UNIT ⇒ '1'

Introduction

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Database :-

A database is an organised collection of facts. In another word we can say that it is a collection of Information arranged & presented to serve an [illegible] purpose.

- **An Example :-**
  1) Dictionary, where words are arranged alphabetically.
  2) Telephone Directory, where subscriber names are listed in an alphabetic order.
  3) The box of cards with names & address written as a mailing list, then the box & its contents form a mailing database.

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Suppose if I want the names, addresses & phone numbers of your friends. Then it is essential to arrange the names in some order, may alphabetically, to make the search easy. However, as the number of friends gets large, managing the database manually becomes difficult.

A database management system package is a helpful tool for such a situation.

Why Database

Any organization, be it a Bank, Manufacturing Company, Hospital, University or a Government Department, requires huge amount of data in some form or the other.

All such organisations need to collect data, manipulate them & store them for future use.

All such type of organizations require data for a number of purposes, say;

a) Preparing Sales reports.

b) Forecasting Sales.

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(3) Preparing O/P reports :

Thus, we can say that data are very vital aspects of companies. The amount of data used these days in organizations can be measured in the range of some billions of bytes or characters.

- **File** :- It consists of discrete record have length 1 to 4000 characters (or bytes).

  Or

  File is the collection of all related records.

- **Record** :- The collection of field is called a Record.

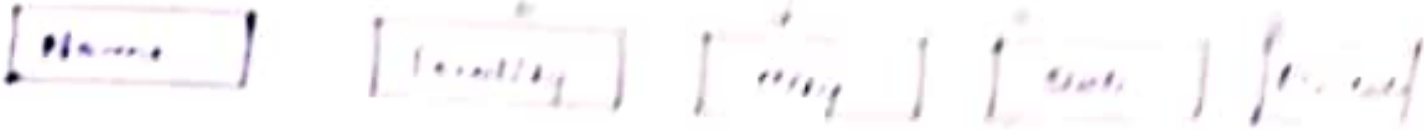
- **Field** :- The smallest piece of meaningful information for a file is called a data item or field.

- **Key Field** :- Emp. code & Address.

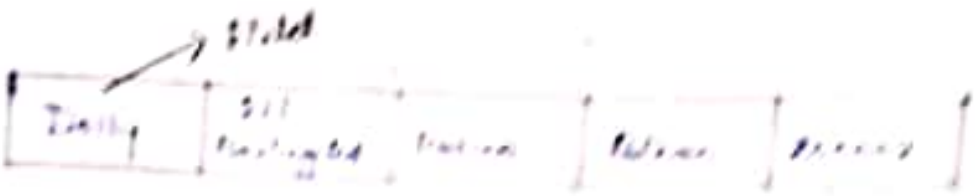
Scanned with CamScanner

Example :-

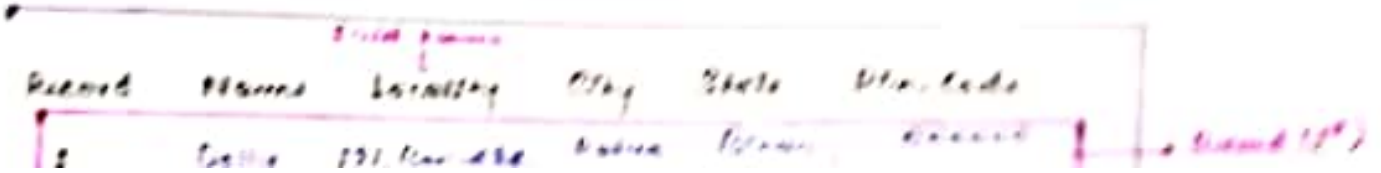
Field :-



Record :-



File :-



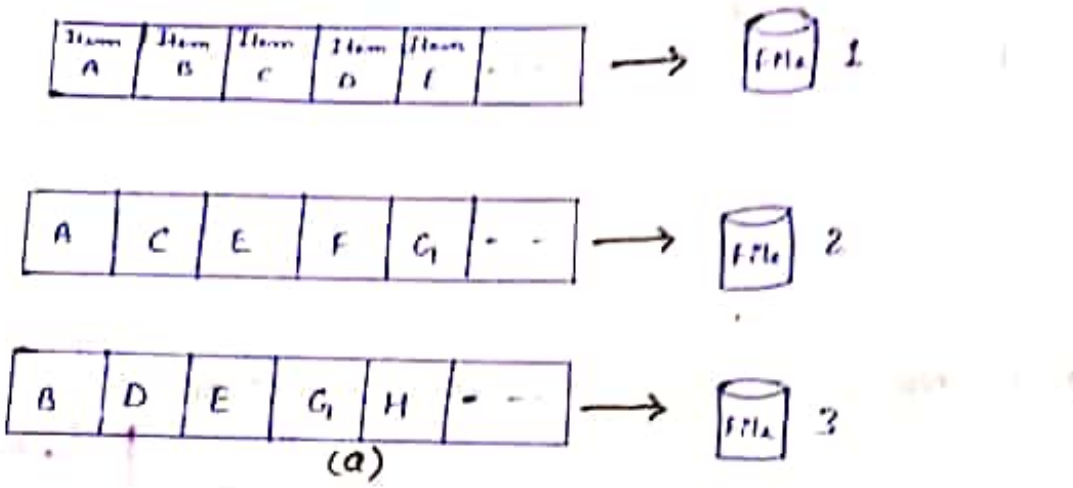
File based Systems uses a database approach.

or

File system & Related Problems:

Typical Record

Three separate files



* File System Related Problem

1) Each files requires separate processing programs.

When separate department in an organisation maintain files that contain duplicate information. That would result in data duplication & hence the change of error see in example → B, D, E, G, H.

In a file processing systems the system store permanent record in various file.

But in case of database systems there exist a collection of inter-relati file.

Supported by conventional O.S
Such as:- Ms DOS

But in a database may be generated automatically or it may be computerised. The computerized database may be creates & maintained by DBMS.

DBMS (Database Management System) :-

DBMS is a S/w system that allows access (पहुँच) to data contained in a database.

The objective of the DBMS is to provide a convenient & effective method of Defining, Storing & Retriving Information contained in the database.

The data contained in a DBMS Pack can be accessed by multiple application programs user.

Application packaged such as SQL, Server, Oracle, M are some communcially available DBMS packages.

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Advantages of DBMS :-

DBMS got following advantages:-

a) It represents complex relationships among different data items.

b) It has a effective control on data redundancy (repeatation)

c) It enforces user-defined rules to ensure the integrity of data in a table form.

d) It has Data Dictionary (content all the information regarding data) is the storage of information pertaining to data field & data manipulation.

e) It ensures that data can be shared across all applications.

f) It enforces data access authorization & has different interfaces through which user can manipulate data.

Disadvantages of DBMS :-

1) Cost :- DBMS is considerably costlier & the cost does not justify acquisition for a limited work.

In case of Data :-)

In the case of   the data can be recovere

Back up & recovery operations are fairly complex in a DBMS.

Data Model :-)

Data Model is a description of stru ... re of a database.

Data Model is used for representing entities (association between two entities) their relationship in a database.

In a database, a group of similar information data, which is of interest to an organisation called an Entity.

Each entity have a no. of ch... teristics. The characteristics of an entity are co... Attributes.

Ex:-

Employee ⟶ entity.

characteristics ~~have~~ add, name, ph.no., balance dues ⟶ A

* Types of DBMS :-)

There are various types of DBMS

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a) HDBMS (Hierarchical)

b) NDBMS (Network)

c) RDBMS (Relational)

HDBMS :-)

DBMS based on hierarchical data model are known as HDBMS

Hierarchical data model was developed by IBM in 1968.

Ex → IMS (Information Management System) by IBM.

Ex → System 2000.

This model is like a tree with the record forming the nodes & fields forming the branches of the tree.

"Hierarchical DBMS follows a tree structure where the roots highest-level & leave at the lowest level."

A tree structure may establish one-to many relationship

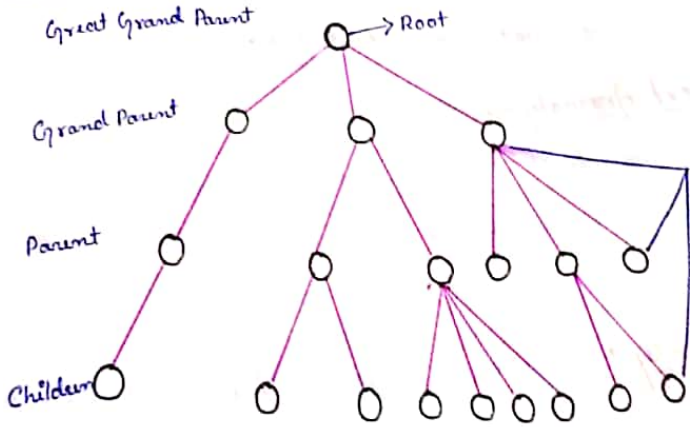
Ex:→

Great Grand parent is root of the structure. Parent may have many children exhibiting one to many relationship.

root → Great Grand Parent.

Node → Grandparent, Parent, Children.

(pend upon
the root)



(Basic Structure of Hierarchical Data

Advantages of Hierarchical Model

It is simple, straight toward & ma
Implementing record relationship.

It is useful when there is som
in the database.

* Disadvantages :-)

1) It cannot represent all the relationships that in the real world.
   i.e. not many to many.

2) Insert Anomaly -> Not insert data about a dependent, if it's superior record is n This is because a node cannot exist a root.

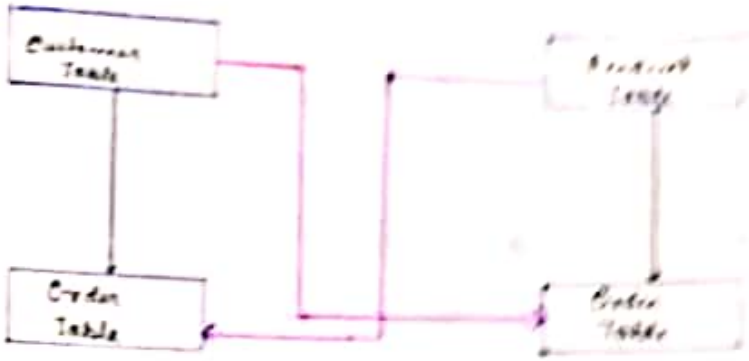
3) Delete Anomaly :-) Deletion operation in a hiera data base leads to loss of many usef information

4) Update Anomaly :-) The customer might be st being in Bombay at one place & in other places.

b) Network DBMS (NDBMS) :-)

In Network DBMS database structures, a re can have a multiple owners.

For ex:-



In customer's order processing application, orders are owned by both customers & sales by products.

The N/w data model is similar to the hierarchical model, except that an entity can have more than one parent.

Ex:-

A member of a N/w database can have multiple owners.

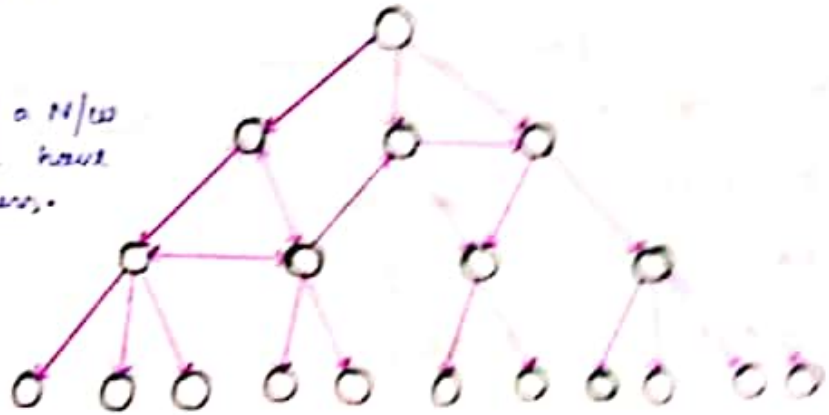


Fig:- A N/w structure that allows 1:1 (one:one), 1:M (one:many), or M:M (many:many) relationships among entities.

IDMS :-> (Integrated Data Management System) & SYSTEM 2000 are examples of N/w DBMS

Relational DBMS (RDBMS) :-

In a Relational Data base Model data is o
in the form of rows & columns simila
table.

Table —called→ Relation.
Rows ⟶ Tuples.
Columns ⟶ Attributes.

For ex —:

There is an employee-service relation th
the entity Employee by the attributes
Name, & Years of Service (Year).

EMP. Service Relation

Attributes → Emp-Code	Name	Year
Tuples → 2113	Abhay Mishra	1
2114	Manoj	3
2115	Kuldeep	2
2116	Dolly Jha	6

Ex- of RDBMS → Oracle, SQL, MS-access
all example of RDBMS

A Database is a collection of information that is organized so that it can be easily accessed, managed & updated.

In one view of database can be classified according to types of content bibliography further numeric & images.

Advantages of N/N Model :-

N/w Model is useful for representing such which have many to many relationships.

Problem of inconsistency (असंगत) does not exist in a model because a data element is physically located at just one place.

Searching a record is easy since there are multiple access paths to a data element.

Disadvantages :-

All the records are maintained using pointers hence whole the database structure

b) Insertion, Deletion & updation of record would require pointer adjustments.

* RDBMS :->

1) It is much easy to use.

2) It is concerned with data not structure.

3) It is used Primary key or Composite key filled to implement record not pointers.

4) It is very useful for representing most of the real world objects & the relationship among them.