

Define Hierarchical Model of Database. List out its advantages and disadvantages, too.

It is one of the oldest models of database design developed by IBM in the 1960s. In this model, the logical relationship is created among the data or files used in the database, in a hierarchical order. In this hierarchy, data are stored from the root, nodes or trunks and up to the leaves. It can be known as the top-down structure or upside-down tree structure of the database model. All records in hierarchy are called nodes and each node is related to other files or data in a parent-child relationship. Each parent record can have one or more child records but each child record will have only one parent record. Similarly, the top level record of the hierarchy is called root record.

Note: In the above figure, Software is the root. System and Application are the parent and others are child records of them. Without consulting to their respective parent record, we cannot use the child record. So, they are highly secure.

Advantages:

- i. Easiest model of database design
- ii. Child records are more secure, which makes the whole database secure
- iii. Searching fast
- iv. Helps to create 'One-to-many' relationship
- v. It helps to build complex system from simple components

Disadvantages:

- i. It is an old outdated database model
- ii. Impossible to modify the child records without touching parent record, so it is not flexible
- iii. It cannot handle 'Many-to-Many' relationship
- iv. It increases data redundancy because same data can be kept in different parents
- v. When parent node or parent record is deleted, all the children nodes will also be deleted automatically

Define Network Database Model. Write advantages and disadvantages.

This model is modified version of the Hierarchical Database Model developed by Charles Bachman. In this model, one child node can have more parent nodes, where in the hierarchical model, one child record would have only one parent node. By this design, the child node can be accessed from any parent nodes, which causes to increase the flexibility of database operation. It forms the multidimensional link structure among the records.

Advantages:

- i. More flexible
- ii. Reduces data redundancy because same data is not stored in different parent records.
- iii. Searching is faster by the multidirectional pointers, which means the records can be searched from any parent record.

Disadvantages:

- i. It is complex for modeling
- ii. It needs larger programs to handle the relationships
- iii. Large memory consumption
- iv. Less secure than hierarchical model because it allows multi-access facility of records

Define Relational Database Model. List out the advantages and disadvantages of it.

This is a very popular database model, in which the data are arranged or stored in two-dimensional tables called 'Relations'. The column of a table or relation is known as field or attribute and the row is called record or tuple. A field can give incomplete information or it gives a piece of information, where as a record gives complete information. It was developed by E.F. Codd. This model can handle 'Many-to-Many' relationship.

Advantages:

- i. Easy to understand
- ii. Easy to create 'Many-to-Many' relationships among the records.
- iii. Very less data redundancy or duplication
- iv. Normalization of database is possible
- v. Very easy to store and modify the records

Disadvantages:

- i. More complex due to many to many relationships
- ii. Too many rules make non-user friendly
- iii. Normalization of database require a good knowledge of normalization
- iv. Wrong relationships create wrong operation
- v. The function of Action queries cannot be recovered, even in the case of mistake

E.g. Relation: Names

S.N.	Name	Phone
1	Suman	5656565
2	Hira	5665666