DATA MODELLING

A model is a representation of 'real world' objects and events, and their associations.

Data models are used to show how the data is connected and stored inside a system i.e data models define how the logical structure of a database is modeled.

A data model comprises three components:

i. A **structural part**, consisting of a set of rules according to which databases can be constructed
ii. A **manipulative part**, defining the types of operation that are allowed on the data
iii. A **set of integrity constraints**, which ensures that the data is accurate.

Data models fall into three broad categories:

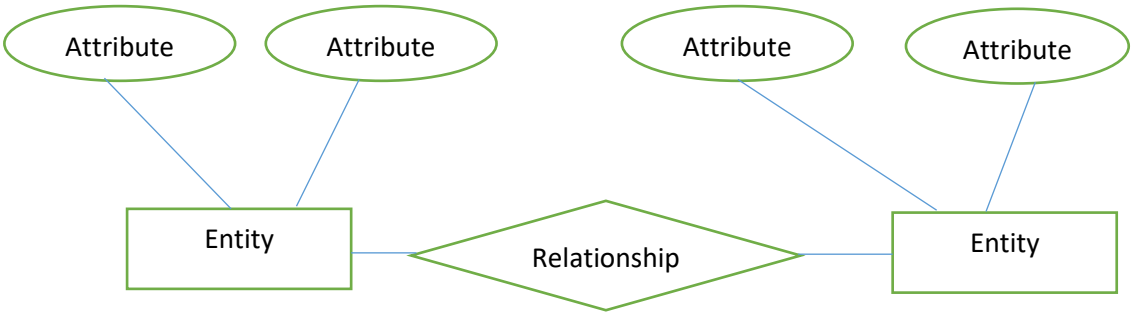
i. Object-based data models

Object-based data models use concepts such as entities, attributes, and relationships. An **entity** is a distinct object in the organization that is to be represented in the database. An **attribute** is a property that describes some aspect of the object to be recorded, and a **relationship** is an association between entities.

Some of the more common types of object-based data model are:

a) Entity–Relationship data model

The Entity relationship data model structure is based on the impression of the real world entities and the existing relationship between them.



b) Object-Oriented data model

An object-oriented data model consists of the data piece and the methods in the form of database management system instructions.

ii. Record-based data models

The record-based data model contains different kinds of record types. Each of the record types has a fixed length and a fixed number of fields.

The three principal types of record-based logical data model are:

a) Relational data model

The relational data model is based on the concept of mathematical relations. In the relational model, data and relationships are represented as tables, each of which has a number of columns with a unique name. Examples,

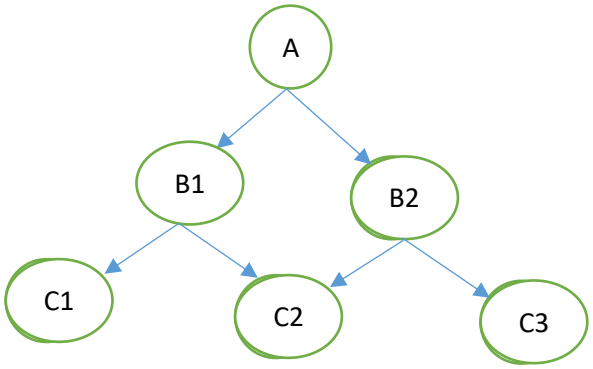
Branch (branchNo, street, city, postcode)

Staff (staffNo, fName, lName, position, sex, DOB, salary, branchNo)

b) Network data model

In the network model, data is organized more like a graph, and are allowed to have more than one parent node.

In this model data is more related as more relationships are established in this database model. Also, as the data is more related, hence accessing the data is also easier and fast. This data model is used to map many-to-many data relationships.

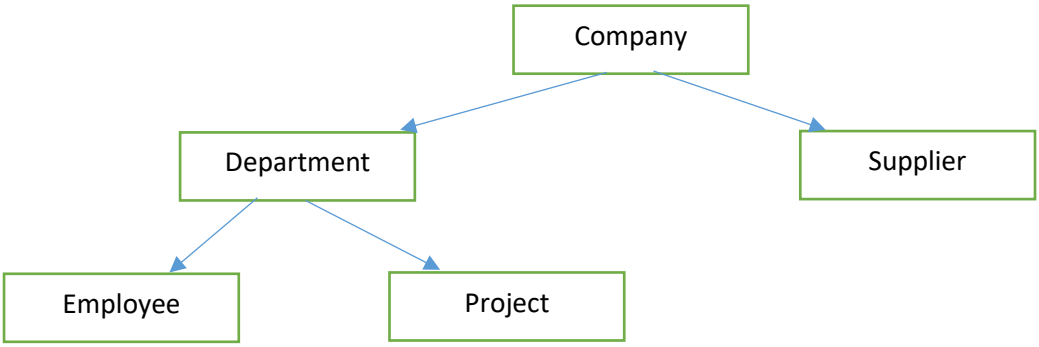


c) Hierarchical data model.

The hierarchical model organizes data into a tree-like-structure, with a single root, to which all the other data is linked. The hierarchy starts from the Root data, and expands like a tree, adding child nodes to the parent nodes. In this model, a child node will only have a single parent node.

This model efficiently describes many real-world relationships like index of a book, recipes etc.

In hierarchical model, data is organized into tree-like structure with one-to-many relationship between two different types of data, for example



iii. Physical data models

Physical data models describe how data is stored in the computer, representing information such as record structures, record orderings, and access paths.