DBMS

Data: Data is the raw material that can be processed for any computing machine.

Example :- Employee name, Product name, Student name, Marks of the student, any number, image.

Information: It is the data that has been converted into more useful or intelligable form eg. report card sheet.

- **Why we need Information ?**

1]. To gain knowledge about the surroundings.
2]. To keep the system upto date.
3]. To know about the rules and regulation of the society.

Knowledge: Human mind purposefully organise the information and evaluate it to produce knowledge eg 238 is a data and Marks of student is information and the hardwork require to got mark is knowledge.

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              Knowledge
            /           \
    Fact Based      Heuristic Based
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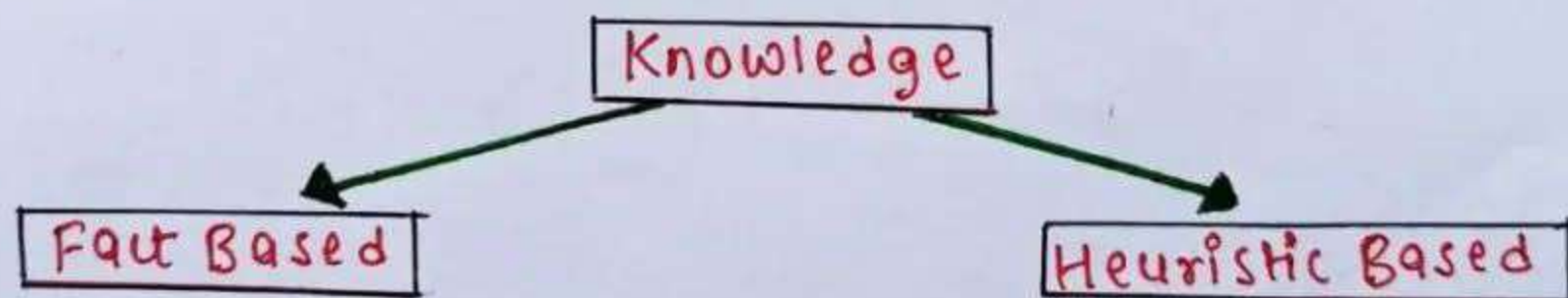
1]. **Fact Based :-** The knowledge gain from fundamental & through experiment.

2]. **Heuristic Based :-** It is the knowledge of good practice and good judgement like hypothesis.

Difference between Data and Information

DATA	INFORMATION
1]. Data is the raw fact.	1]. It is the processed form of data.
2]. It is not significant to a business.	2]. It is the significant to a business.
3]. Data are Atomic level piece of Information.	3]. It is a collection of data.
4]. Data doesnot help in decision making.	4]. It help in decision making.
5]. Examples :- product name, name of student.	5]. Example :- Report card sheet.

Database : The related information when placed in an organised form makes a database or an organised collection of related information is known as <u>database.</u>

Example :- Dictionary, Telephone directory, Mobile contact.

Operation perform on Database

1]. Insertion
2]. Updation
3]. Deletion
4]. Retrive
5]. Sorting.

Difference b/w computerised database and manual database.

Traditional file System :

File System :- A File system is the method of storing and Organising the computer files and the data they contain to make it easy to find and access them.

Characterstic of Files System :

1]. It is a group of files for storing the data of an Organisation.

2]. Each file is independent from one another.

3]. Each File is called a flat files.

4]. Files are design by using the program written in Programming language such as, C++.

Disadvantages of File Processing system :

1]. Seperated and isolated data.

2]. Duplication of data :- It cost time and money.
   • It takes up additional storage space.
   • It can lead to loss of data integrity.

3]. Data dependencies :- Files and record were describe by specific physical format that were code in the application program by the programs.

4]. Difficulty in representing the data from the user point of view.

5]. Data Security :- The security of data is low in the files based system because the data is maintain in a flat file is easy accesible.

6]. Transactional problems :- This system does not satisfy transactional properties called ACID properties → A Atomicity, C → consis , I → Insolation, D → Durability.

7]. Concurrency Problem :- When multiple user access a same piece of data at a same interval of time then it is called a concurrency of system. When two or more user read the data simuntaneosly then their is no problem but when they like to update the file simuntaneously. It may result in a problem.

Building Block of Database :-

1]. Column / fields.
2]. Row / tuple / Record
3]. Tables.

DBMS (Data Base Management System) :

It is the software system that allows the user to define, to create and maintain the database and provide control access to the data.

Application of Database :

1]. Library system
2]. Banking system
3]. ATM

Database :- MySql, Oracle, Sql server, DB2, Microsoft Access.

Components of DBMS :

★ Hardwere :- The hardwere is the actual computer system used for keeping and accessing the database conventional DBMS hardwere consist of secondary storage devices such as harddisk. Database run on the range of machine from micro computers to main frames.

★ Softwere :- Softwere is the actual DBMS between the physical Database and the user of the system. All the request from the user for accessing the database are handled by DBMS.

★ Data :- It is an important component of the database management system. The main task of DBMS is to process the data. Databases are used to store the data, retrived, and updated to and the from of database.

★ |User :-| There are no. of users who can access or retrive the data on demand using the application and the interfaces provided by the DBMS.

The Users of the database can be classified into the following groups.

- Naive Users
- Sophisticated users
- Online users
- Specialized users
- Application programmers
- DBA — Database Administrator

- |Naive users :-| Those user who need not be aware of the presence of the database system. They are the end users of the database who work through a menu driven application programs, where the type and range of response is always indicated to the users.

- |Sophisticated user :-| They are those user who interact with the system without writting the program Instead they form their request in database query language.

- |Online user :-| Those users who may communicate with database directly through an online terminal or indirectly through user interface and application program.

- |Specialized user :-| Specialized users who write specialized database applications that do not fit into the fractional database Processing framework.

- **Application Programmer :-** The application programmer users who are responsible for developing the application programs or user Interface. The application programs could be written in high level language. Example :- Java, .net, php etc.

- **Database Administrator (DBA) :-** It is a person or the group incharge of implementing the database system within the organization. The DBA has all the privileges allowed by the DBMS and can assign or remove the privileges from the users.

★ **Procedure :**

Disadvantages of DBMS :-
- Complexity
- Size
- Performance
- Higher impact of failure
- Cost of DBMS

Differentiate b/w file management system & DBMS.

- **Master File :-** Master File are those file which remain static. There is no change.

- **Transaction File :-** Transaction file are those file which is dynamic in nature. We can made changes.

- **Instances :-** The situation where a data or Information is stored in the database at a particular moment of time is called an instances.

- **Schema :-** The overall design of the database is called schema OR Description of database.

- **Subschema :-** It is the subset of the schema and inherit the same property that a schema has. It gives the users a window through which he/she can view only that part of database which is of insert to him.

Architecture of DBMS:-

There is 3 level.
1]. External Level
2]. Conceptual Level
3]. Internal Level.

Objective of three level Architecture or sparc 3 level Architecture :

The objective is to seperate each users view of the data from the way the database is physically represented.
There are several reasons.
1). The internal structure of the database should be uneffected while changes to the physical aspects of storage.
2). The DBA should be able to change the conceptual structure of the database without affecting all other user.

1]. **External level / view level :-** This level describes that part of the database that is relavent to each users. This level insulates the users from the details of conceptual and the internal level.

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2]. Conceptual level / logic level :- This level describe what data is stored into the database and the relationship among the data.

It represents :-

a). All the entities, attributes and there relationships.

b). The constraints on the data.

c). Security and integrity information.

3]. Internal level / storage level :- It is the physical representation of the database on the computer. This level describe how the data is stored in the database. It covers the data structure and file organisation used to store the data on storage devices.

Schemas :-

1). External Schema

2). Conceptual Schema

3). Internal Schema.

1]. External schema :- The external view is described by means of schema called <u>External schema</u>. That corresponds to differents view of the data.

2]. Conceptual schema :- The conceptual view is defined by conceptual schema, which describes all the entities, attributes and their relationship with the integrity constraints.

3]. Internal schema :- Internal level is defined by internal schema, which is a complete description of the internal model. There is only 1 conceptual schema and 1 internal schema per database and more than 1 external schema.

Schema is also known as <u>Intension</u>.

Note:- Instance/Extension of database.

Mapping between the levels :-

1). External/conceptual Mapping .
2). Conceptual/Internal Mapping.

1] External/conceptual mapping :- Each External schema is related to the conceptual schema by external conceptual Mapping. This Mapping gives the correspondance among the records and the relationships of the external & conceptual views. There is a mapping from a particular Logical record in the external view to one or more conceptual record in the conceptual view.

2] Conceptual/Internal Mapping :- Conceptual scheme is related to Internal schema by Conceptual Internal mapping. Mapping between the conceptual and Internal level specifiy the method of deriving the conceptual Record from physical database.

Data Independence :-

1). Logical data independency.
2). Physical data independency.

1] Logical data Independency :- It indicates that the conceptual schema can be changed without effecting the existing external schema. The changes would be absorbed by the mapping between external and conceptual level.

2]. Physical data Independency :- It indicates that the physical storage structure or devices can be changed without effecting the conceptual schema. The change would be absorbed by the conceptual Internal mapping.

→ Logical data independency is much more difficult to achieve than physical data Independency as it require the flexibility in the design of the database and programmer has to see the future requirement or modification in the design.

★ Limitation of File Processing system :-

1]. Separated and Isolated Data :- To make a decision a user might need data from two separate files. First the files were evaluated by analysts and programmers to determine the specific data required from each file and the relationship between the data and then application could be written in a programming language to process and extract the needed data.

2]. Difficulty in representing data from the user view :-
To create useful application for the user, often data from various files must be combined.
In file processing it was difficult to determine relationships between isolated data in order to meet user application.