Data models

Data Model gives us an idea that how the final system will look like after its complete implementation. It defines the data elements and the relationships between the data elements. Data Models are used to show how data is stored, connected, accessed and updated in the database management system. Here, we use a set of symbols and text to represent the information so that members of the organisation can communicate and understand it.

Types of data models

1. Object based data models

   a) ER Data models
   b) Object oriented data models

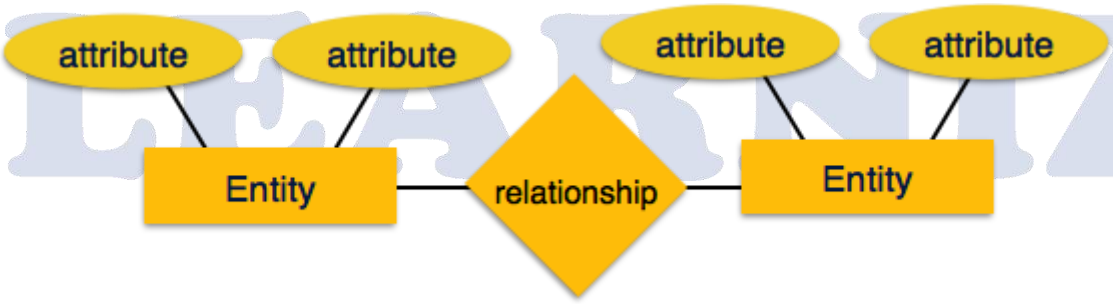
2. Physical Models

3. Record Based Data models

   a) Hierarchical Data Models
   b) Network Data models
   c) Relational Data models

1. Object based data models:

(A) ER data models: ER data model is the representation of real world objects with their attributes and relationship.



Entity: Rectangles are used to represent the entity in the diagram. Name of the Entity is written inside the rectangle. A strong entity is represented by simple rectangle. A weak entity is represented by two rectangles

Attribute: An oval shape is used to represent the attributes. Name of the attribute is written inside the oval shape and is connected to its entity by a line. Multivalued attributes are represented by double oval shape; whereas derived attributes are represented by oval shape with dashed lines. A composite attribute is also represented by oval shape, but these attribute will be connected to its parent attribute forming a tree structure.

Primary key: An underline to the attribute name is put to represent the primary key. The key attribute of the weak entity is represented by dashed underline.

Relationship: A diamond shape is used to show the relationship between the entities. A mapping with weak entity is shown using double diamond. Relationship name will be written inside them.

One to one relation: A one-to-one relationship is represented by adding ‗1' near the entities on the line joining the relation. In another type of notation one dash is added to the relationship line at both ends.

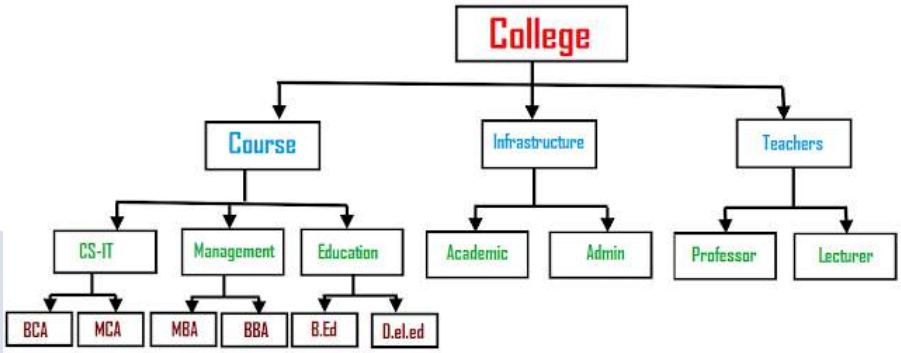
One to many relation: A one-to-many relationship is represented by adding ‗1' near the entity at left hand side of relation and ‗N' is written near the entity at right side. Other type of notation will have dash at LHS of relation and three arrow kind of lines at the RHS of relation as shown below.

Many to many relation: A one-to-many relationship is represented by adding ‗M' near the entity at left hand side of relation and ‗N' is written near the entity at right side. Other type of notation will have three arrow kinds of lines at both sides of relation as shown below.

(B) Object oriented data model: An object database (also object-oriented database management system, OODBMS) is a database management system in which information is represented in the form of objects as used in object-oriented programming. Object databases are different from relational databases which are table-oriented. Object-Relational database are a hybrid of both approaches

2. Physical Data Models:

Physical data model represents how the model will be built in the database. A physical database model shows all table structures, including column name, column data type, column constraints, primary key, foreign key, and relationships between tables.



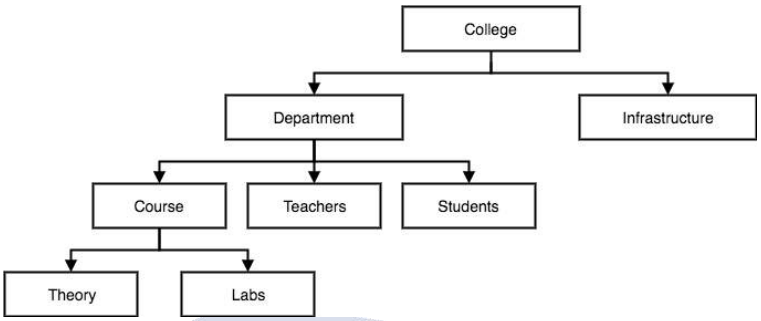
Features of a physical data model include: Specification all tables and columns. Foreign keys are used to identify relationships between tables.

- Denormalization may occur based on user requirements.
- Physical considerations may cause the physical data model to be quite different from the logical

3. Record based data models:

(a) Hierarchical data models:

A hierarchical database model is a data model in which the data is organized into a tree-like structure. The data is stored as records which are connected to one another through links. A record is a collection of fields, with each field containing only one value. The entity type of a record defines which fields the record contains.

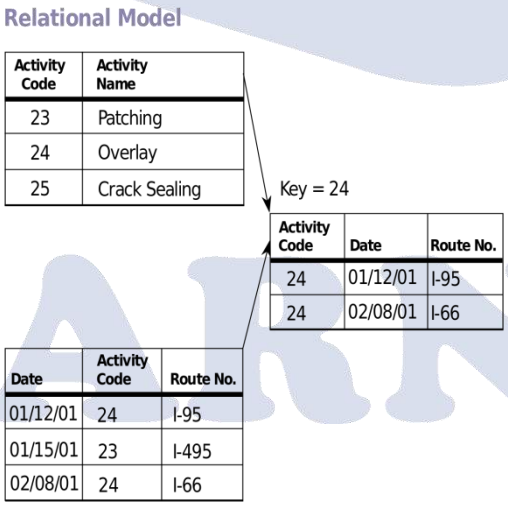


(b) Network Data Models:

The network model is a database model conceived as a flexible way of representing objects and their relationships. Its distinguishing feature is that the schema, viewed as a graph in which object types are nodes and relationship types are arcs, is not restricted to being a hierarchy or lattice. Network model replaces the hierarchical tree with a graph thus allowing more general connections among the nodes. The main difference of the network model from the hierarchical model, is its ability to handle many to many (N:N) relations. In other words, it allows a record to have more than one parent.

(c) Relational Data Models:

1. Where all data is represented in terms of tuples, grouped into relations. A database organized in terms of the relational model is a relational database.



The purpose of the relational model is to provide a declarative method for specifying data and queries: users directly state what information the database contains and what information they want from it, and let the database management system software take care of describing data structures for storing the data and retrieval procedures for answering queries.