

DATA MODEL

Types of Databases and Database Applications

- Traditional Applications:
 - Numeric and Textual Databases
- More Recent Applications:
 - Multimedia Databases
 - Geographic Information Systems (GIS)
 - Data Warehouses
 - Real-time and Active Databases
 - Many other applications

Data Model

A model is an abstraction process that hides superfluous details. Data modeling is used for representing entities of interest and their relationship in the database.

Data model and different types of Data Model

Data model is a collection of concepts that can be used to describe the structure of a database which provides the necessary means to achieve the abstraction. The structure of a database means that holds the data.

→ data types

→ relationships

→ constraints

Types of Data Models

1. High Level- Conceptual data model.
2. Low Level – Physical data model.
3. Relational or Representational
4. Object-oriented Data Models:
5. Object-Relational Models:

1. High Level-conceptual data model: User level data model is the high level or conceptual model. This provides concepts that are close to the way that many users perceive data.

2 .Low level-Physical data model : provides concepts that describe the details of how data is stored in the computer model. Low level data model is only for Computer specialists not for end-user.

3. Representation data model: It is between High level & Low level data model

Which provides concepts that may be understood by end-user but that are not too far removed from the way data is organized by within the computer.

The most common data models are

1. Relational Model

The Relational Model uses a collection of tables both data and the relationship among those data. Each table have multiple column and each column has a unique name .

Relational database comprising of two tables

Customer –Table.

Customer-Name	Security Number	Address	City	Account-Number
Preethi	111-222-3456	Yelhanka	Bangalore	A-101
Sharan	111-222-3457	Hebbal	Bangalore	A-125
Preethi	112-123-9878	Jaynagar	Bangalore	A-456
Arun	123-987-9909	MG road	Bangalore	A-987
Preethi	111-222-3456	Yelhanka	Bangalore	A-111
Rocky	222-232-0987	Sanjay Nagar	Bangalore	A-111

Account –Table

Account-Number	Balance
A-101	1000.00
A-125	1200.00
A-456	5000.00
A-987	1234.00
A-111	3000.00

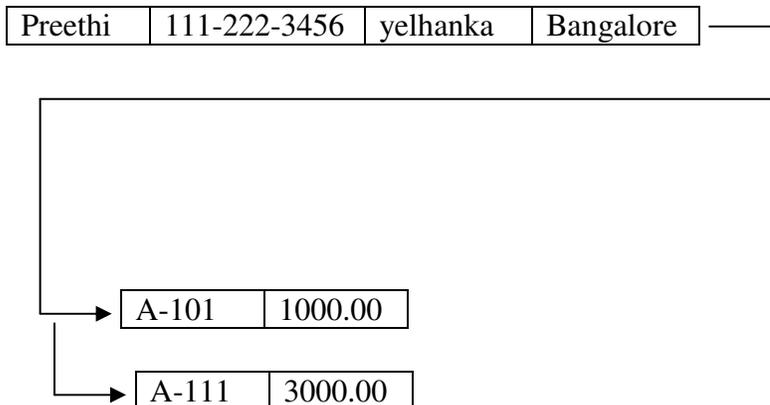
Customer Preethi and Rocky share the same account number A-111

Advantages

1. The main advantage of this model is its ability to represent data in a simplified format.
2. The process of manipulating record is simplified with the use of certain key attributes used to retrieve data.
3. Representation of different types of relationship is possible with this model.

2. Network Model

The data in the network model are represented by collection of records and relationships among data are represented by links, which can be viewed as pointers.



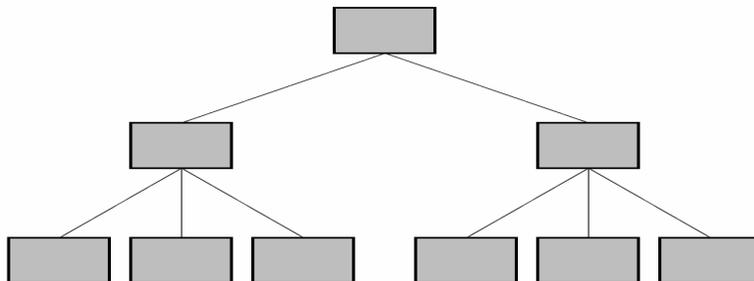
The records in the database are organized as collection of arbitrary groups.

Advantages:

1. Representation of relationship between entities is implemented using pointers which allows the representation of arbitrary relationship
2. Unlike the hierarchical model it is easy.
3. data manipulation can be done easily with this model.

3. Hierarchical Model

A hierarchical data model is a data model which the data is organized into a tree like structure. The structure allows repeating information using parent/child relationships: each parent can have many children but each child only has one parent. All attributes of a specific record are listed under an entity type.



Advantages:

1. The representation of records is done using an ordered tree, which is natural method of implementation of one-to-many relationships.
2. Proper ordering of the tree results in easier and faster retrieval of records.
3. Allows the use of virtual records. This result in a stable database especially when modification of the data base is made.

4 Object-oriented Data Models

- Several models have been proposed for implementing in a database system.
- One set comprises models of persistent O-O Programming Languages such as C++ (e.g., in OBJECTSTORE or VERSANT), and Smalltalk (e.g., in GEMSTONE).
- Additionally, systems like O2, ORION (at MCC – then ITASCA), IRIS (at H.P.- used in Open OODB).

5 Object-Relational Models

- Most Recent Trend. Started with Informix Universal Server.
- Relational systems incorporate concepts from object databases leading to object-relational.
- Object Database Standard: ODMG-93, ODMG-version 2.0, ODMG-version 3.0.
- Exemplified in the latest versions of Oracle-10i, DB2, and SQL Server and other DBMSs.
- Standards included in SQL-99 and expected to be enhanced in future SQL standards.

Source : <http://elearningatria.files.wordpress.com/2013/10/introduction.pdf>