ASSIGNMENT-1

1) Explain three schema architecture with a neat diagram.

=> • The three-schema architecture is a design approach for databases that splits data views into three layers.

i) EXTERNAL SCHEMA (USER VIEW): This level represents the way individual users or user groups view the data.

External view

Empno	Ename

Empno	Ename	salary	Deptno

• Each view schema describes the database part that a particular user group is interested and hides the remaining database from that user group.

ii) CONCEPTUAL SCHEMA (LOGICAL VIEW): This level represents the logical structure of the table database as seen by the administrator.

Global view

EMPLOYEE
Empno: Integer (4) key
Ename: String (15)
Salary: String (8)
Deptno: Integer (14)
Post: String (15)

- Also describes what data are to be stored in the database and also describe what relationship exists among those data.

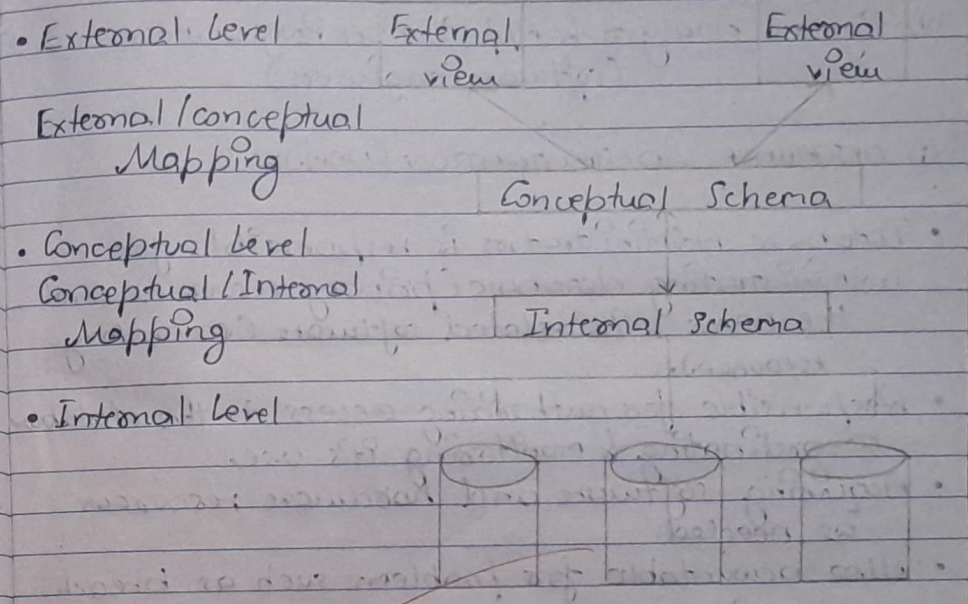
iii) INTERNAL SCHEMA (PHYSICAL VIEW):- This level defines how and where the data is stored and accessed.

Internal View

STORED_EMPLOYEE record length 60
Empno: 4 decimal offset 0 Unique
Ename: String length 15 offset 4
Salary: 8.2 decimal offset 13
Deptno: 4 decimal offset 21
Post: String length 15 offset 31

- storage space allocations
  - For example:- B-Trees, Hashing etc.
- Access paths
  - For example:- Specification of primary and secondary keys, indexes, pointers and sequencing.
- Data compression and encryption techniques
- Optimization of internal structure
- Representation of stored fields.

- Neat diagram of schema architecture:



2) Explain actors on the scene and worker behind the scene.

⇒ * ACTORS ON THE SCENE

- The people whose jobs involve the day-to-day use of large database are called database actors on the scene.

- They are as follows:-

i) Database Administrator (DBA)
ii) Database Designer (DDD)
iii) End Users
iv) System Analysts & Application Programmer (software engineers)

(i) DATABASE ADMINISTRATOR (DBA):

- Database Administrator is responsible for administrating database (primary resource) and the DBMS & its related software (secondary resource).
- Responsible for authorizing access to the database co-ordinating & monitoring it's use.
- Acquiring software and hardware resources as needed.
- Also accountable for problems such as breach of security or poor system response time.

(ii) DATABASE DESIGNERS:

- Database Designers are responsible for identifying the data to be stored in the database.
- Also they choose appropriate structures to represent & store this data.
- Responsible to communicate with all database users in order to understand their requirements & to create a design that meets these requirements.
- Database Designers interact with all groups of users & develop views of the database that meet the data. Each view is then analysed & integrated with the view of other user groups.

(iii) END USERS:-

End users are the people whose jobs require access to the database for querying, updating & generating reports.

- There are several categories:-

a) CASUAL END USERS:- Occasionally access the database, but they may need different information each time. They use sophisticated database query language to specify their requests.

b) NAIVE OR PARAMMETRIC END USERS:- Their job is to constantly query and update the database using standard types of queries & updates called canned transactions.
(queries that carefully programmed tested)
EXAMPLES: Bank tellers check account balances reservation clerks for airlines, hotels etc.

c) SOPHISTICATED END USERS:- It includes engineers, scientists business analysts & others who throughly familiarize themselves with the facilities of DBMS. To implement their applications, they from their request in a database quiry language.

d) STAND ALONE END USERS:- These users maintain present personal database by using readymade program packages that provide easy-to-use menu based or graphical graphics based interface. Example: Tally (Accounting Package)

iv) SYSTEM ANALYSTS & APPLICATION PROGRAMMERS:-

- System Analysts determine the requirements of end users & develop specifications for ~~real~~ canned connect transactions as programs. Then they test, debug, documents & maintain canned transactions.
- Such systems analysts & application programmers are commonly referred as ~~for~~ software engineers.

* WORKERS BEHIND THE SCENE:-

- These people are associated with the design, development and operation of the DBMS software and system environment.
- THEY ARE CATEGORIZED AS:-

1) DBMS system designers & implementers
2) Tool developers
3) Operators & maintainance personel.

1) DBMS system designers & implements:-

- These will design and implement the DBMS modules and interfaces as a software package.
- DBMS is very complex software system and it must interface with the operating system and ~~compiler~~ compilers for various programming languages.

2) TOOL DEVELOPERS:-

- They Design and implement tools that facilitates database design, performance and database system.
- Design tools are optional packages that are purchased seperately and includes packages for database design, prototyping simulation and test data generation.
- Independent software vendors develop and market these tools.

3) OPERATORS & MAINTENANCE PERSONEL:-

- Are responsible for the actual running and maintenance of the hardware and software environment for database system.

(3) List and explain the characteristics of DBMS.

⇒ CHARACTERISTICS OF DBMS ARE:-

i) Self-Describing Nature of a Database System.
ii) Insulation between programs and Data, and Data Abstraction.
iii) Support for Multiple views of the Data.

iv) Sharing of knowledge and Multi-user transaction processing:

i) APPROACH-1: self-Describing Nature of a Database System:-

- The database system contains not only the database itself but also an entire definition or description of the database structure and constraints also known as metadata of the database.
- This definition is stored within the DBMS catalog, which contains information like the structure of every file, the sort and storage format of every data item, and various constraints/rules on the information.
- The information stored in the catalog is called metadata & describes the structure of primary database.

ii) APPROACH-2:- Insulation between programs and Data, and Abstraction:-

- In a traditional file processing system, the structure of database knowledge files is embedded within the application programs, so any changes to the structure of a file may require changing all programs that access the file.
- The structure of knowledge files is stored within the DBMS catalog separately from the programs that access them we call this property program data independence.
- The characteristics that allows program-data independence and program-operation independence is known as data abstraction.

iii) APPROACH-3: support for Multiple views of the Data:-

- A database sometimes has many users, each of whom may require a special perspective or view of the database.
- A view could also be a subset of the database, or it's going to contain virtual data that is derived from the database files but isn't explicity stored.

iv) APPROACH-4:- sharing of knowledge and Multi-user Transaction Processing:-

- A multi-user DBMS allows multiple users to access the database at an equivalent time, or concurrently.
- DBMS must include concurrency control software to ensure that several users trying to update the same data do so in a controlled manner so that the results of the updates is correct.

1) Explain any 4 DBMS interfaces:

⇒ A DBMS interface enables a user to enter queries into a database without the need for the query language.

TYPES OF DBMS INTERFACE:-

(i) FORM-BASED INTERFACE:-

- It displays a form to each users.
- Users can fill out all of the form entries to insert new data, or they can fill out only certain entries where the DBMS will retrieve matching data entries.

User Name	:-	
Department	:-	CSE
Floor	:-	1
Block	:-	A-Block
Room No.	:-	
Problem Reported on	:-	
Telephone No	:-	
Complaint	:-	
		Submit Reset

(ii) SPEECH INPUT & OUTPUT:- Applications with limited information vocabulary allows speech for input and output.

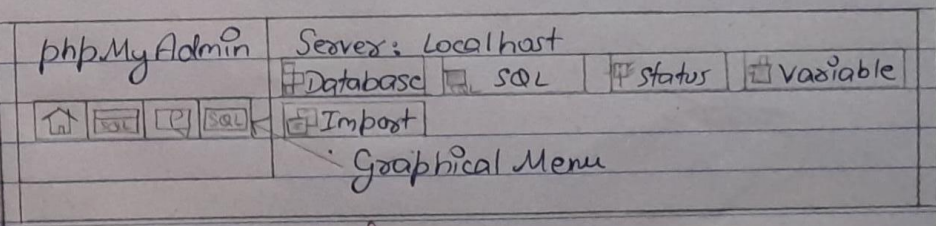
EXAMPLE:- Inquiries for telephone dictionary, flight arrival/departure, & bank account information.

(iii) NATURAL LANGUAGE INTERFACE:-

- They accept request written in english or some other language & they make an attempt to understand them.
- If the interpretation is successful, the interface generates a high level query corresponding to the natural language and submits it to the DBMS for processing.
- EXAMPLE:- Voice Recognition system.

(iv) GRAPHICAL USER INTERFACE (GUI):-

- Display a schema to the user in diagrammatic form. The users specify a query by manipulating the diagram. GUI's utilize both ~~menus~~ menus and forms. They use pointing device like mouse.



Graphical Menu

05/11/24