Data

In general, **data** is any set of characters that has been gathered and translated for some purpose, usually analysis. It can be any character, including text and numbers, pictures, sound, or video. If data is not put into context, it doesn't do anything to a human or computer.

facts and statistics collected together for reference or analysis

the quantities, characters, or symbols on which operations are performed by a computer, which may be stored and transmitted in the form of electrical signals and recorded on magnetic, optical, or mechanical recording media.

things known or assumed as facts, making the basis of reasoning or calculation.

Use example of 470001 pin code

Examples of Data

- **Student Data on Admission Forms:** When students get admission in a college. They fill admission form. This form contains raw facts (data of student) like name, father's name, address of student etc.
- **Data of Citizens:** During census, data of all citizens is collected.
- **Survey Data:** Different companies collect data by survey to know the opinion of people about their product.
- **Students Examination data:** In examination data about obtained marks of different subjects for all students is collected.

Information

Information is stimuli that has meaning in some context for its receiver. When information is entered into and stored in a computer, it is generally referred to as data. After processing (such as formatting and printing), output data can again be perceived as information.
When information is packaged or used for understanding or doing something, it is known as knowledge.

Use example of pin code

Examples of Information

- **Student Address Labels:** Stored data of students can be used to print address labels of students.
- **Census Report:** Census data is used to get report/information about total population of a country and literacy rate etc.
- **Survey Reports and Results:** Survey data is summarized into reports/information to present to management of the company.
- **Result Cards of Individual Students:** In examination system collected data (obtained marks in each subject) is processed to get total obtained marks of a student. Total obtained marks are Information. It is also used to prepare result card of a student.
- **Merit List:** After collecting admission forms from candidates, merit is calculated on the basis of obtained marks of each candidate. Normally, percentage of marks obtained is calculated for each candidate. Now all the candidates names are arranged in descending order by percentage. This makes a merit list. Merit list is used to decide whether a candidate will get admission in the college or not.

Comparison Chart

Basis of Distinction	Data	Information
Definition	Data are raw numbers or other findings which, by themselves, are of limited value.	Information is data that has been converted into a meaningful and useful context.
Example	Ticket sales on a band on tour.	Sales report by region and venue – tells us which venue is most profitable.
Significance	Data by itself alone is not significant.	Information is significant by itself.
Etymology	Data is a plural of datum, which is originally a Latin noun meaning "something given." Its origin dates back to the 1600s.	Its origin dates back to the 1300s.

Key Differences

- Data is the input language for a computer and information is the output language for human.
- Data is unprocessed facts or mere figures but information is processed data which has been made sense of.
- Data does not depend on information but information depends on data and without it, information cannot be processed.
- Data is not specific but information is specific enough to generate meaning.
- Data is the raw material that is collected but information is a detailed meaning generated from the data.

What is a Database?

Database is a systematic collection of data. Databases support storage and manipulation of data. Databases make data management easy

A database is simply an organized collection of related data, typically stored on disk, and accessible by possibly many concurrent users.

Use phone pic.

Dbms

A database management system (DBMS) refers to the technology for creating and managing databases. Basically, DBMS is a software tool to organize (create, retrieve, update and manage) data in a database.
The main aim of a DBMS is to supply a way to store up and retrieve database information that is both convenient and efficient.
DBMS is a collection of inter-related data and set of programs to store & access those data in an easy and effective manner

Why Use DBMS?

- To develop software applications In less time.
- Data independence and efficient use of data.
- For uniform data administration.
- For data integrity and security.
- For concurrent access to data, and data recovery from crashes.
- To use user-friendly declarative query language.

Where is Database Management System (DBMS) being Used?

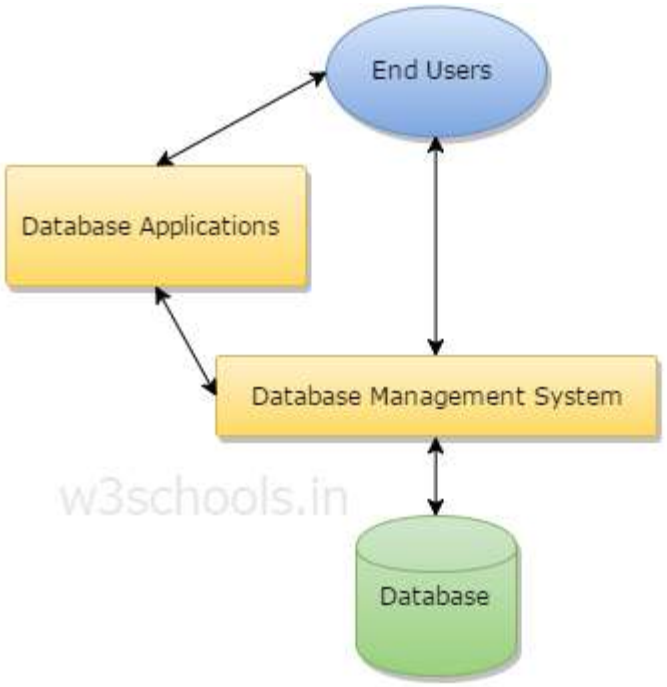
- Airlines: reservations, schedules etc
- Telecom: calls made, customer details, network usage etc
- Universities: registration, results, grades etc
- Sales: products, purchases, customers etc
- Banking: all transactions etc

Advantages of DBMS

A DBMS manage data and has many advantages. These are:

- Data independence: Application programs should be as free or independent as possible from details of data representation and storage. DBMS can supply an abstract view of the data for insulating application code from such facts.
- Efficient data access: DBMS utilizes a mixture of sophisticated concepts and techniques for storing and retrieving data competently and this feature becomes important in cases where the data is stored on external storage devices.
- Data integrity and security: If data is accessed through the DBMS, the DBMS can enforce integrity constraints on the data.
- Data administration: When several users share the data, integrating the administration of data can offer major improvements. Experienced professionals understand the nature of the data being managed and can be responsible for organizing the data representation to reduce redundancy and make the data to retrieve efficiently.

Components of DBMS



Components of a Database Management System

- Users: Users may be of any kind such as DB administrator, System developer or database users.
- Database application: Database application may be Departmental, Personal, organization's and / or Internal.
- DBMS: Software that allows users to create and manipulate database access,
- Database: Collection of logical data as a single unit.

(tree structure)

Hierarchical Model in DBMS

Hierarchical model is a data model which uses the tree as its basic structure. So, lets define the basics of the tree.

Basics of Tree :

- A tree is a data structure that consists of hierarchy of nodes with a single node, called the **root at highest level**.
- A node may have any number of children, but each child node may have only one parent node on which it is dependent. Thus the parent to child relationship in a tree is one to many relationship whereas child to parent relationship in a tree is one to one.

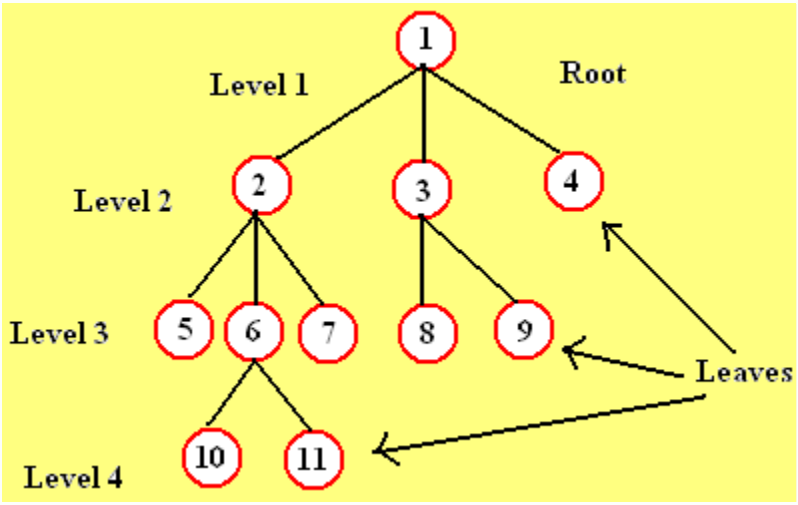


Figure 1

- In figure 1, the node at level 1 is called the root node and the nodes at that has no children are called **leaves.** For example, node 4, 5, 7, 8, 9, 10 and 11.
- Nodes that are children of the same parent are called **siblings**. For example, nodes 2, 3, 4 are siblings.
- For any node there is a single path called the **hierarchical path from the root node**. The nodes along this path are called that nodes **ancestors**.
- Similarly for a given node, any node along a path from that node to leaf is called its **descendent**.
- For example, suppose we have to find out the hierarchical path of node 10, then it will be 1→2→6→10 and the ancestors of node 10 are 1, 2 and 6.
- The **height of tree** is the number of levels on the longest hierarchical path from the root to a leaf. The above tree has a height= 4.
- A **tree is said to be balanced** if every path from the root node to a leaf has the same length.

Figure 2 shows a **balanced and an unbalanced tree**.

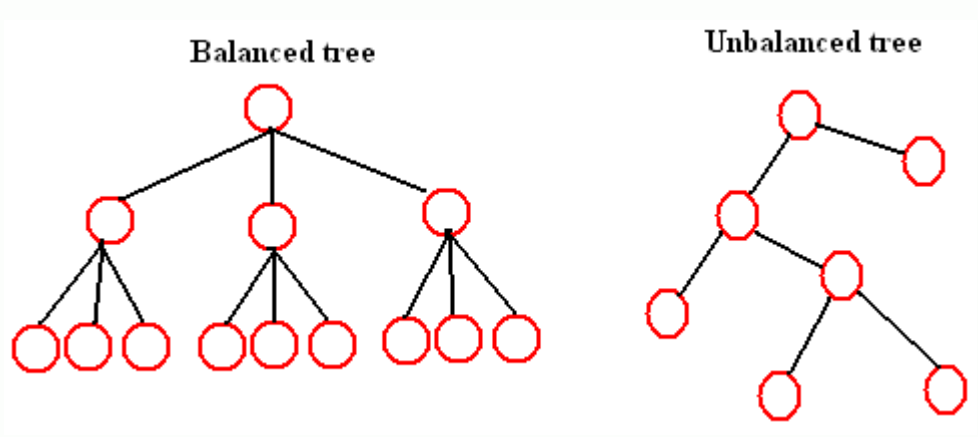


Figure 2

A **binary tree** is one in which each node has not more than two children. Figure 3 shows a binary tree

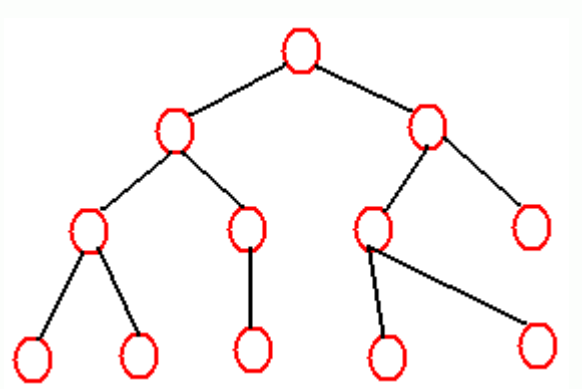


Figure 3

Example of Hierarchical Model :

- **Figure 4 shows** a data structure diagram for a tree representing the STUDENT, FACULTY and CLASS.
- The root node chosen is faculty, CLASS as a child of faculty and STUDENT as a child of class.
- The cardinality between CLASS and FACULTY is one to many cardinality as a FACULTY teaches one or more CLASS.
- The cardinality between a CLASS and a STUDENT is also one to many cardinality because a CLASS has many STUDENTS.

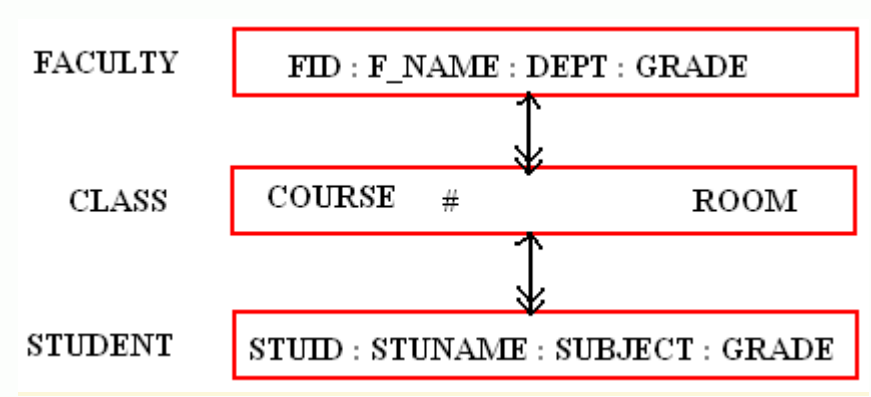
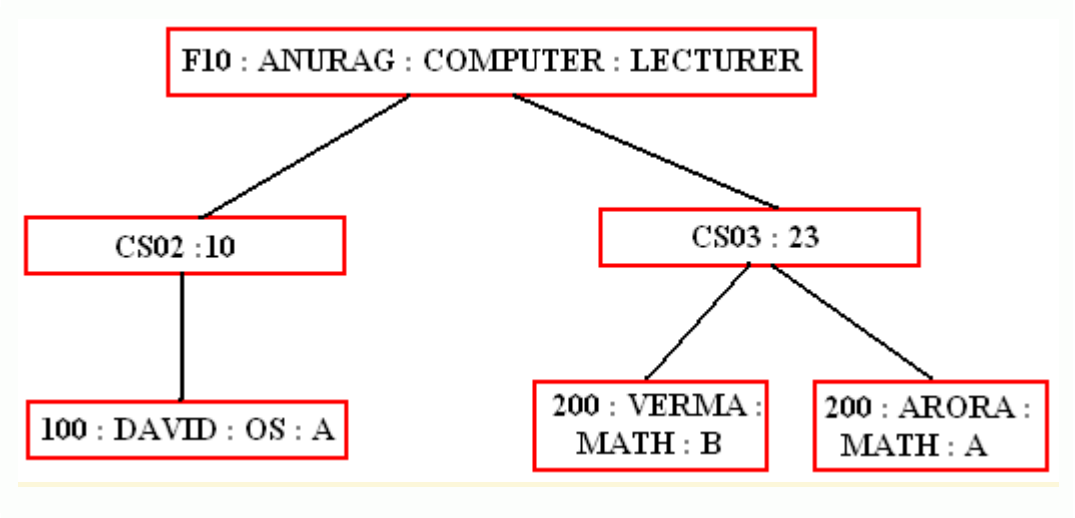


Figure 4

Figure 5 shows an **occurrence of the FACULTY-CLASS-STUDENT**.



Plex structure

Network Database or Network Model in DBMS

The network database or network model uses the plex structure as its basic data structure. A network is a directed graph consisting of nodes connected by links or directed arcs. The nodes corresponds to record types and the links to pointers or relationships. All the relationship are hardwired or pre-computed and build into structure of database itself because they are very efficient in space utilization and query execution time.
The network data structure looks like a tree structure except that a dependent node which is called a child or member, may have more than one parent or owner node.All figure shows the network model –

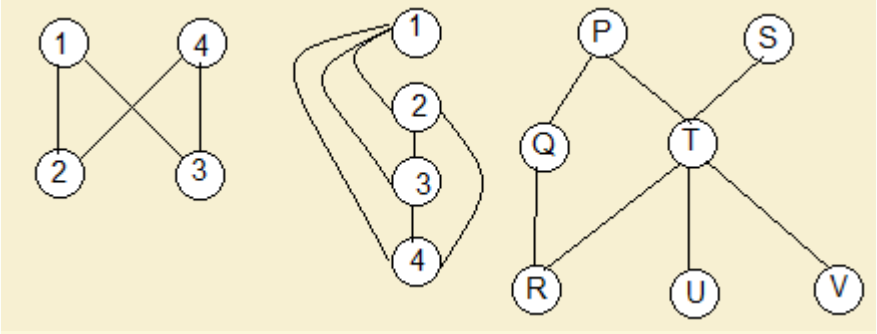


Figure 1

A diagram called as **Bachman Diagram** is used to represent a network data structure. The nodes in the network are replaced by rectangles that represent records and links are shown by lines connecting the rectangles.

A plex structure with two record types is shown / Example of Network Database :

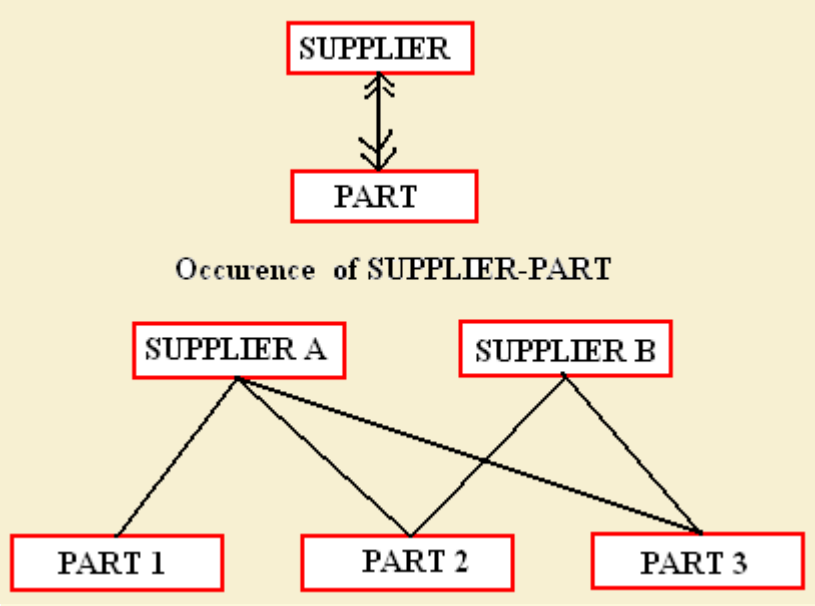


Figure 2