INTRODUCATION OF RDBMS

UNIT-I

1)Traditional File-based system.

2) Database management system.

3)Roles in data base environment.

4) Advantages and Disadvantages of DBMS.

5)Database Architecture.

6)Database languages.

7) Data models.

TERMS IN DBMS

1) DATA:- Data is representation of facts and conception in formalized manner suitable for communication by human. There are two types of data.

1) processed data

2)Unprocessed data

2) DATA ITEM:- It is the representation of any value that can be used as a component of data structure. Ex:-Name , Age.

3) DATA STRUCTURE:-It is the rough idea or blue print of any DBMS.

Ex:-Array , stack.

4) DATA RECORD:-It is the collection of data item.

Ex:-employee record

5) DATA FILE:- It is the collection of data record.

Ex:- File of student record

6) DATA SIZE:-The specified size declared by the user for any data item.

7) DATA TYPE:-It specifies the type of data we are going to use. It decides the nature of data items.

Following are the various types of data types:-

- **Character data type**
- **Number data type**
- **Date/time data type**
- **Yes/No data type**
- **Memo data type**
- **Hyperlink**
- **Lookup Wizard**
- **Auto Numbers**

8)DATA BASE:-It is the collection of record or file of information grouped together.

9)DATA BASE SYSTEM:-It is an integrated collection of related files along with the details about their definition, interpretation, manipulation and maintenance.

10)DBMS stands for database management system.

What Is DBMS?

- DBMS stands for database management system.
- DBMS does not support 4GL.
- We cannot use relationship in DBMS.
- There is no rule to fire any query to change the structure of database.
- In DBMS it does not supports client server.

What is RDBMS ?

- RDBMS stands for Relational database management system.
- RDBMS supports 4GL.
- We can use relationship in RDBMS ,Queries are fired to change the structure of database.
- There is various rule to fire any query to change the structure of database.
- In RDBMS it supports software like MYSQL,ORACLE .

ADVANTAGES OF DBMS

- Reduction of redundancy
- Data sharing
- Data integrity
- Data security
- Conflict resolution
- Data independence:

  a)Physical data independence

  b)logical data independence

DISADVANTAGES OF DBMS

- Problem by centralization
- Cost of software/hardware and migration
- Complexity of backup and recovery

ARCHITECTURE OF DBMS

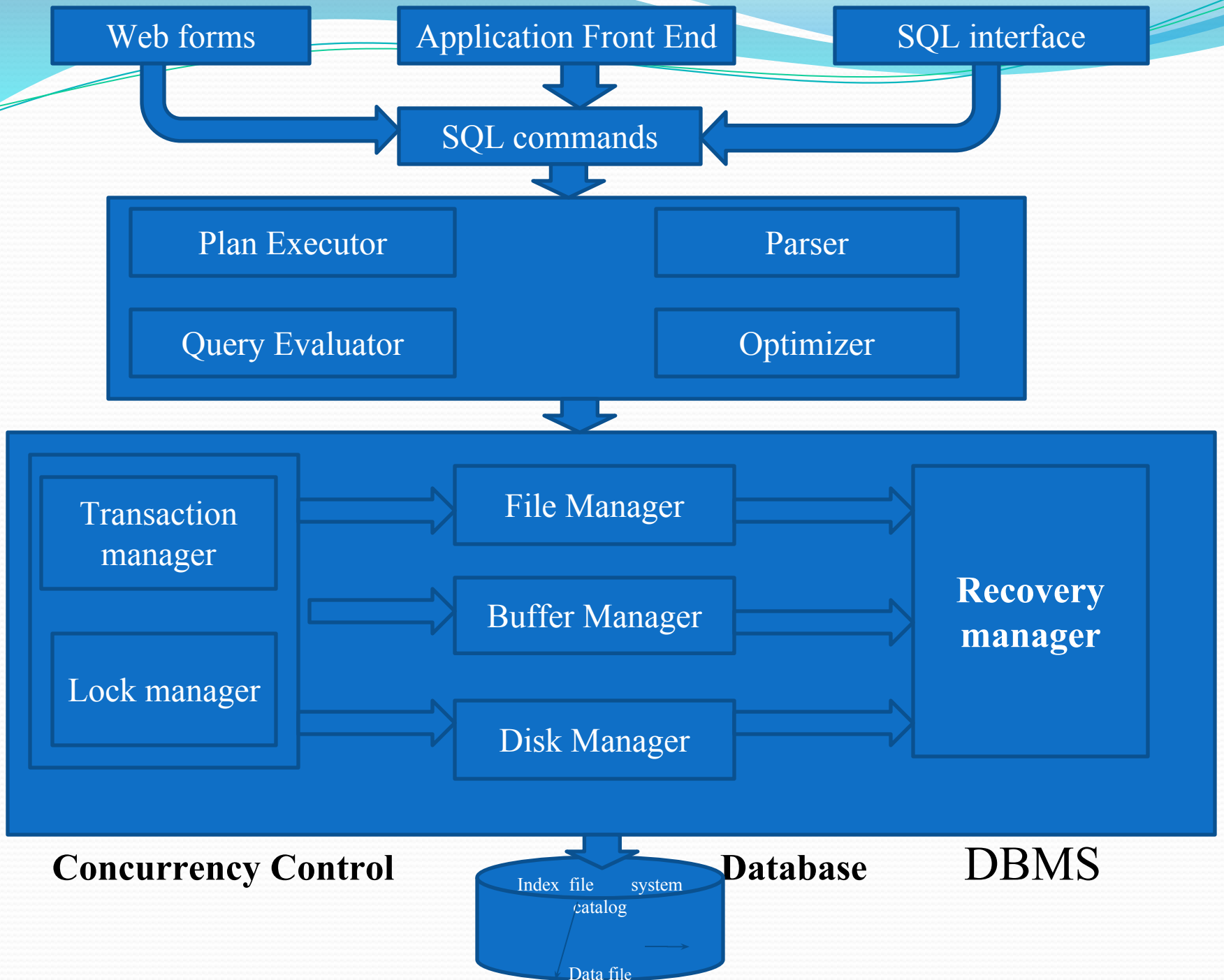
- **Architecture of DBMS explains the internal behavior of database management system components. In DBMS architecture there are basic building blocks available which can interact with each other to perform particular job.**
- **In Architecture there are various components or blocks which can perform different roles. Query evaluation engine have four blocks as follows:**

a) **Plan executor**

b) **Query evaluator**

c) **Parser**

d) **optimizer**


Web forms
Application Front End
SQL interface
SQL commands
Plan Executor
Parser
Query Evaluator
Optimizer
Transaction manager
Lock manager
File Manager
Buffer Manager
Disk Manager
Recovery manager
Concurrency Control
Index file
system catalog
Data file
Database
DBMS

DESCRIPTION OF ARCHITECTURE

A) PLAN EXECUTOR: Plan Executor is a blueprint about any query given by the user for evaluation a query and is generally represented by tree or relational operator.

B) **QUERY EVALUATOR:** Query evaluator can be used to understand and evaluate the relational operator which can serve as the building blocks for evaluating queries.

C) **PARSER:**

Parser will check the syntax of query as well as verifies if the relational and attribute used in the query are defined in the database.

D) **Optimizer :**

SQL queries are optimized by decomposition them into collection of smaller units called as block. A typical query optimizer concentrate on optimizing a single block at a time. The optimizer concentrate on optimizer examine the system catalog to retrieve the information about data types, length of data item and access path.

Transaction manager

Any activity done by the user is called as transaction Transaction is nothing but any one execution of user program in database of User program in database management system .

A transaction is a program unit whose execution may change contents of database remain inconsistent state .

For ex:- Air reservation , any type of bank transaction

<u>Transaction have four actions :</u>

- **Read**
- **Write**
- **Commit**
- **Abort**

LOCK MANAGER:

A lock is a mechanism use to control access to the data types objects. There are two types of locks.

1. Share lock :- An object can be held by two different transaction at the same time.

2. Exclusive lock:- An object ensure that no other transaction hold any lock on this objects.

CONCURENCY CONTROL:-

Concurrency control is that term when same object can be demanded by the number of user at one time is called concurrency control. E.g. Travel agent reservation system.

FILE MANAGER :-

File manager is used to allocate a disk space for a data in memory of a computer. It can also store a data base structure for the database .

BUFFER MANAGER :-

Buffer manager is used to bring data pages from memory to main memory. It is temporary storage area which can interact immediately with current data or pages.

DISK SPACE MANAGER :-

Disk space manager is used to manage memory storage related operation . it can handle four operations like allocation of memory, de-allocation of memory, read a data from memory and write a data into the memory.

RECOVERY MANAGER:-

Recovery manager plays a very important role when system get crashed. At this situation, we may lost maximum data then recovery manager can repairing using a technique for recovery of data . Sometimes it is possible to recover a data partially or fully but it depends upon intensity of damage to the system.

NAIVE USERS:-

Naive users are those users who do not have complete knowledge about a particular system but can handle the simple operations perform on the system.

SOPHISTICATED USERS:-

Sophisticated users are those users who have complete knowledge about particular system and can handle complex operations performed on it.

TRADITIONAL FILE BASED SYSTEM

- A collection of application program that perform that perform services for the end user is called as traditional file based system.

  For ex:- production of report, creation of worksheet.
- Each program defines and manages its own data
- It is basically used to store information manually

Advantages & Disadvantages

Advantages:- It is sure that we want any information without any communication.

2)The maintenance of traditional base file is easy and not expensive.

Disadvantages:- 1)Data redundancy and inconsistency 2)Difficult in accessing data 3)Data isolation 4)Data integrity 5)security problem.

DATA MODELS

A]Data model is a collection of conceptual tool for describing a data, data relationship, data semantics and consistency constraints.

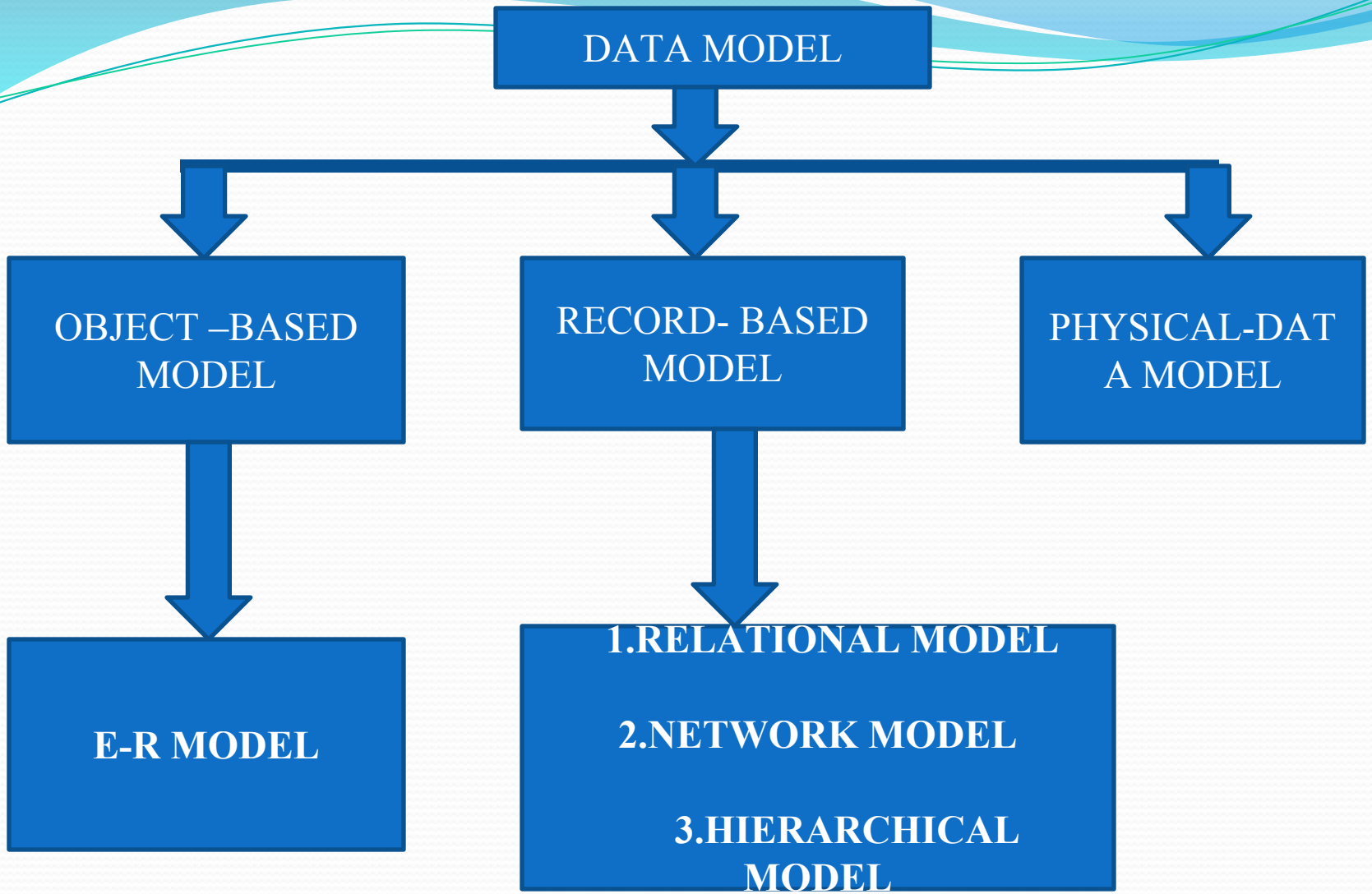
B]Basically a data model is nothing but group of attributes which is collected and represents some entity and using that entity we can design a relationship between another entity.

C] It is divided into following three types:

1] object-based model

2] Record-based model

3] Physical data model


DATA MODEL
OBJECT –BASED MODEL
RECORD- BASED MODEL
PHYSICAL-DATA MODEL
E-R MODEL
1.RELATIONAL MODEL
2.NETWORK MODEL
3.HIERARCHICAL MODEL

OBJECT BASED MODEL:-

1.Object based model describes data at the conceptual level and internal view level.

2.It can provide flexible structuring capabilities and allow data constraints object based model is divided into another model i.e. (E-R model)

Entity Relationship model

1) E-R model is based on perception of real world which consists of collection of objects.

2) These objects are referred as entities in E-R model.

3) An entity is an object that is distinguishable from other object by specific set of attribute.

4)The database structure ; employing the E-R model is usually shown pictorially using E-R Diagrams.

The following conventions are used for drawing E-R diagrams:

1] 

Entity set is shown by using this symbol.

2] 

The attribute of entity set is shown by the symbol.

3] 

The relationship among the entity set is shown by this symbol.

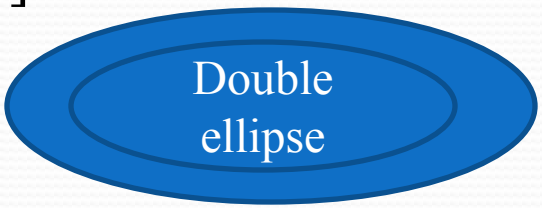
4]

The nature relationship between entity, attributes relationship diamond is shown by this symbol.

.

5] 

The attribute of given entity set by this symbol.

6] 

It represents a multi-valued attribute.

7] 

Total participation of an entity Double lines in a relationship set.

RECORD–BASED DATA MODEL

1] Record-based data model completely depend on a record based operation

2] Any single row in a table is called as single record or tupple or row.

3]It specifies the overall structure of database and provides higher level description of the implementation of the database

It is broadly divided into following three types :

1)Relational data model

2)Network data model

3)Hierarchical data model

RELATIONAL-DATA MODEL

Relational data model is used create a relation between two or more tables. It express that which attribute of one table is related with other table attribute.

a)It represents data and the relationship between data by collection of table, each of which has no. of columns with unique name. The database is then organize in fix format.

SAMPLE RELATIONAL DATABASE

Emp. _ id	Emp. _name	Emp. _add	salary
100	Poonam	Amravati	8000
101	Nikita	Nagpur	9000
102	swati	Yavatmal	7000
103	Nidhi	Pune	14000

Employee _ Information

Emp. _id	salary
100	8000
101	9000
102	7000
103	14000

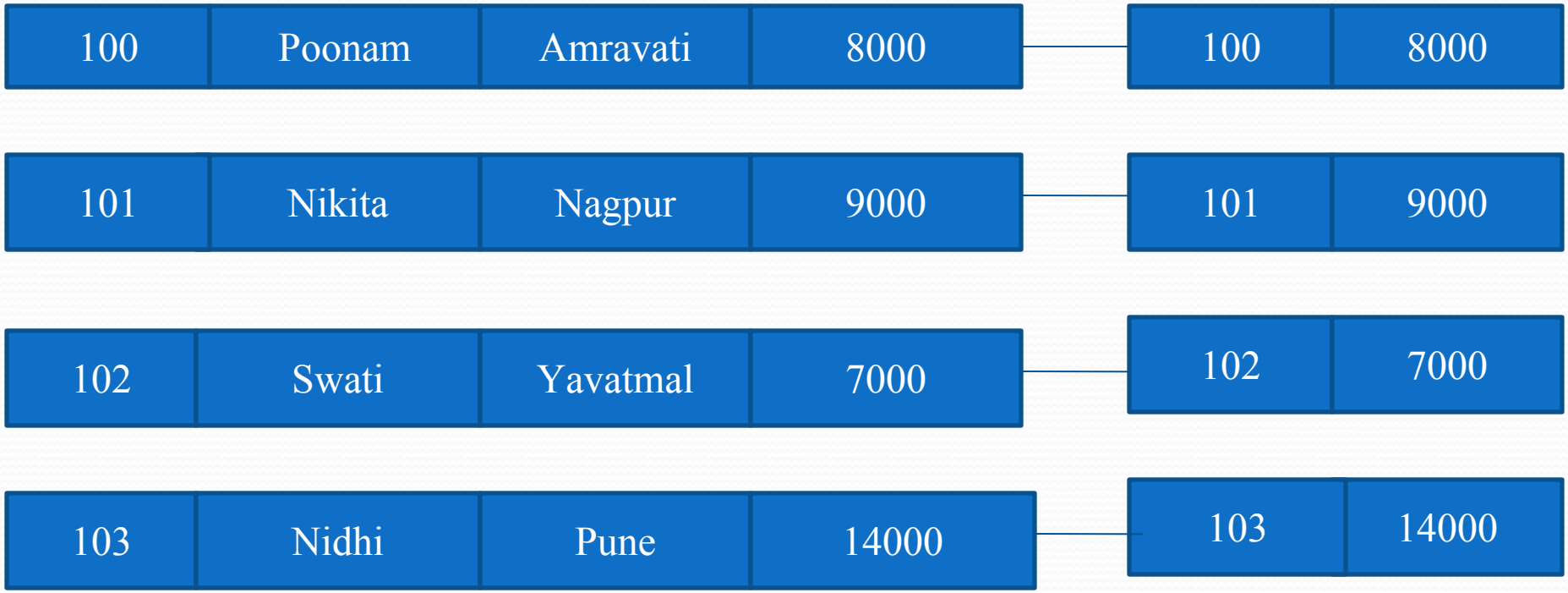
Salary _ Data

NETWORK DATA MODEL

- **Network data model is collection of table, data by collection of records with fix format and relation among data are represented by links which can be view as pointers.**

1. **Data in the database are organize as a graph.**
2. **The boxes are use to are use to the records and lines between the record.**
3. **It support many to many relationship.**
4. **The relationship between different record is called as set.**

SAMPLE NETWORK MODEL



HIERARCHICAL MODEL

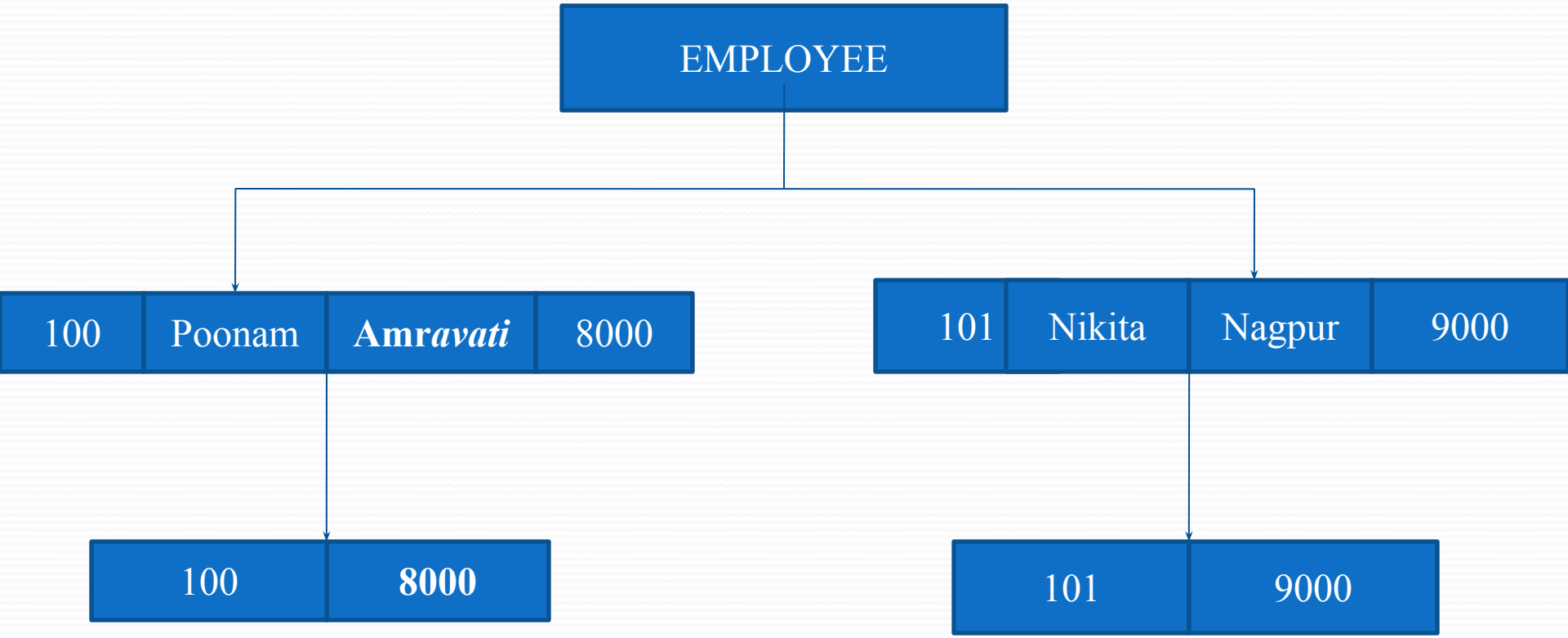
Hierarchical model is collection of record . The data-storage in this model is in the form of parent-child relationship.

a) It differ from network model because it is organize as collection of trees rather than graphs

b)The origin of data tree is called root . The data following the root is called as node and last node in the series is called leaf node

c) It supports one to many relationship.

SAMPLE HIERARCHICAL MODEL



PHYSICAL DATA MODEL

a) **Physical data model is that model which contains the actual data structure with their attribute and data records.**

b) **When your conceptual view is ready and we insert a database is called physical data model.**

ROLES IN A DATABASE ENVIORNMENT

In a database environment there are various people which are required to perform different activities as per the role given to them all the role given to them all the person appointed in database environment support or handle proper functions for smooth functioning of DBMS. It is divided in five sections.

a)Data Administrator (DA)

b)Database Administrator(DBA)

c)Database Designers

d)Application Developers

e)End Users

DATA -ADMINISTRATOR(DA)

a)The data administrator is the person in the database environment.

b)The work of the data administrator is to collect raw data and analyze it

c)After analyzing , the DA has to arrange the data in proper format

d)This data is then submitted to database administrator . If it is approved by him then it will be pass on to database designer for its design.

DATABASE ADMINISTRATOR

a)Database administrator is a key person in database system.

b)He is the one who control and co-ordinate all task occurring in database environment.

C)DBA performs the following duties:

1]controls the conversation between server side person.

2]provides data security by using different backup technique etc.

DATABASE DESIGNER

a)It first analyze the data provided to them by data administrator.

b)He will then decide what to design with that data and create a blueprint of it.

c)The designed blueprint is then submitted to DBA. If the DBA approves it ,it will be pass on to Application Developer for coding.

d)It plays an important role to design back end of any DBMS.

APPLICATION DEVELOPER

a) It design the front end of DBMS.

b)The coding into a particular design provided by designer will be done by application developer.

c)When coding is completed , application developer will submit it to DBA if DBA founds it user friendly then it will be provide it to user.

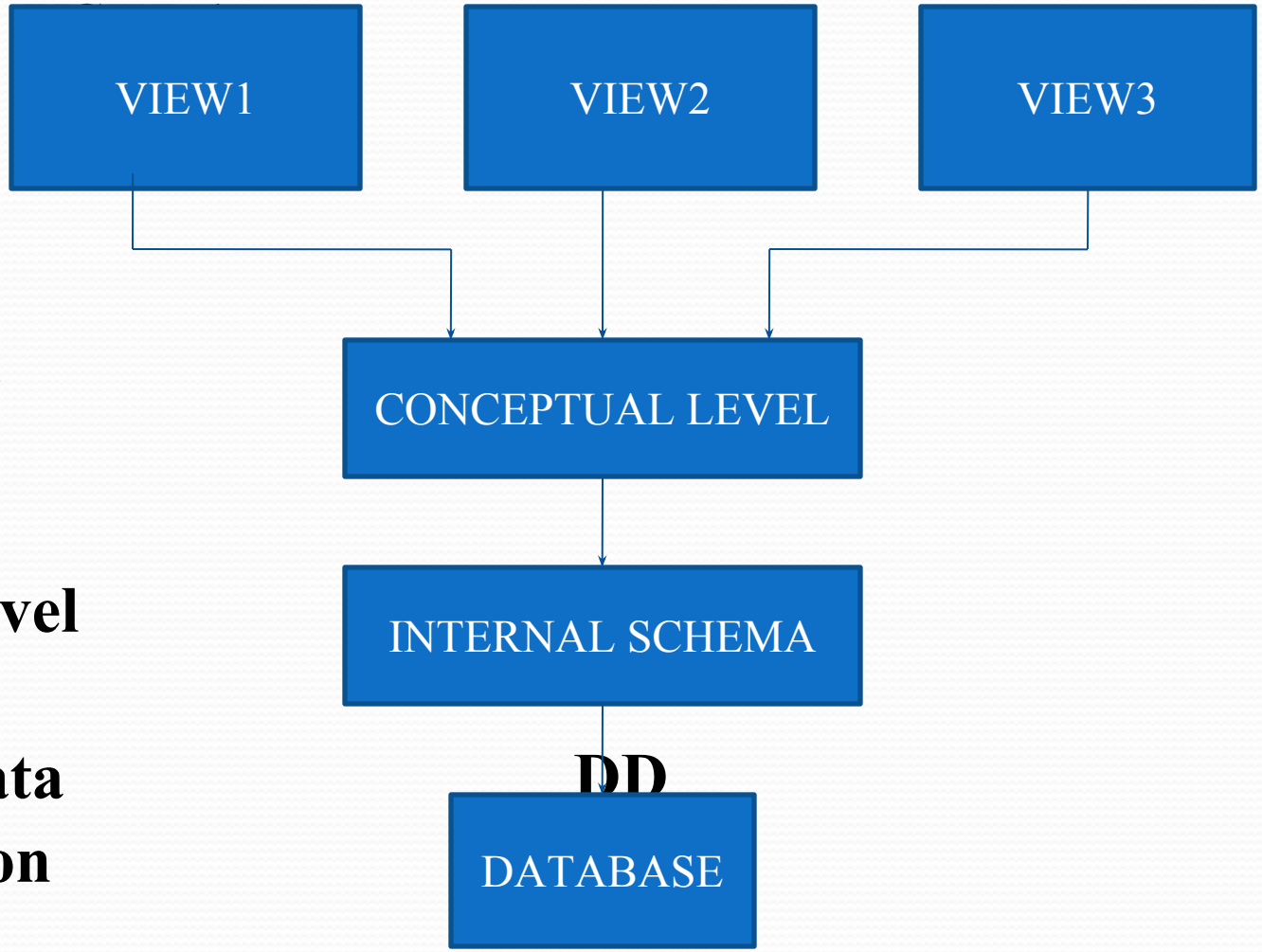
THREE LEVEL ARCHITETURE

External Level

Conceptual Level

Internal Level

Physical Data Organization



DESCRIPTION OF THREE LEVEL ARCHITECTURE

1. **EXTERNAL LEVEL :-**

The users view of the level describes that part of the database that is relevant to each user. External view is described by schema is called external schema. External schema consist of definition of logical records and relationships.

2. CONCEPTUAL LEVEL:-

It is the community view of database. This level describes what data is stored in database and the relationship among the data. The conceptual view is defined by conceptual schema. It represents all entities, their attribute and their relationship. One conceptual view represents entire database.

3. INTERNAL LEVEL:-

It is the physical representation of the database on the computer. This level describes how the data is stored in database. It is the closest to the physical storage method .It is based on the understanding of how the data is typically accessed .It is expressed by the internal schema.

RELATIONSHIP AMONG ENTITIES

The association that exists between the attributes of an entity ,relationship exist among different entities. Relationships are used to model the interactions that exist among entities and the constraints that specifies the no. of instances of one entity that is associated with others.

It consists of three types :

1)One to one Relationship

2)One to many Relationship

3)Many to many Relationship

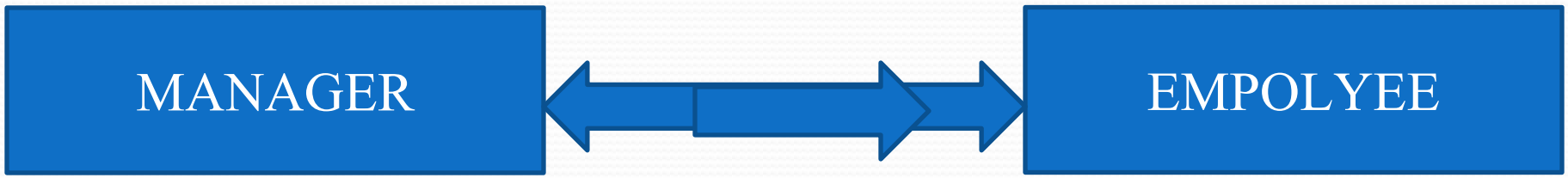
ONE TO ONE RELATIONSHIP

The one to one relationship between entity set E1 & E2 indicates that for each entity in either set there is at most one entity in second set that is associate with it .Each entity is represented by rectangle and relationship between them is indicated by direct line.

1:1 Relationship

ONE TO MANY RELATIONSHIP

A one to many relationship exists from the entity MANAGER to the entity EMPLOYEE Because there are several employees reporting to the manager. There could be an occurrence Of the entity type MANAGER having zero occurrence of entity type EMPLOYEE reporting to him.



RELATIONSHIP AMONG THE E-R MODEL

Types of Relationship among the E-R model are as follows:

a)one-to-one relationship

b)one-to-many relationship

c)many-to-many relationship

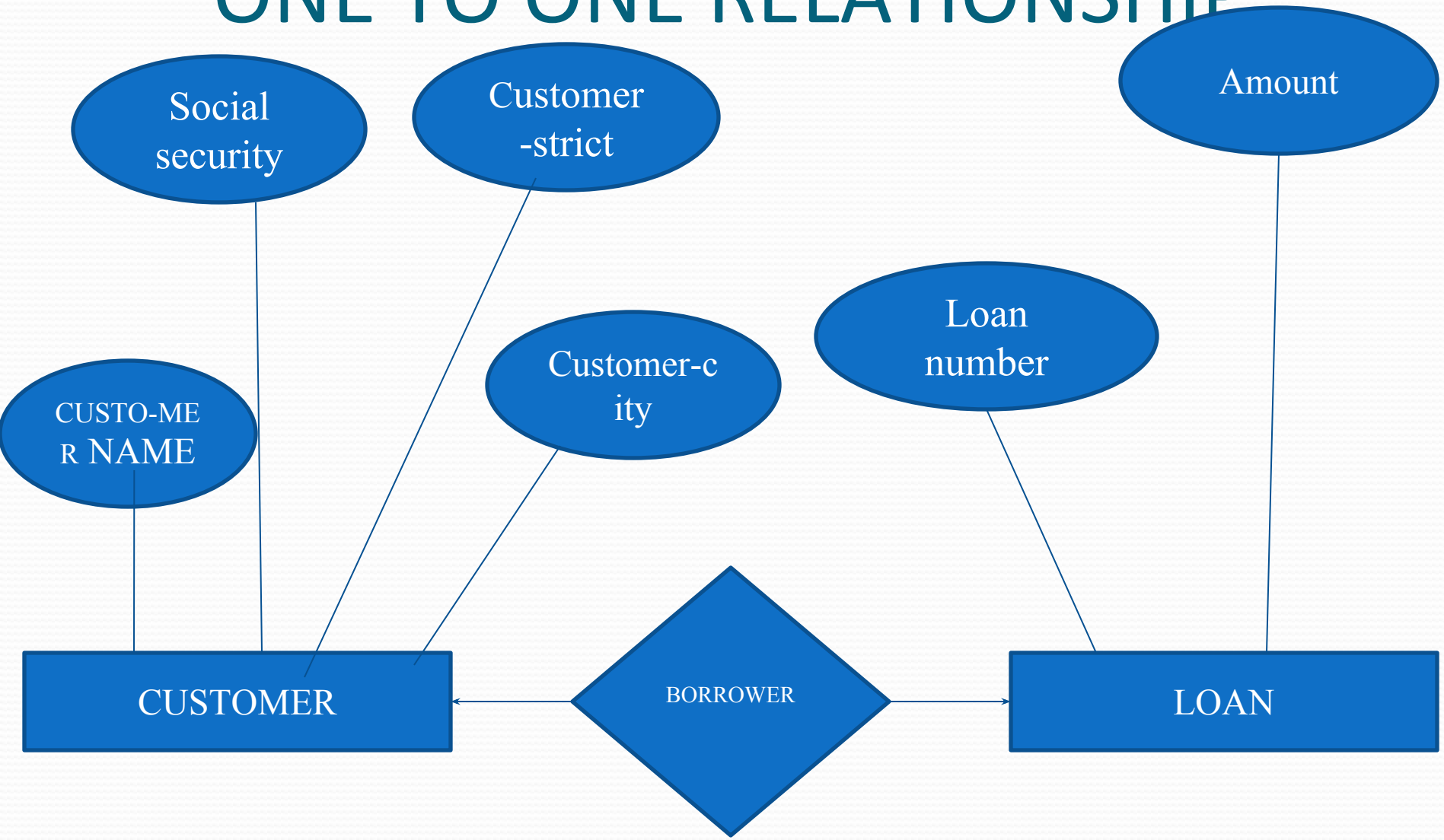
MANY TO MANY RELATIONSHIP

The relationship between the entity EMPLOYEE in the entity project can represent many to many relationship. Each employee could be involve in no. of different projects under no of employees could be working on given project.

ONE TO ONE RELATION:-

If the relationship set borrower were one to one ,then both lines from borrower would have arrows. The one arrow pointing to the loan entity set and one arrow pointing to the customer entity set.

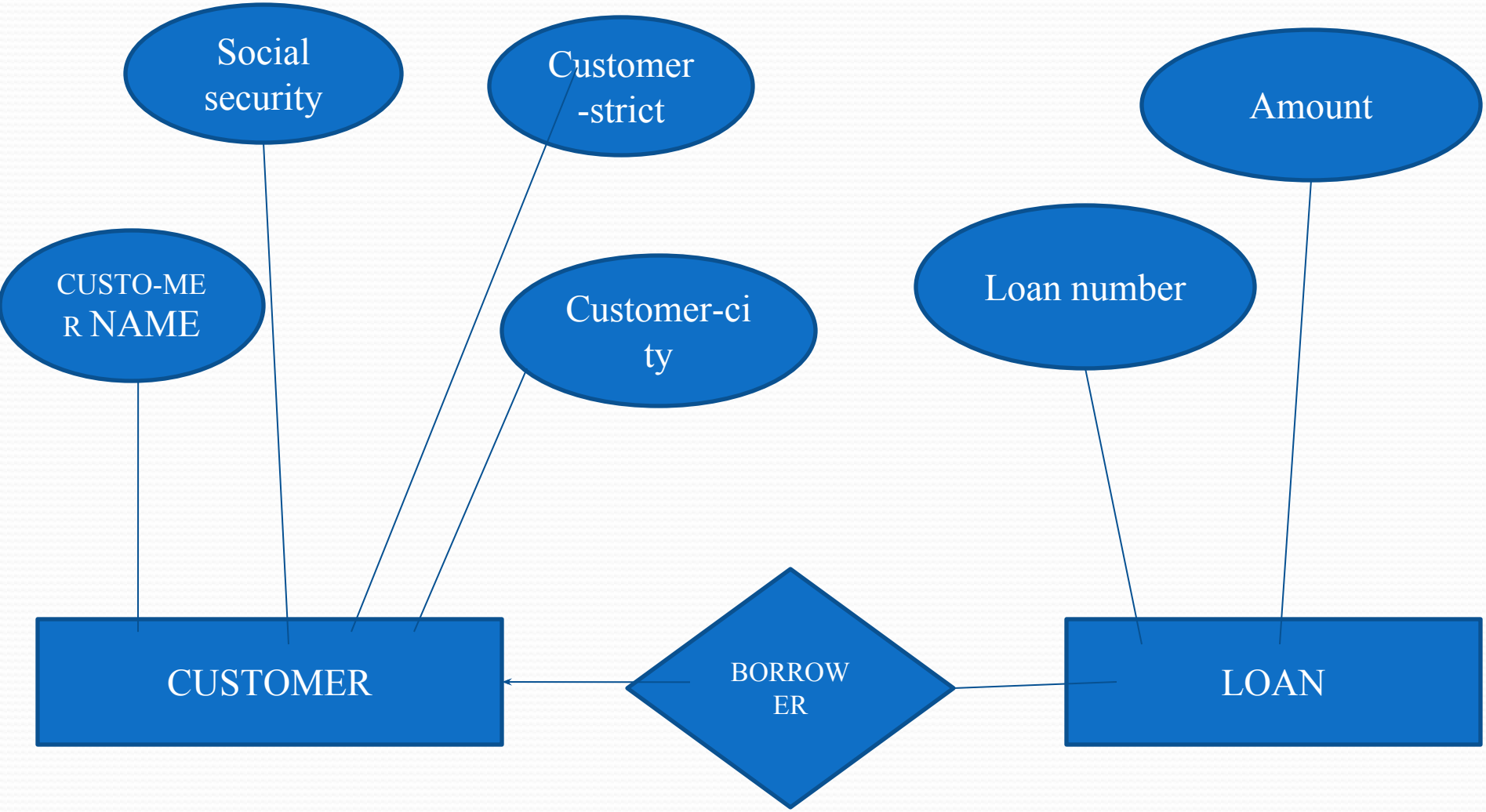
ONE TO ONE RELATIONSHIP



ONE-TO-MANY RELATIONSHIP

If the relationship set borrower were one-to-many from customer to loan, then from borrower to the customer would be directed with an arrow pointing to the customer would be directed with an arrow pointing to the customer entity set.

ONE TO MANY RELATION SHIP



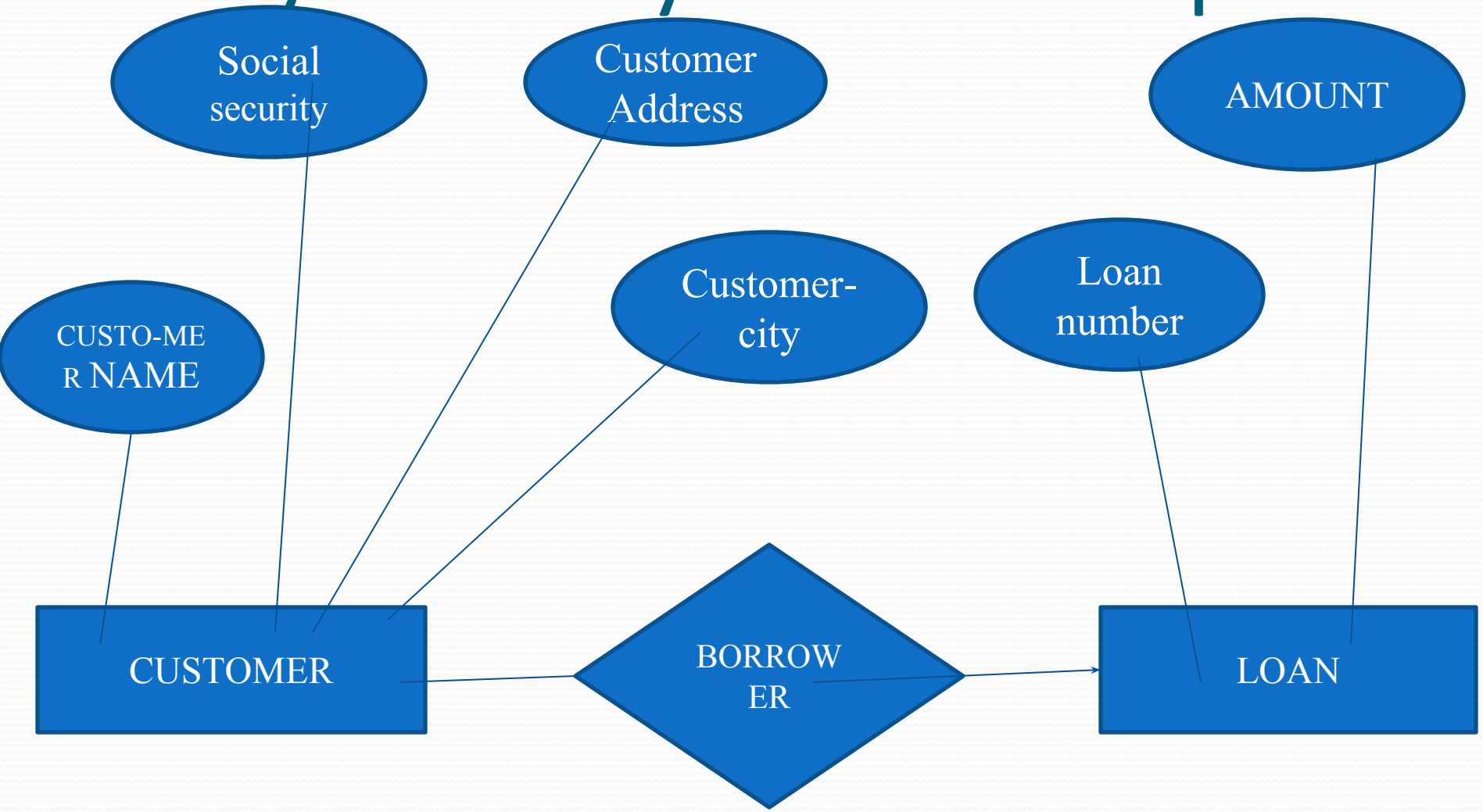
MANY TO MANY RELATIONSHIP

If the relationship set borrower were many to many to one, from customer to loan, then the line from borrower to loan would have an arrow pointing to the loan.

A directed line from the relationship set borrower is either one-to-one, or many-to-one relationship set from customer.

An undirected line from the relationship set borrower to the entity set loan specifies that borrower to the entity set loan specifies that borrower is either in many to one-or-one or one-to-many relationship.

Many to Many Relationship



Question bank based on UNIT-I

	Marks
Q.1 . What is DBMS? explain & define following terms 1. Data item 2. Data record 3. Data size 4. Data file	4
Q.2. What is Traditional file based system ? Explain	4
Q.3. Explain Roles in the Database Environment.	4
Q.4. What is Data Independence? Explain with their types.	4
Q.5. Draw Architecture of DBMS? And Explain.	8
Q.6. What is Data Models ? Explain with their types in detail	8
Q.7 . Write difference between DBMS & RDBMS(any five)	5
Q.8 . Explain Advantages & Disadvantages of DBMS.	8
Q.9. Explain Advantages & Disadvantages of Data Model.	4
Q.10. What is DBA? Explain with their duties.	4