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7. Database, Concepts and Types

- Database is a collection of related data and data is a collection of facts and figures that can be processed to produce information. Mostly data represents recordable facts. Data aids in producing information, which is based on facts. For example, if we have data about marks obtained by all students, we can then conclude about toppers and average marks. A database management system stores data in such a way that it becomes easier to retrieve, manipulate, and produce information.



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7.1 Characteristics

- **Real-world entity:** A modern DBMS is more realistic and uses real-world entities to design its architecture. It uses the behavior and attributes too. For example, a school database may use students as an entity and their age as an attribute.
- **Isolation of data and application:** A database system is entirely different than its data. A database is an active entity, whereas data is said to be passive, on which the database works and organizes. DBMS also stores metadata, which is data about data, to ease its own process.



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7.1 Cont.

- **Relation-based tables:** DBMS allows entities and relations among them to form tables. A user can understand the architecture of a database just by looking at the table names.

- **Consistency:** Consistency is a state where every relation in a database remains consistent. There exist methods and techniques, which can detect attempt of leaving database in inconsistent state. A DBMS can provide greater consistency as compared to earlier forms of data storing applications like file-processing systems.



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7.2 Different Types of Database

A database is basically a repository of data which is devised in order to support efficient data storage. In addition to data storage, a database also assists in retrieval and maintenance of data stored in it. There are many different types of databases.



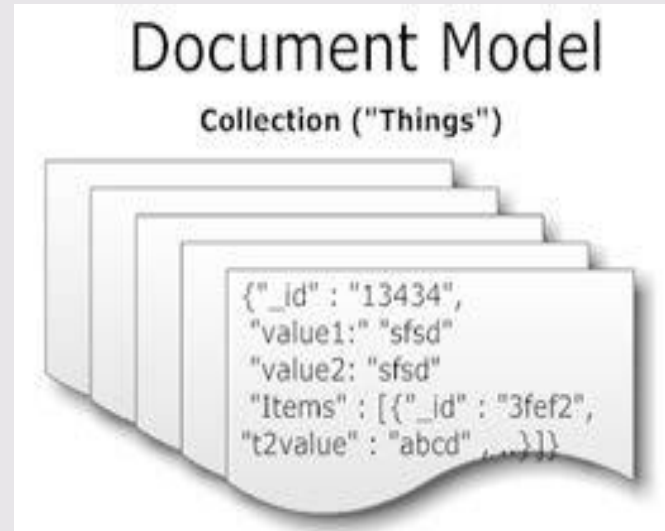
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7.2 Cont..

• **Document Oriented Database –**

This database is free from any type of strict schema. It does not store data in the form of data table, but in the form of text records. This type of database is suitable for storing dynamic data. CouchDB and RavenDB are examples of document databases. It is useful for an application which is document-based.





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7.2 Cont..

• Embedded Database –

An embedded database runs within an application, and therefore it does not run as a separate application. Unlike general purpose databases, this database is embedded as in line code or linked library. It saves time wasted on issues related to installations or maintenance. These types of databases are generally found in the set-top boxes, mobile phones, etc.





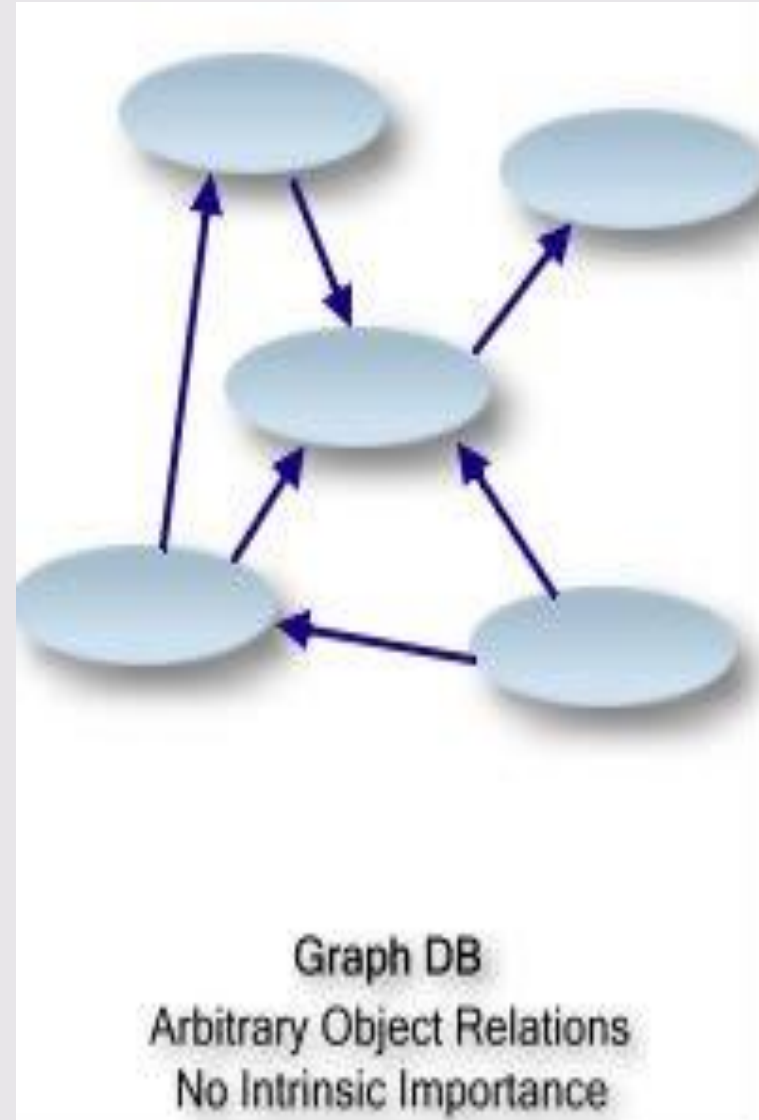
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Graph Database –

It is based on the relationship of resources with each other, and no particular resource has any essential importance on the other. These types of graphs help in storing data for a dynamic schema. It provides index free adjacency. In this graph database, each vertex works as a mini index for its adjacent elements.

7.2 Cont..





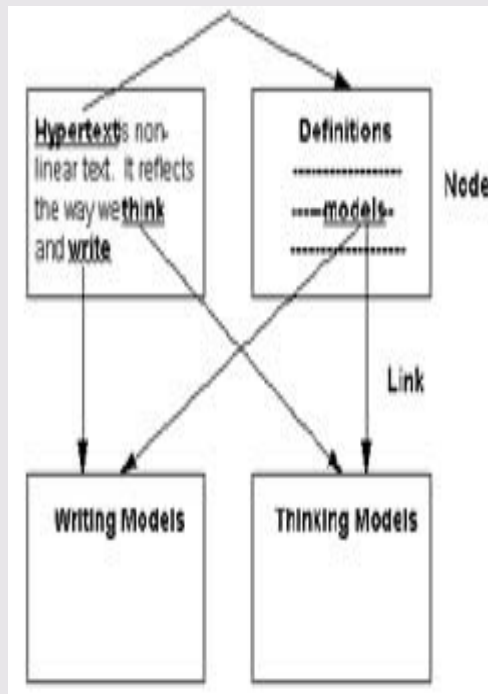
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7.2 Cont..

- **Hypertext Database –**

These types of databases are used for organizing a large sum of dissimilar information. The type of information is not devised for carrying out numerical analysis. An object is linked with any other object in a hypertext type of database. This kind of database system was invented by Ted Nelson. They are preferred for maintaining online encyclopedias.





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7.2 Cont..



- **Operational Database** – It contains data related to the operations going on in an organization or enterprise. Some of the main information it contains are regarding information of employees, data describing transactions, etc. This type of database is updated regularly.

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7.3 Uses of DBMS in Agriculture

Machinery, crop, livestock, and payroll records are all commonly maintained with database management systems. The success (or failure!) of your computerized agricultural record-keeping activities may depend in part on the database management system you use to keep your records.