Assignment - 1

Ques.1: What are the advantages and disadvantages of Database Approach.

Answer ⇒ Following are the advantages and disadvantages of database Approach.

Advantages of Database :

1. Control of data redundancy :
The file based data management systems contained multiple files that were stored in many diffrent locations in a system or even across multiple systems. Because of this, there were sometimes multiple copies of the same file which lead to data redundancy.

2. Sharing of Data :
In a database, the users of the database can share the data among themselves. There are various levels of authorisation to access the data. and consequently the data can only be shared based on the correct authorisation protocols being followed.

3. Data Consistency :
Data consistency is ensured in a database because there is no data redundancy. All data appear consistently across the database and the data is same for all the users viewing the

database.

4 Privacy:
The privacy rule in a database means only the authorized users can access a database according to its privacy constraints.

5. Backup and Recovery:
DBMS automatically takes care of backup and recovery. The users don't need to backup data periodically because this is taken care of by the DBMS.

Disadvantages of Database :-

1. High Hardware cost:
Additional memory and processing power may be required to run the DBMS, resulting in the need to upgrade the hardware.

2. High conversion Cost:
The organization that was using file system need to load files into the database which may be difficult and time consuming process.

3. Higher Programming Cost:
Because a DBMS is a complex tool with many features, it requires experienced programmers resulting in extra payment for the hire and expertise

4. Complexity:
The provision of the functionality we expect of a good DBMS makes the DBMS an extremely complex piece of software.

5. Database Management System software is very costly.

Question2: Explain ANSI / SPARC Architecture of a Database System.

Answer: The American National standards Institute (ANSI)/ Standards Planning and Requirements committee (SPARC)

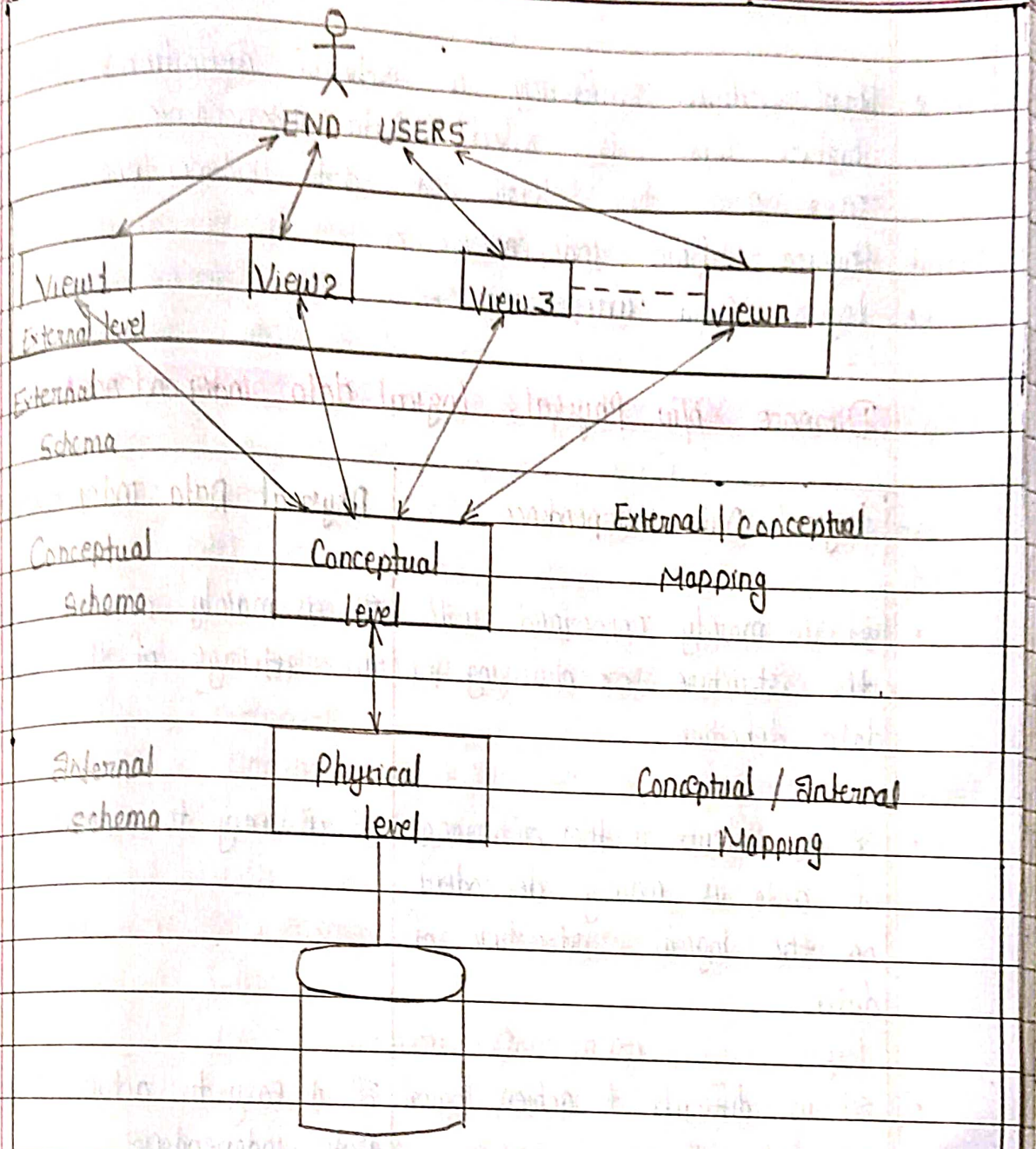
- The three schema architecture is also called ANSI/ SPARC architecture or three-level architecture.
- This framework is used to describe the structure of a specific database system.
- The three schema architecture is also used to seprate the user applications and physical database.
- The three schema architecture contain three levels. It breaks the database down into three diffrent categories.

1. Physical level or Internal schema:
- This level is also known as physical level/ internal level.
- The internal level has an internal schema, which describes the physical storage structure of the database.

- The internal Schema is also known as physical schema.
- It use the physical data model. It is used to define that how the data is actually stored in the storage devices.
- This level is also responsible for allowing space to the data.
- This is the lowest level of the architecture.

2. Logical Level or Conceptual level:
- The conceptual schema describes the design of a database at the conceptual level. Conceptual level is known as logical level.
- The conceptual Schema describe the structure of the whole database.
- The conceptual level describes what data are to be stored in the database and also describes what relationship exists among those data.
- Programmers and database administrators work at this level.

3. View Level or External Schema:
- The view level is the "top level" of the three level DBMS architecture.
- At the external level, a database contains several schemas that sometimes called as subschema.
- The subschema is used to describe the different view of the database.
- The view level describes the end user interaction with DBMS.



Three level Architecture of DBMS

Question 3 What is Data Independence? Differentiate between logical Data Independance, Physical Data independence

Answer: Data Independence : The ability to modify a schema definition in one

level without affecting a schema definition in the next higher level is called Data independence.
There are two levels of data independence.

- Physical Data independence
- Logical Data independence

Difference b/w Physical, Logical data independence:

Logical Data independence	Physical Data independence
• It is mainly concerned with the structure or changing the data definition.	It is mainly concerned with the storage of the data.
• It is difficult as the retrieving of data is mainly dependent on the logical structure of data.	It is easy to retrieve.
• It is difficult to achieve logical data independence.	It is easy to achieve physical Data independence
• You need to make changes in application program if new field are added or deleted from the database.	A change in the physical level usually doesn't need change at application program level.
• Concerned with conceptual schema.	Concerned with internal schema
• Example: Add / Modify / delete	Example: change in compression

a new attribute.	technique, storage devices etc.

Question 4: What are database constraints? Explain in detail.

Answer → Constraints are used to specify rules for data in a table.
Constraints are used to limit the type of data that can be inserted in a table.
Constraint can be column level or table label.
Column level constraints apply to a column and table label constraints apply to the table.
Constraint ensure the correctness of the data in the database.
Relational constraints are the restrictions imposed on the database content or the object.

Types of Constraints in Database :

- Domain Constraint
- Tuple Uniqueness constraint / Unique key
- Key constraint
- Not Null constraint
- Integrity constraint
  - Entity integrity Constraints
  - Referential integrity Constraints

1. Domain Constraints :

It defines the domain or set of values for an attribute. It specify that value taken by the attribute must be atomic value from its domain.

Example :

Name	Age
Abc	19
DEF	20
GHI	A

Not allowed since only integer value is allowed here.

2. Tuple Uniqueness Constraints :

This constraint specify that all the tuples must be unique in any relation. Duplicate record of tuple are not allowed in a relation.
Unique key constraint duplicate values are not allowed in a relation.

Name	Age
Abc	19
XYZ	20
PQR	19

duplicate ~~values~~ tuples

3. Key Constraints :
It specify that in any relation all the values of primary key must be unique and primary key cannot have null values.

Example :-

Rollno	Name	Branch
1	XYZ	IT
2	PQR	CSE
3	ABC	ME

4. Not Null Constraint :-
This constraint specify that an attribute cannot have null values.

5. Integrity Constraints :

(i) Entity Integrity Constraints :

It states that primary key cannot be null. This is because primary key value is used to identify tuples or records in a relation. If primary key is null than we cannot identify those records.

P.T.O.

example :-

Rollno.	Name	branch
1	ABC	IT
2	DEF	CSE
○	GHI	ME

primary Key

Not allowed.

primary key can't be null.

(ii) Referential Integrity Constraints :-

This constraint is specified b/w two tables. It is also known as foreign key constraint. This constraint states that if a foreign key is exist in a relation either the foreign key value must be match the primary key value of some tuples in its parent table or foreign key value must be null.

Relationship

Rollno.	Name	Branch
1	Abc	IT
2	def	CSE
3	GHI	ME

primary key

parent table.

primary key — foreign key

Courseid	Course Name	Rollno.
C01	Degree	1
C02	Diploma	2
C03	ITI	18

child table

Not allowed as Rollno. 18 is not defined as a primary key value

Foreign key value must be equal to the primary key value of parent table or it should be null. This constraint ensure that their must exist a valid relationship b/w two tables.

Question 5:- Explain Following :

1. Schema : The overall design of the database is called schema. Schema is the organization of data in a formal manner.

Schema is of three types : Physical schema, logical schema and view schema.

Schema is only a structural view (design) of a database.

2. Instance :

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

3. Primary key :

Primary key is an attribute or group of attributes that uniquely identify a tuple in the table. Primary key is selected from one of the candidate key. Primary key cannot be duplicate and it can't be null.

4. Foreign Key

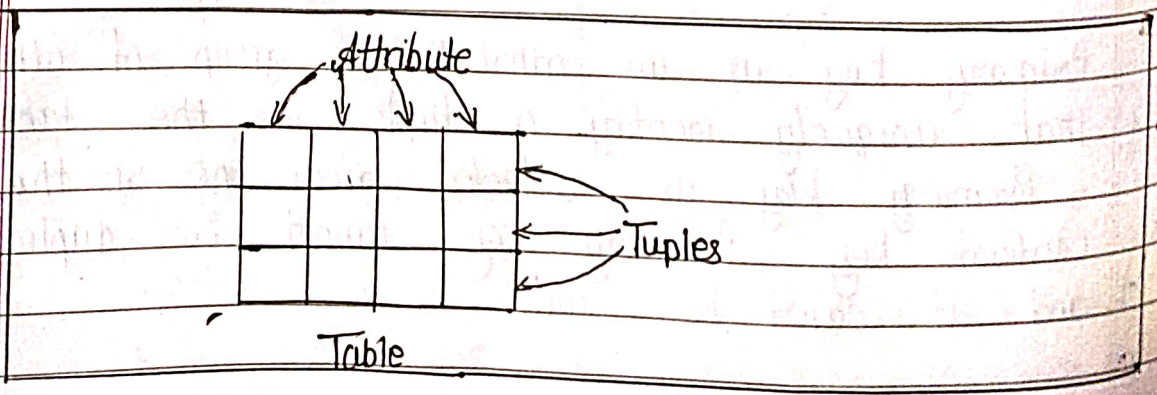
Foreign key are the column of a table that point to the primary key of another table. It is a column or attribute that creates a relationship between two tables. It is useful in linking two tables together.

5. Tuple

In the context of relational database, a tuple is one record. The information in a database can be thought of as a spreadsheet, with columns representing different categories of information and tuples representing all the information from each field associated with a single record. or: In simple words A tuple is a row of a relation.

6. Attribute:

Attribute are the properties which define the entity type. An attribute is represented as oval shape in an ER diagram.



7. Mapping :

The process to convert a request and the result from one level to another level is known as Mapping.

There are two types of Mappings:

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