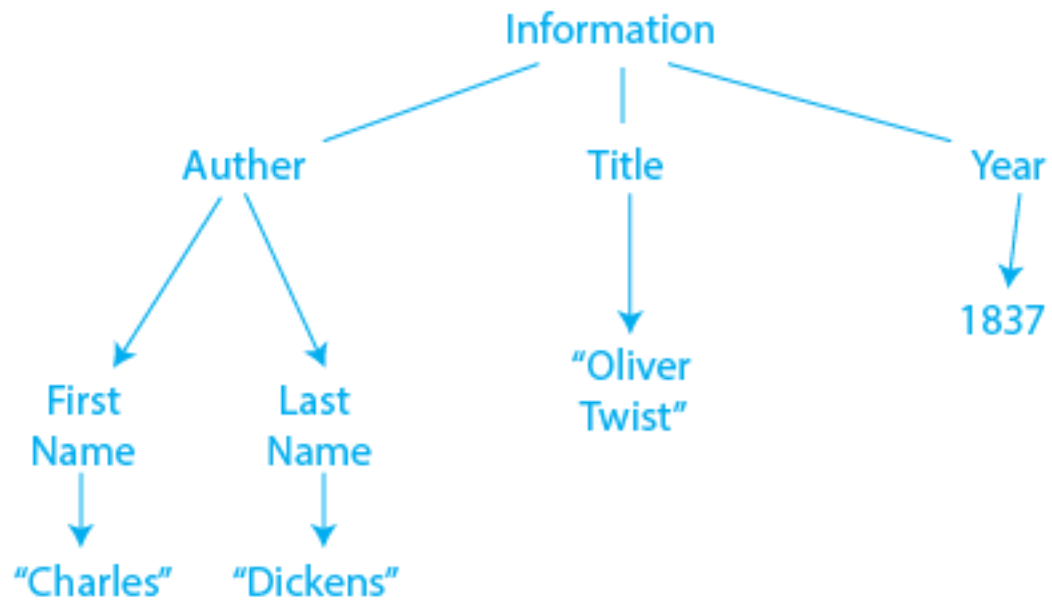


Semi structured data model

- The semi structure datamodel permits the specification of data where **individual data items** of the same type have different set of attributes .
- Example
 - **XML** (Extensible Markup Language)



Semi Structured





Advantages of Semi-structured Data:

- Flexibility
- Scalability
- Faster Data Processing

Disadvantages of Semi-structured Data:

- Complexity
- Lack of standardization
- Reduced performance
- Limited tooling
- Data security

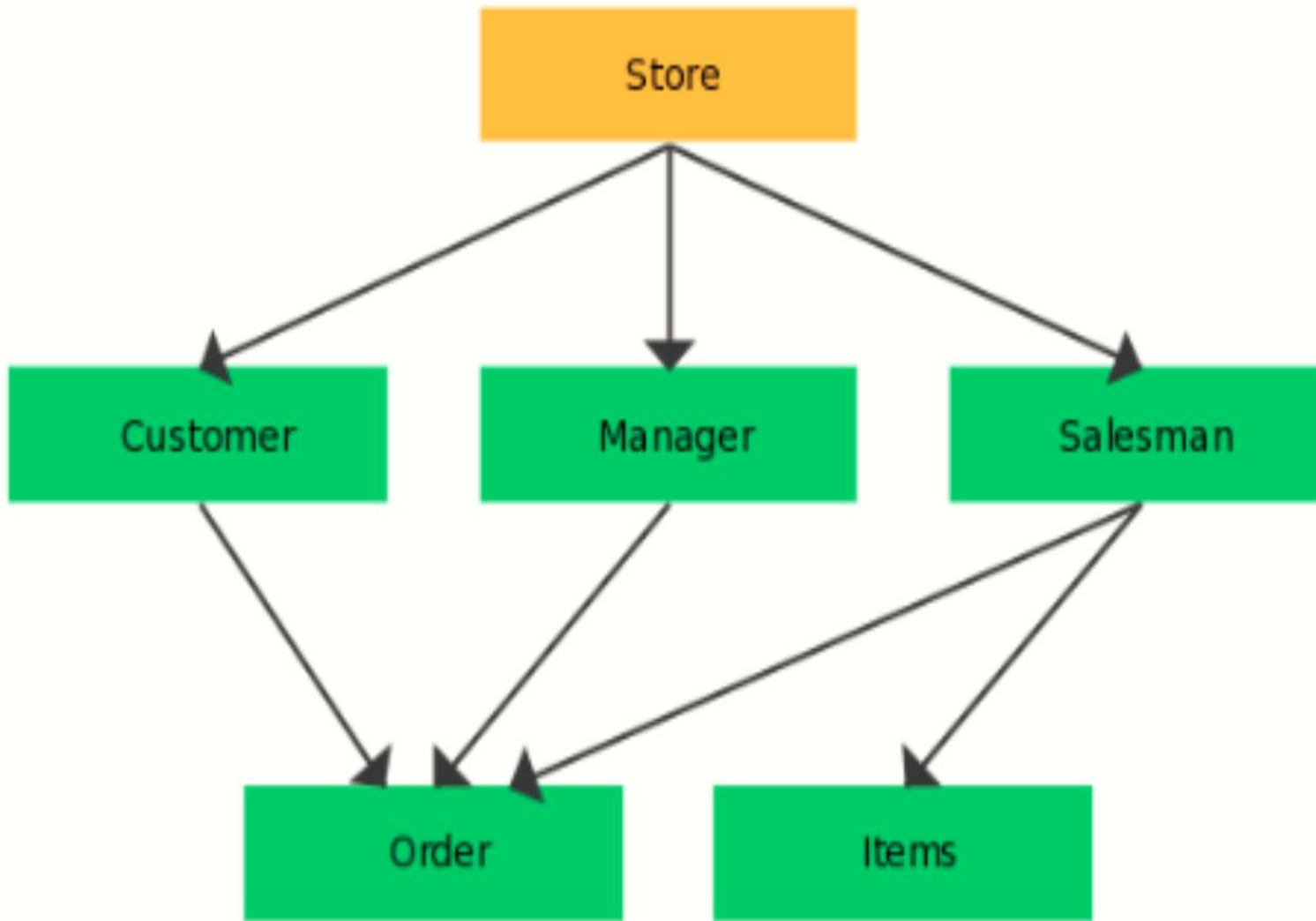


Network Model

- It is data structure diagram
- **Advantage**
 - Data independence
 - Conceptual simplicity
 - Easy to design
- **Disadvantage**
 - Lack of structure independence



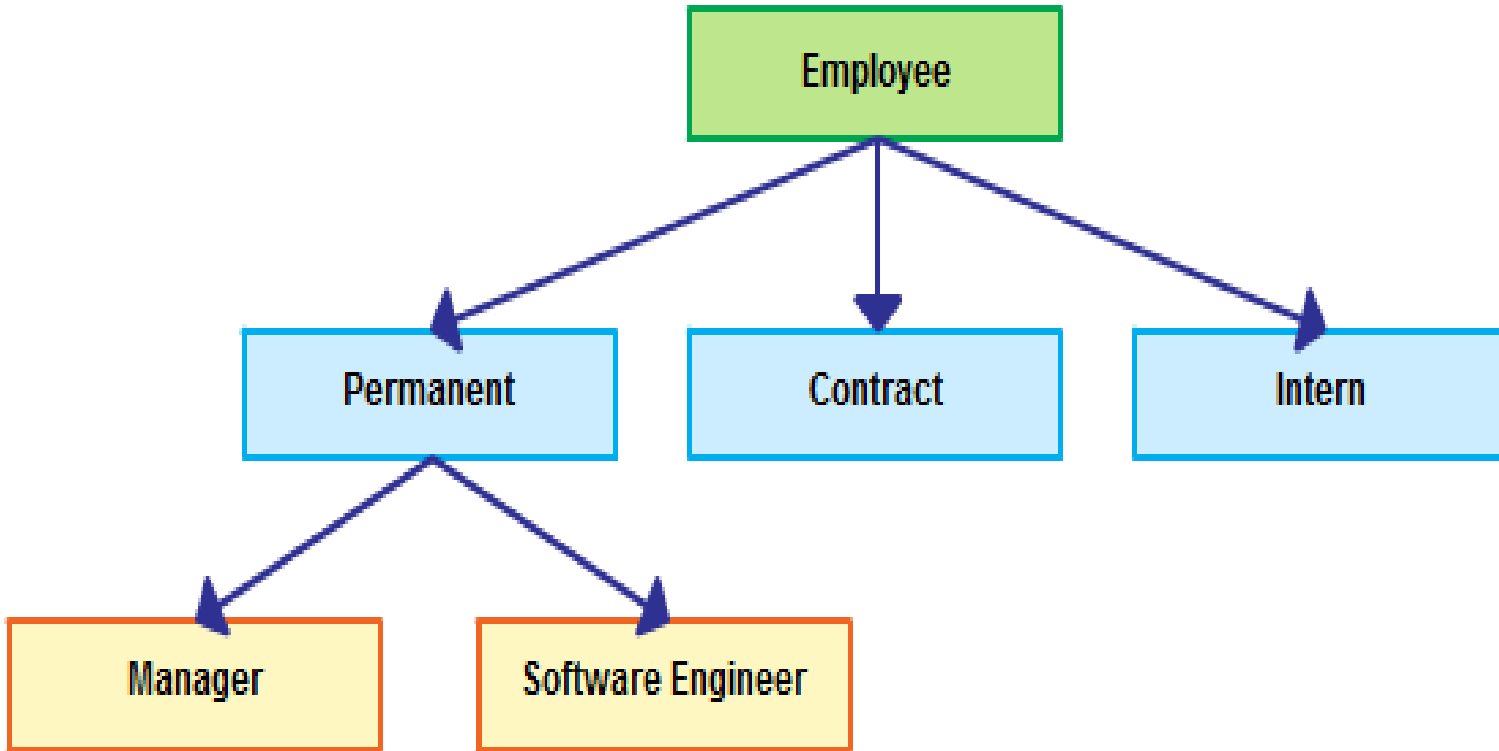
Network Data Model





Hierarchical Model

- It uses tree structure diagram
- **Advantage**
 - Simple
 - Easy to update
 - Design is simple
 - Database security
 - Efficiency
- **Disadvantage**
 - Implementation complexity
 - Difficult to manage





Advantages

Conceptual **simplicity**

groups of data could be related to each other

related data could be viewed together

Centralization of data

reduced redundancy and promoted consistency

Disadvantages

Limited representation of data **relationships**

did not allow Many-to-Many (M:N) relations

Complex implementation

required in-depth knowledge of physical data storage

Structural Dependence

data access requires physical storage path

Lack of Standards

limited portability



EVALUATION

1. Advantage of data models

a) _____

b) _____

c) _____

2. Disadvantages of data models

a) _____

b) _____

c) _____



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Thank You