

1. What is Data Base System?

Data Base System :-

A data base is an organized collection of data.

A relational database more restrictively, is a collection of schemas, tables, queries, reports, views and other elements.

In general, the data are organized to represent significant parts of reality in such a way that it supports process needing this information.

2. Characteristics of a good database are :-

i) Should be able to store all kinds of data that exists in this real world.

ii) Should be able to relate the entities/ tables in the database by means of a relation. i.e; any two tables should be related.

- iii) Data and application should be isolated. Because database is a system which gives the platform to store the data and the data is the one which allows the database to work.
- iv) There should not be any duplication of data in the database.
- v) A multiple user should be able to access the same data base, without affecting the other user.
- vi) Database should also provide security i.e; when there are multiple users are accessing the database, each users will have their own levels of rights to see the database.
- vii) Database should also support ACID property, i.e; while performing any transactions like insert, update and delete, database makes sure that that real purpose of the data is not lost.

3) What is Database Management System?

Database management system :-

A Database Management System (DBMS) is a piece of software that provides services for accessing a database, while maintaining all the required features of the data.

Commercially available Database management systems in the market are Inbase, FoxPro, IMS, and Oracle, MySQL, SQL servers and DB2 etc.

DBMS is an intermediate layer between programs and the data. Programs access the DBMS, which then accesses the data.

There are different types of DBMS ranging from system that run on personal computers to huge system that run on mainframes.

The following are main examples of database application:

- Computerized Library System.
- Automated teller machines.
- Flight reservation system.

#### 4. Advantages of DBMS:-

The database management system has promising potential advantages. which are explained below:-

1. Controlling Redundancy:-

2. Integrity can be enforced:-

Integrity of data means that data in database is always accurate such that incorrect information correct be stored in data base.

3. Inconsistency can be avoided:-

4. Data can be shared:-

5. Standards can be enforced:-

Since DBMS is a control system, so standard can be enforced easily may be company level. Department level, National level or International level.

6. Restricting unauthorized access:-

When multiple users shares a database it is likely that some users information in the database.

7. Cost of developing and maintaining system is low.

## • Disadvantages of DBMS :-

The disadvantages of the database approach are summarized as follows :-

### 1. Complexity :-

The provision of the functionality that is expected of a good DBMS makes the DBMS an extremely complex piece of software.

### 2. Size :-

The complexity and breadth of functionality makes the DBMS an extremely large piece of software, occupying many megabytes of disk space and requiring substantial amounts of memory to run efficiently.

### 3. Performance :-

The DBMS is written for many applications rather than just one. So the performance of the DBMS is not good.

### 4. Higher impact of failure :-

### 5. Additional Hardware Costs :-

### 6. Cost of DBMS :-

The cost of DBMS varies significantly depending on the environment and functionality provided.

Introduction of DBMS :- Due to rapid use of database as a corporate resources and steady growth of information technology in computerisation in last 20 years, all the organizations and the institute have realize the value of information as a resources. As present information industry has felt the crash of prices of data storage & transmission devices, database technology is really in the driver seat of the whole information technology. In all walks of life and in all areas of industry technology, databases will change the realms of what it is possible for man to do.

DBMS :- The primary goal of a DBMS is to provide an environment that is both convenient and efficient to use in retrieving and storing database information. If data is to be shared among several users, the system must avoid possible anomalous results.

DATA, Information Knowledge :- A collection of uncorrelated facts an event, object or an entity is called data and any data at a particular time is an information. In the strict sense, data refer to the values physically recorded in the database & the information refer to the conclusion (meaning drawn out by same user).

Data processing :- DP is a term mostly associated with business and commercial work.

But it does involve scientific data processing. Data processing varies from being completely manual to those which rely on the use of large computers and according can be:

- i) Manual
- ii) Semi-manual
- iii) Mechanical
- iv) Electronic

Database administrator :- (DBA) One of the main reasons for having DBMS is to have central central of both data and programs accessing that data. The person having such central over the system is called the database administrator.

Define the short term :-

- (i) Metadata :- Data about data is called Metadata.

Field: The smallest unit of data that has meaning to it's users is called data item. If has traditional been called a field.

Record: Collection of field, is called record.

Database: Database is a collection of correlated data or information.

Files: Information stored in specification manner is called file.

Hardware: The physical storage of data required for data base maintenance is hardware. The hardware portion of the system consists of

★ The secondary storage volumes.

★ The processor and associated main memory that are used to support the execution of the database software.

Advantages of DBMS - ① controlling Redundancy: duplication, wastage of

storage space, inconsistent

② Restricting Unauthorized Access

③ Providing persistent storage for program objects and data structures - object-oriented

database, ODBB are compatible with C++, Java.



④ Permitting inferencing and action using deduction Rules :- education database system (declarative language), active. data base system (event - conditional - action).

⑤ Providing Multiple User Interfaces.

⑥ Representing complex Relationships among Data.

⑦ Providing Backup and recovery.

Users :- In DBMS, generally three broad class of users are considered, Application programmers, End Users and DBA - Database Administrator.

Application Programmers :- Application programmer class develops the application programs that use the database language such as C, COBOL, PL/I etc. These programs can manipulate the database in all the possible ways.

End users :- This class access the database from a terminal using a query language provided as an integral part of the system or through application program developed by application programmer.

Database managers :- Database typically require a large amount of storage space. Corporate database are usually measured in terms of gigabytes or for the present database, terabytes of data.

Since the main memory of computers cannot store this information.

Users - ① Specialized Users :- sophisticated users writes specialized

database application that do not fit into the traditional data processing framework. For example - graphics data and audio data.

② Sophisticated Users :- sophisticated users interact with the system without writing program. Instead they form their requests in a database query language.

③ Naive Users :- Unsophisticated users interact with the system by invoking one of the permanent application programs that have been written previously.

Example :- A bank teller who needs to transfer a specified amount from account A to account B would invoke a program to update the account from which the money is being transferred, and the account to which the money is to be transferred. This class of users is also called end users.

Data Models :- An integrated collection of concepts for describing and manipulating data relationships between data and constraints on the data in an organization is called Data Model.

Data model should provide the basic concepts and notations that will allow database designers and users to communicate their understanding of organizational data.

Depending on the levels of data we are modeling we have divided models into three categories :-

- 1- Object Based Data Model
- 2- Record Based Data Model
- 3- Physical Data Model

A data model can be thought of as comprising three components :-

- 1) A structural part consists of a set of rules according to which database can be constructed.
- 2) A manipulative part, defining the type of operations that are allowed on data (i.e. operations for updating, retrieving data from the database and changing the structure of the database).

3) Possibly a set of integrity rules, which ensures that the data is accurate.

### 1) Object Based Data Model :-

Object based data model uses concepts such as entities, attributes and relationship.

An entity is a distinct object (a person, place, thing, event) in the organization that is to be represented in the database.

An attribute is a property that describes some aspect of the object that we wish to record and a relationship is an association between entities. The common types of object based data model are :-

- i) Entity Relationship
- ii) Semantic
- iii) Functional
- iv) Object Oriented

The Entity-relationship model has emerged as one of the main techniques for database design and forms the basis for the database design. The object-oriented data model extends the definition of an entity to include not only the attributes that describe the state

of the objects but also the action that are associated with the object i.e. its behaviour. The object is said to encapsulate both state and behaviour.

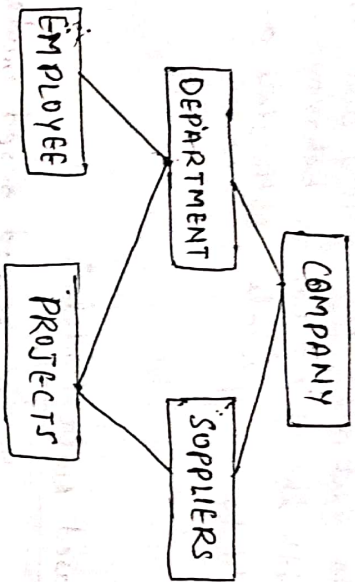
### 2) Record Based Data Models :-

In a record based model, the database model, the database consists of a number of fixed format records possibly of different types. Each typically of a fixed length. There are three type of record based data models:

- i) Network model
- ii) Hierarchical model
- iii) Relational model

i) Network Model:- In the network model, data is represented as collection of records are relationships are represented by sets.

This is the enhanced version of hierarchical data model. It is designed to address the drawbacks of the hierarchical models. It helps to address M:N relationship. This data model is also represented as the hierarchical but this model will not have single parent concept. Any child in the tree can have multiple parent here.



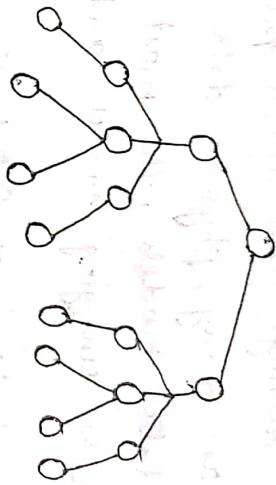
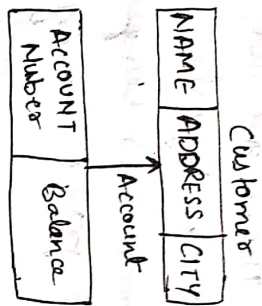
### NETWORK DATA MODEL

#### ii) Hierarchical Model :-

In network model, the data are represented by collection or records and relationship between data are represented by links. This structure holds for hierarchical model also. The only difference is that in the hierarchical model records are organised as collection or trees rather than graphs. The hierarchical model organizes data in a tree structure. There is a hierarchy of parent and child data segments.

However, the hierarchical model allows a node to have only one parent. A hierarchy model can be represented as a tree graph, with records appearing as nodes, also called segments and sets as edges.

The data is stored as records which are connected to one another through links in the form of organised chart, in which top most position is held by superior in chart.



(a) Tree structure

Diagram

(b) Structures of Hierarchical Model

(iii) Relational Model :-

The relational model uses a collection of tables to represent both data and the relationship among those data. Each table has multiple columns and each column has a unique name. A row in a table represents a relationship among a set of values called tables.

Relational data model is the primary data model, which is used widely around the world for data storage and processing. It is a mathematical model defined in terms of predicate logic and set theory. Three key terms are used extensively in relation database models: relations, attributes, and domain.

### 3) Physical Data Models:-

Physical data models describe how data is stored in the computer, representing information such as record structures, record orderings and access paths. There are not as many physical data models as logical data-models, the most common ones being the uniting model and the frame memory.

#### • Instance of Database:-

As new information is inserted or deleted in a database, it changes with time.

The collection of information stored in database at a particular instant of time is called an instance of the database.

#### • Schema:-

The overall design of the database is called database schema.

The description of a database is called the database schema, which is specified during database design and is not expected to change frequently. Schema is the organization of data in a formal manner.

There

- 1) Physi
- 2) logi
- 3) Conc

The f design a Schema level.

• A view is the by of entire

#### • System

memo to de and Program of D



There are three types of schemas:-

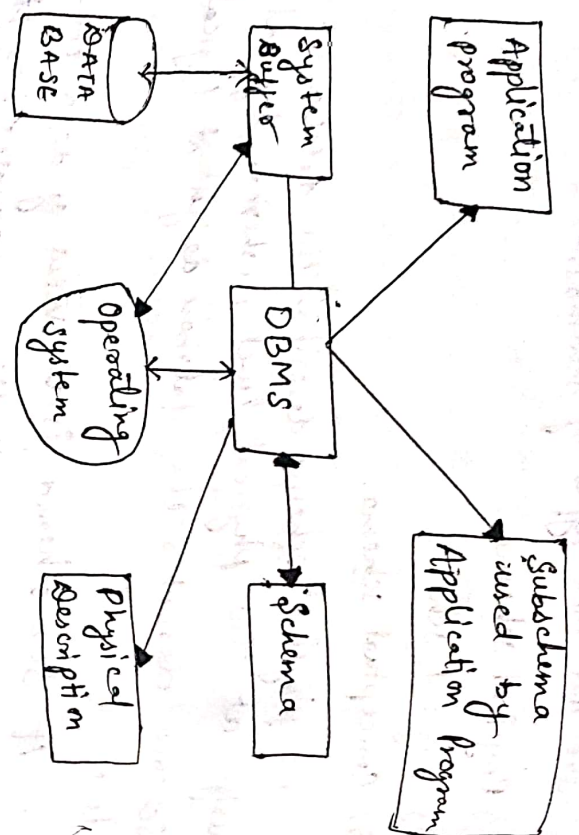
- 1) Physical schema.
- 2) Logical schema.
- 3) Conceptual schema.

The physical schema describes the database design at the physical level, whereas logical schema describes the database design at logical level.

A subschema is the view of data item viewed by the application programmers i.e. it is that data, which is viewed and used by application programs. It is support of the entire data base.

#### • System Buffer:-

System Buffer is that internal memo which is used by system temporarily to do a given task. It is a volatile memory and used only during execution of a program. The following figure gives the junction of DBMS.



### FUNCTIONING OF DBMS

#### • DBMS Architecture :-

Database is the collection of inter-related data and set of procedure to access that data.

The main purpose of database is to provide users with an abstract view of the data i.e; system hides certain details of how the data are stored and maintain.

For the system to be usable, it must be retrieve data efficiently. In DBMS architecture schemas can be defined at following three levels :-

- 1) Internal level or Internal schema or physical level.
- 2) Logical level or Conceptual schema or Conceptual level.
- 3) External level or External schema or view level.

1) Internal level or Internal schema or physical level.  
 It is the physical representation of the database on the computer. This level describes how the data is stored in the database.

2) Logical level or Conceptual schema or Conceptual level.  
 It is the community view of the database. This level describes what data is stored in the database and the relationships among the data.

3) Database language.  
 To carry out DBMS function, it uses a data language, which is used to represent schema, subschema, physical layouts of the data etc. Any data language is usually a combination of two sub languages. There are :-

- 1) Data Definition Language (DDL):  
 It consists of commands to create the objects such as tables, views, indexes etc.

## 2) Data Manipulation language (DML):-

It is used for query, insertion, deletion and updation of information stored in database.

## 1) Data Definition Language:-

A language that allows the DBA or user to describe and name the entities, attributes and relationship. required for the application, together with any associated integrity and security constraints.

A database schema is specified by set of definition expressed by a special language called Data definition language.

The result of compilation of DDL statements in a set of tables is stored in a special file called system catalog.

## • Data Independence :-

The ability to modify a schema definition in one level without affecting a schema definition in the next higher levels of data independence :-

- i) Physical Data Independence
- ii) Logical Data Independence

### ii) Physical Data Independence :-

Physical data independence refers to the immunity of the conceptual schema to changes in the internal schema.

### iii) Logical Data Independence :-

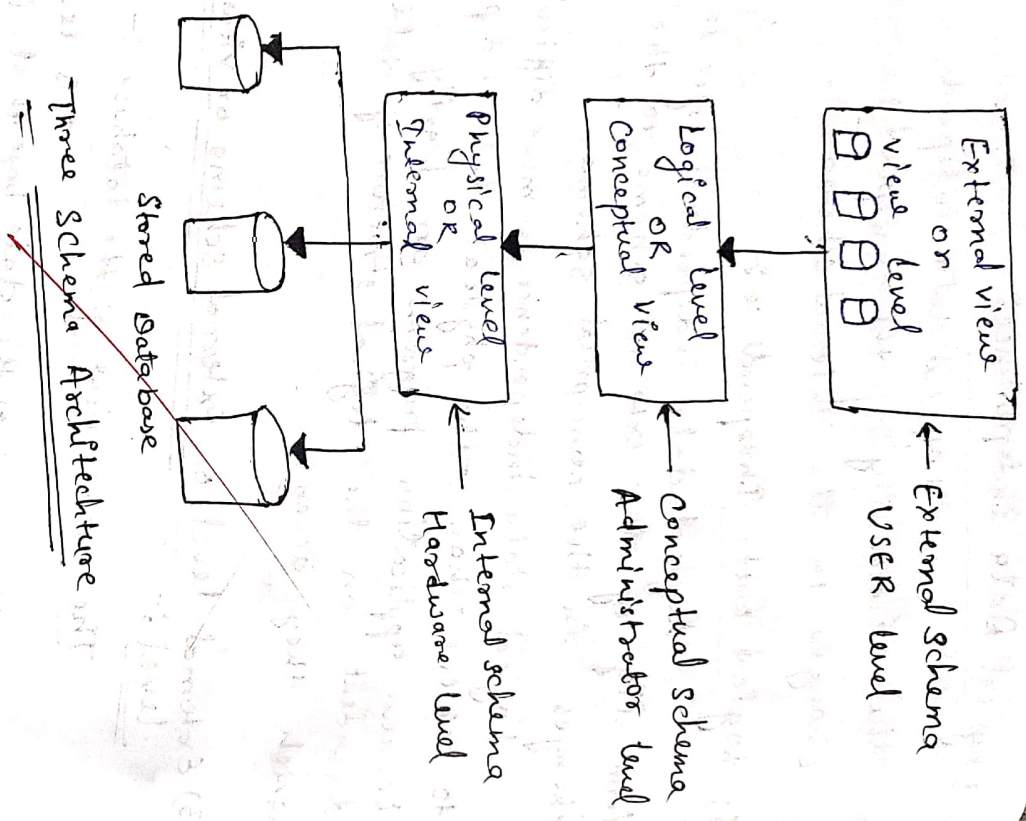
Logical data independence refers to the immunity of the external schema to the changes in the conceptual schema. Logical data independence is more difficult to achieve than the physical data independence because application programs are heavily dependent on the logical structure of data which they access.

### 3) External Level or External Schema or Views Level :-

The user's view of the database :-

This level describes the part of the database that is relevant to each user.

regarding how some objects are managed  
data holder is manipulating with info  
no filter with



- Data Abstraction :-  
 The characteristics that allows program data independence and program operation independence is called Data Abstraction.

## 2) Data Manipulation Language :-

A language that provides a set of operations to support the basic data manipulation operation on the data held in the database.

Data Manipulation language (DML) consists of :-

- i) Retrieving Data :- SELECT command
- ii) Inserting Data :- INSERT command
- iii) Deleting Data :- DELETE command
- iv) Modification :- UPDATE command

The part of a DML that involves data retrieval is called ~~insert~~ a query language.

DML is of two types :-

i) Procedural DML :- A language that allows the user to tell the system what data is needed and exactly how to retrieve the data.  
It requires a user to specify what data are needed and ~~exactly~~ how to get that data.

ii) Non-procedural DML :- A language that allows the users to state what data is needed without specifying how to get it.  
It requires a user to specify what data are needed without specifying how to get that data.

## • DBMS Interface :-

user-friendly interfaces provided by a DBMS may include the following :-

### (i) Menu-Based interfaces for Browsing :-

These interfaces present the user with lists of operations, called menus, the user leads through the formulations of a request.

### (ii) Forms-Based interfaces :-

A forms-based interface displays a form to each user. Users can fill out all of the form entries to insert new data, or they fill out only certain entries, in which case of DBMS will retrieve matching data for the remaining entries.

### (iii) Graphical user interface :-

A graphical user interface (GUI)

typically displays a schema to the user in diagrammatic form. The user can then specify a query by manipulating the diagram.

### (iv) Natural language interface :-

These interface concepts request written in English or some other language and attempt to "understand" them. A natural "schema", which is similar to the database



is provided by  
flowing :-

causing :-  
of the user  
manus, the  
simulations

displays a  
will cut all  
as data, or  
yes, in  
trieve making

(GUI)

the user

in than

the

invest written  
and  
actual  
database

conceptual schema.

v) Interface for Parametric users :-

Parametric users, such as bank tellers, often have a small set of operations that they must perform repeatedly. System analysts and programmers design and implement a special interface for a known class of naive users.

vii) Interfaces for the DBA :-

Most database systems contain privileged commands that can be used by the DBA's staff. These include commands for creating accounts, setting system parameters, granting access, authorization, changing a scheme and reorganizing the storage structure of a database.

### • Classification of Data Management System :-

Several criteria are normally used to classify

DBMS :-

i) The first is the data model on which the DBMS is based. The two types of data models used in many current commercial DBMS are the relational data model. Many legacy applications still run on database systems based on the hierarchical and network data models.

(ii) The second criteria used to classify DBMS, is the number of users supported by the system. Single users system supports only one user at a time and Multituser system supports multiple users concurrently.

(iii) A third criteria is the number of sites over which the database is distributed. Distributed DBMS, Homogeneous DBMS, heterogeneity DBMS and Federated DBMS (multi database systems).

(iv) A fourth criteria is the cost of the DBMS. Single user low end system are low cost and at the other end, a few elaborate packages are very high.

We can also classify a DBMS on the basis of the types of access path option for storing files. General purpose or special purpose.

~~Q~~

Date  
22-2-18

## Introduction of data base

Data which is collection of raw facts, figures etc. All access of the database is controlled by a sophisticated software package called Database management system.  
DBMS is the collection of procedures that data and set of procedures to access that data.

Data:- It is defined as representation of facts. Concept of instruction in a formalised manner suitable for communication. Data is represented with the help of characters like Alphabets (A-Z, a-z), digits (0-9), special characters (t, -, /, <, /) etc.

Field:- A set of characters which are used together to represent a specific data elements are known as field.

Example:- Roll number of a student may be represented as roll-no.

Record:- Collection of field is called Record.

Ex:- The class record for a student contains such data field as roll-no, Name, Marks etc.

File:- Collection of record is called file

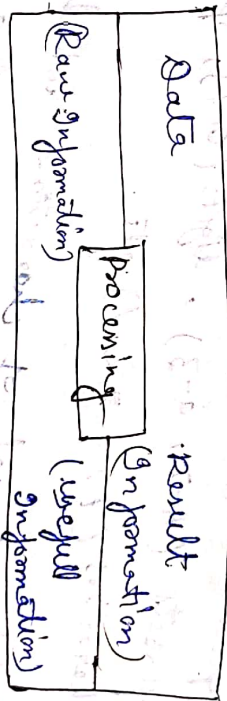
Ex:-

Roll No.	Name	Marks
2005	Geeta	94
2006	Rajit	69

Here Roll-No., Names are the field.

Information - It is the processed data on which decision and action are based.

Data Processing:- It is the recording of data by people or machine to increase their and value for some particular purpose.



Example of data and information;

Data base:- A shared collection of logically related data and a description of the data designed to meet the information needs of an organization. It is a complex thing.

Its properties:- ① A database represents some aspects of real world called the miniworld. Change of the miniworld are reflected in DB.

② A database is designed, got has an undivided group of users.

③ A database is a logically coherent collection of data with some inherent meaning.

Metadata - Data about data is called metadata.

Characteristics:- ① self describing nature.

② Program data independency  
↳ is called data abstraction  
↳ data hide.

③ Support a multiple use of data.

↳ multiple views create.

④ Sharing of data multiple views of data.

Advantage of data base - ① Control of data redundancy.

↳ the data base can not be exist some time.

(2) Data consistency  
↳ same balance.

- (3) Sharing of data
- (4) Search capability.

Disadvantage :- (i) complex

(ii) large size (No. of users)

(iii) high hardware cost

(iv) higher programming cost

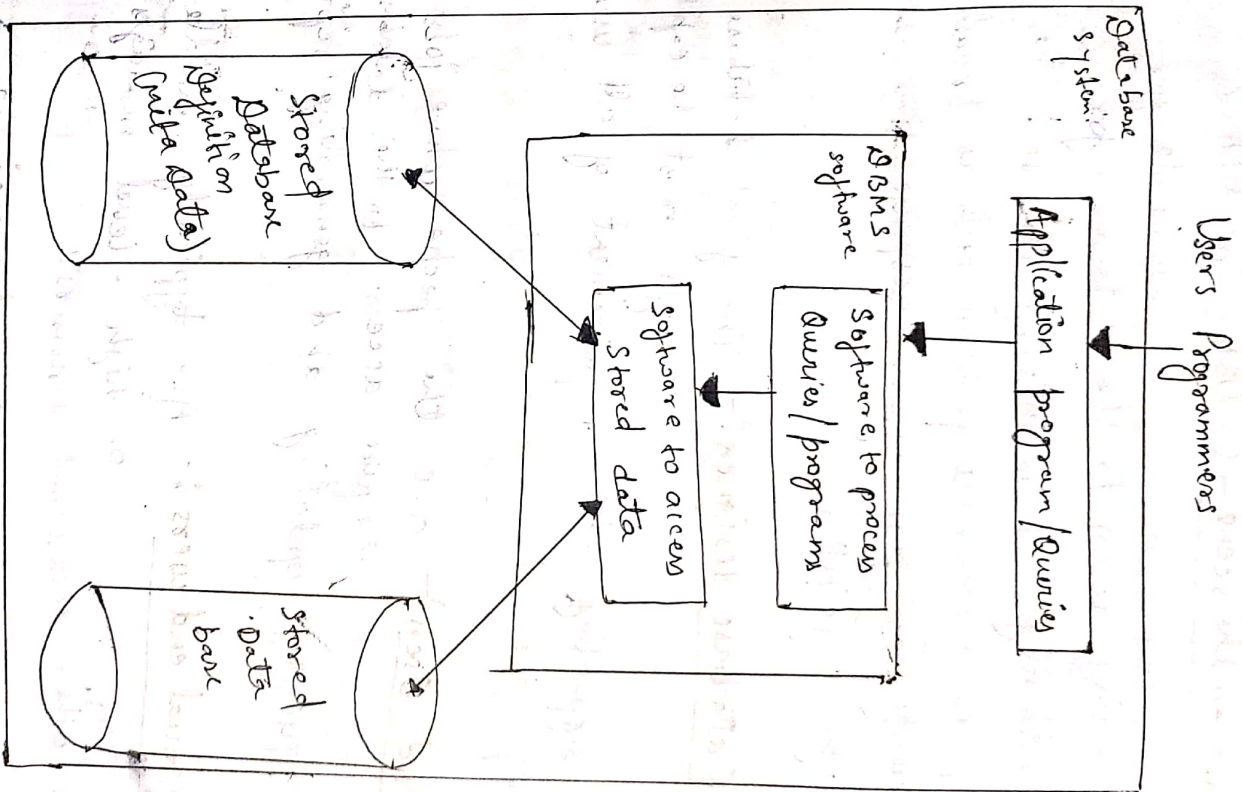
(v) Back up of recovery.

Database administrator (DBA) :- get in

individual (group) called the data base administrator. Who is responsible for designing, creating & maintaining the database to satisfy the needs of users.

DBMS :- DBMS is the collection of interrelated data and a set of procedures to access that data. And perform backup and recovery procedures automatically.

DBMS  
↳ (i) software  
↳ (ii) Data recovery (iii) Relation (iv) RDBMS  
↳ (v) parameters for DBA.



Database system environment, illustrating the concepts

Actors on the scene - (i) DBA - The DBA is responsible for

authorizing access to the database, for co-ordinating and maintaining its use. The

DBA is accountable problem such as breach security or poor system response time in large organisation.

(ii) Database designers - The final database design must be capable of supporting the requirement of all user groups.

(iii) End Users - are the people whose jobs require access to the database for querying updating and generating reports.

(iv) Casual end users - Are typically middle or high-level managers or other occasional browsers.

(v) Naive or parametric end users - Using standard types of queries and updates. called canned transactions that have been carefully programmed and used. The tasks that such users



perform are varied.

ii) sophisticated end users:- Include engineers, business scientists and others.

ii) stand alone end users:- Maintain personal database by using ready made program packages that provide easy to use menu or graphics based interfaces single person users program.

④ system Analysis and Application programmers (software engineers).

System Analysis:- System Analysis is a structured methodology used, the activities can be arranged differently. It is applied to information technology, where computer-based system require.

Workers behind the scene:- In addition to those who design, we and administer a database, others are associated with the design, development and operation of the MIS software.

and system environment.

(i) DBMS system designers and implementors:-

Design and implement the DBMS modules and interface, as a software package. A DBMS is a very complex software system. Including modules for implementing the catalog.

(ii) Tool developers:- The software packages that facilitate database modeling and design, Database system design and improved performance.

(iii) Operators and maintenance personnel:- are responsible for the actual running and maintenance of the hardware and software environment for the database system. They typically do not use the database contents for their own purpose.

## Relational DBMS :-

- ① Table :- collection of rows and columns.
- ② Field or attribute :- column name.

Sid	Stream	Branch
S1	A	CS
S2	A	IT
S3	B	CS

- ③ Arity or domain or degree :- no. of field or attributes in a table

- ④ Attribute Range :- Possible values of the field or attributes.

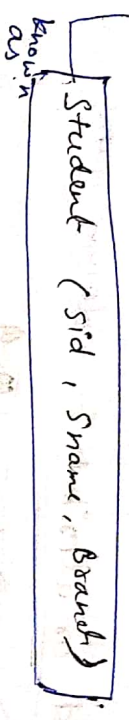
- ⑤ Cardinality :- no. of tuples in the Relation or tables.

- ⑥ Tuple :- A row is called tuple or record.

Sid	Stream	Branch
S1	A	CS
S2	A	IT
S3	B	CS

→ tuple.

Abstraction of Table or Relational schema  
 define as the table name with the attribute.



Relational Instances :- at a particular point of time a set of

tuple or rows.

Codd Rule :-

There can be no two tuples having

same value or every two tuple are differentiated from each other.

Key :- mini. no. of attributes we use to differentiate b/w two tuple of the relation.

(A, B, C) & (A, B, C, D), (A, B, C), (A, B, C, D)

Sid	Cid
S1	C1
S2	C2
S1	C3

key = (Sid and Cid)

~~Types of key :-~~  
 ① Composite key :- key formed by two or more attribute.

② Simple key :- formed by single attribute

Candidate key :-

Sid	Sharma	Pass No.	Line	DOB	Phone
S1	A	Null	L4	10/10	Y
S2	B	Null	L3	10/10	X
S3	B	Null	L1	11/12	Y
S4	C	Null	L2	Null	-
S5		Null	L5	Null	-

Key = Sid, Line, Pass No., DOB, Phone.  
Candidate key.

One of the candidate key is known as primary key, that is used to identify the tuples.

Alternate key :- All the candidate key except primary key.

Prime attribute set :- attributes belonging to the candidate key known as prime key attribute set.

Non-Prime attribute set - attribute not belonging to the

Candidate key

Ex: Name.

Difference b/w Primary and Alternate key

Primary key

Alternate key

① At most one Primary key each relation.

② Not allowed Null

Value  
→ generated values or unknown values.

① More than one alternate key allow for each relation.

② Allow Null values.

③ Consistent of primary key

(i) key with no null value

(ii) There exist a default index on primary key on which

access to the data base is dependent.

(iii) Numerical values more

priority to design primary key

(iv) Candidate key with

less no. of attributes.

Super key - "Set of attributes used to differentiate tuples of relation"

1) Every candidate key is super key but reverse is not possible.

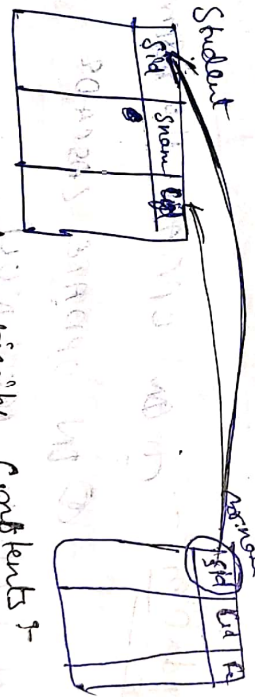
2) Candidate key is a minimal super key

3) Super key is one of the subset of candidate key.

Referential key or Foreign key - Set of attributes of

primary key & alternative key which

has references the same table or different table.



\* Referential Integrity Constraints -

1) Form reference relation (No violation)

2) Insertion (No violation)

Student	Assignment
S1	A1
S2	A2
S3	A3

(ii) Deletion may cause the referential integrity violation.

Sid	Sname	Logn	Sid	Cr	Pce
S1		@	S1	C1	-
S2		@	S1 Null	C2	-
S3		@	S2	C2	-
S4		@	S4	C4	-

course

\* create inconsistency

\* integrity violation - Not perform deletion.

Rule :- (a) ON DELETE NO ACTION

(b) ON DELETE CASCADE (delete from both tables)

(c) ON DELETE SET NULL (when action is not working)

(iii) Update :-

(a) ON UPDATE NO ACTION

(b) ON UPDATE CASCADE

(c) ON UPDATE SET NULL

\* From Referencing Relation :-

- (a) Insertion - prohibited
- (b) Deletion - no referential integrity violation
- (c) Update - may cause a violation



# E-R-Model :- (Entity Relation model)

- Design for high level database
- Schematic representation of DB.

① Entity :- An object that can be differentiated from other object -



② Entity Set :- Set of similar entities.

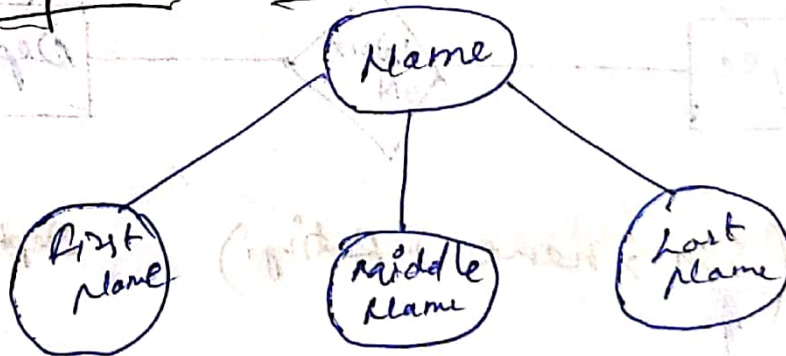
③ Attributes :-

④ Key Attributes :-

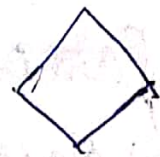
⑤ Multi value Attributes :- course - CS, E, Elec.



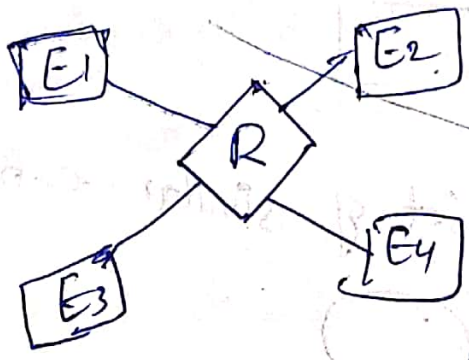
⑥ Compound attributes / composite :-



⑦ Derived Attributes :-   
Ex - Age

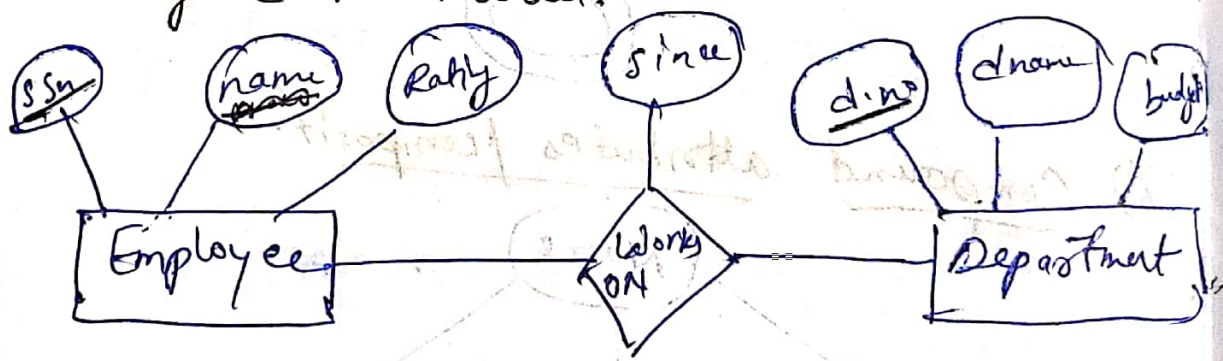
⑧ Relationship set :-   
 Used to relate the two or more entities relationship.

$E_1, E_2, E_3 - E_N$   
 $\downarrow \quad \downarrow \quad \downarrow \quad \downarrow$   
 $A_1 \quad A_2 \quad \cdot$



attribute of R  $\rightarrow A_1, A_2, A_3, \dots, A_N$

Que:- Employee and department by the help of E-R-model.



Employee (SSN, name, Rating)  
 Dept (dno, dname, budget)  
 Works ON (SSN, dno, srate)  
 (Emp) (dno)

Consistent on Entity Set :-

- ① Primary key
- ② Alternate key - may or may not

③ Null or Not Null

Consistent on Relationship set

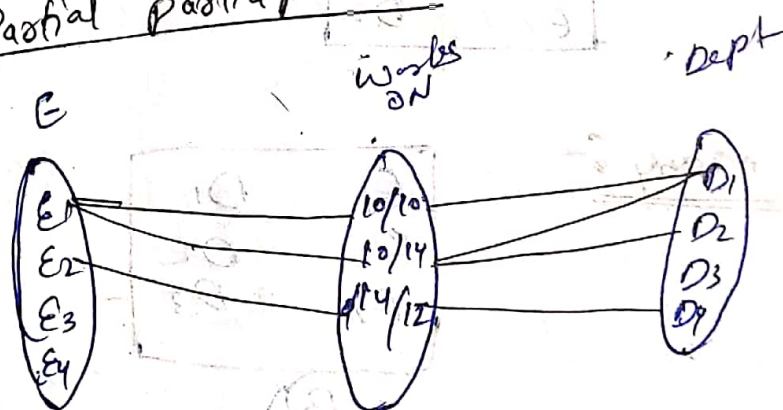
- (i) Primary key
- (ii) Alternate key - may or may not
- (iii) null or not null
- (iv) Foreign key constant

Q1 Create table Works on

Relationship Constant :-

- ① Participation
  - (i) total "
  - (ii) partial "

Partial participation



Total :- All entity relate enhance.

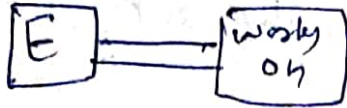
① → one to one



② Many to Many

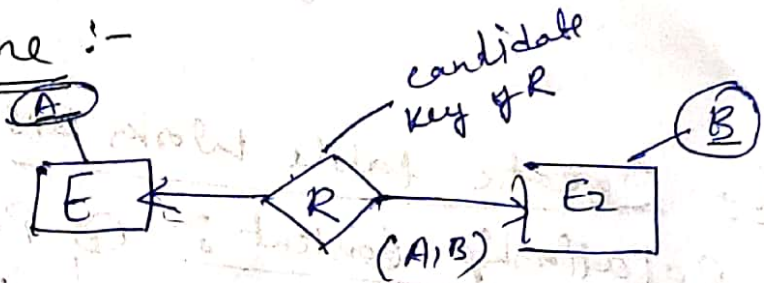


③ Double line



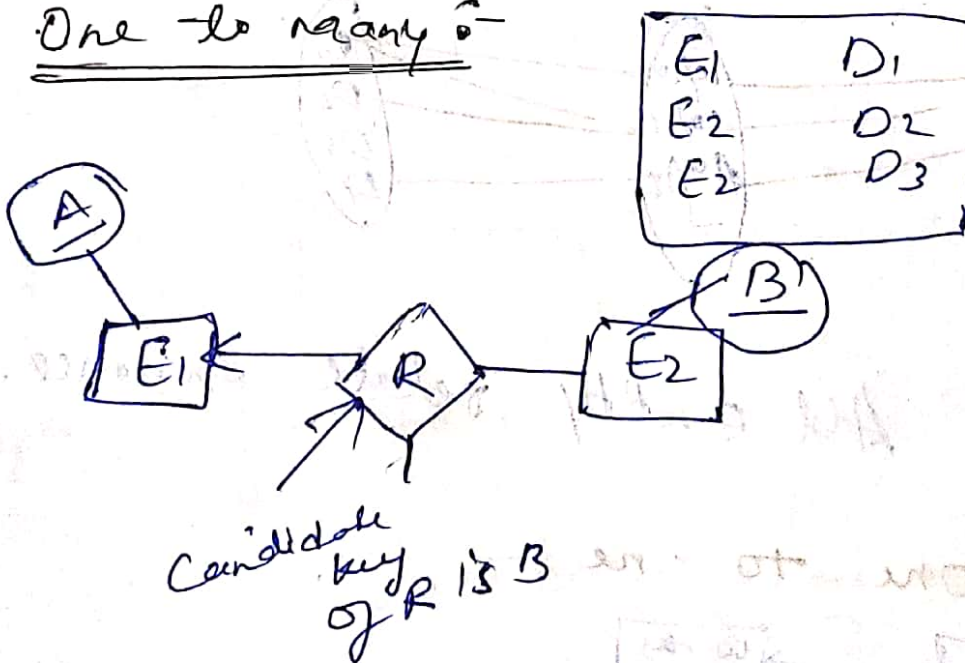
\* Cardinality :- how to one entity set relating another entity set.

(a) One to one :-

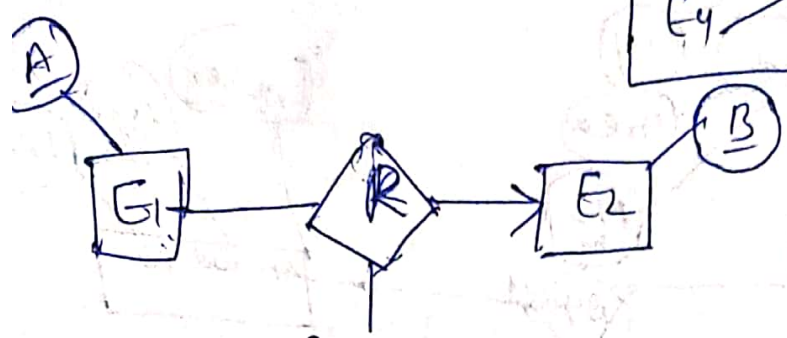
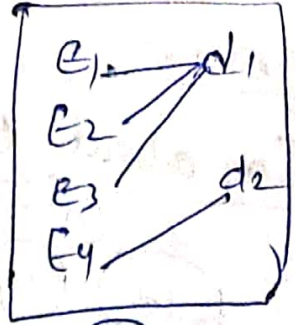


$E_1$	$D_1$
$E_2$	$D_2$
$E_2$	$D_2$

(b) One to many :-

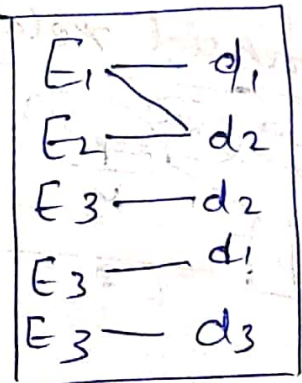


many to one

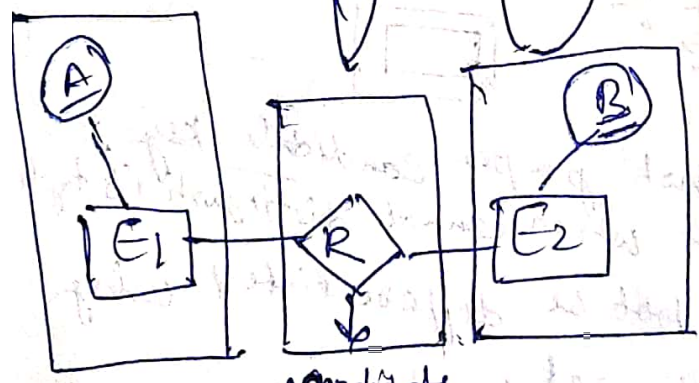
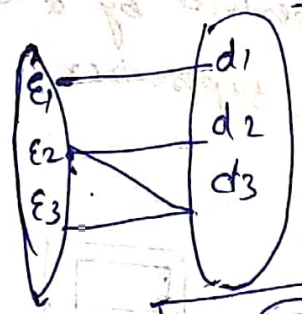


Candidate key of R is A

many to many



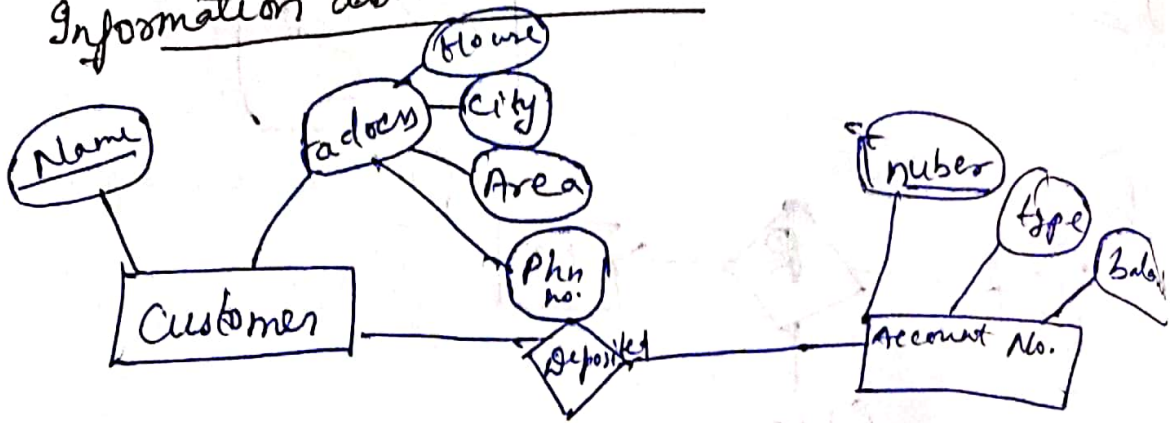
OR



Candidate key is (A, B)

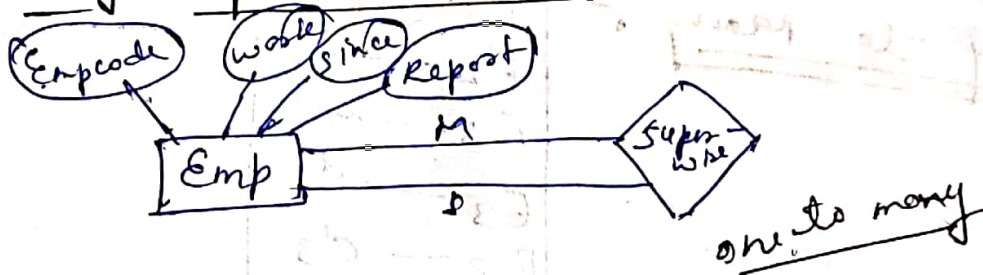
E-R diagram :-

Information about the bank



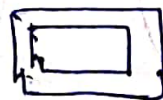
Cardinality - one to one

Self Referential Relation set :-



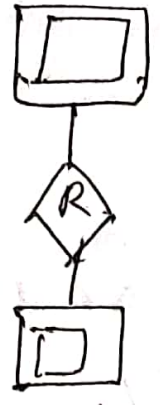
Multiple employee supervised by a employee  
single employee to a supervisor

Weak entity set :-



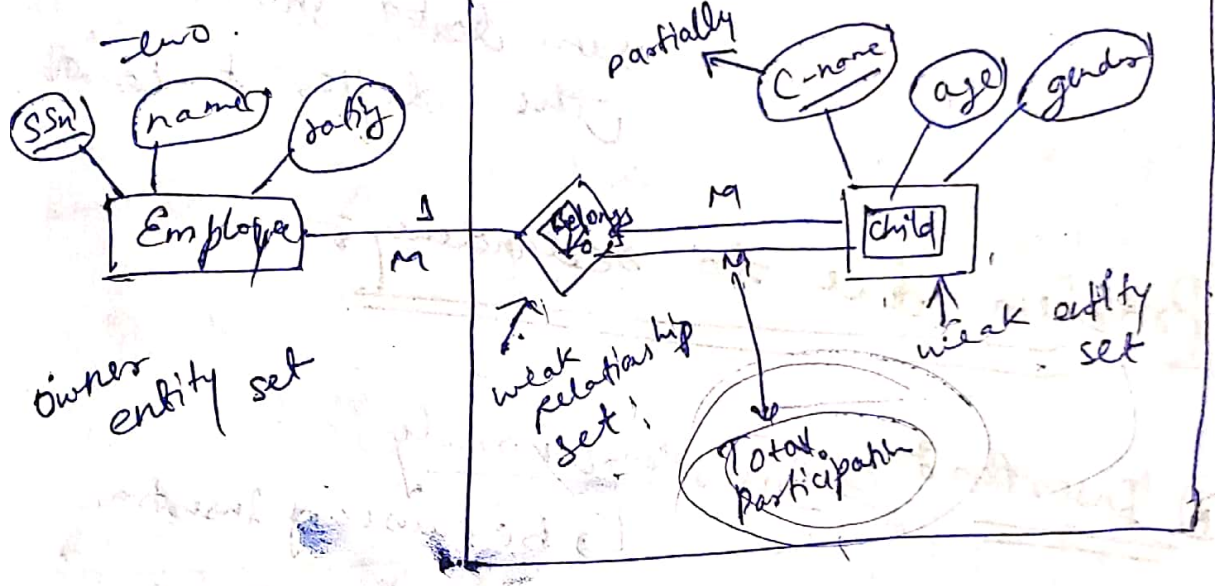
- those have not proper candidate key or entity set which cannot distinguish its tuple.
- Tuple may not be differentiated using own attribute set.
- For weak entity set there should be a proper corresponding owner entity set.
- To be entity not be possible with relate each other.

ex. 2



total participation

↳ max no. of table and min no. of table are



↳ Cardinality b/w owner and weak entity set can be one to many or many to many.  
 ↳ Participation b/w weak entity set with relationship set always total participation.

1	1	1	1
1	1	1	1
1	1	1	1
1	1	1	1