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Assignment_1

Q1) What is DBMS? Discuss the advantages of a database System . Also discuss the risk and cost factors involved in implementing a DBMS.

Answer:- DBMS is a software application that is used to create, access, maintain and manage databases. It accepts the incoming data either from an application or from a user who is manually entering it. It does not matter if it is a large or small DBMS, with this we can store and retrieve data and make changes whenever we want to.

The advantages of DBMS are-
a) We can set up authorized users who can view, share, and access data. This ensures security for data.
b) With minimum data duplicity and redundancy, DBMS provides data protection and integrity.
c) There are some data which are accessed very frequently while there are few that aren't. So, DBMS provides the capability to access the frequently accessed data as quickly as possible.
d) DBMS systems allow Data Integration with much feasibility. Data integration is a process of combining the data residing at different locations and presenting the user with a unified view of data.
e) In DBMS, data is stored in one or more servers in the network and there is some software locking mechanism that prevents the same set of data from being changed by two people at the same time.

The risk and cost factors involved in implementing a DBMS is-

High cost:- Installing a new database system may require investment in hardware and software. The DBMS requires more main memory and disk storage. Moreover, DBMS is quite expensive. Therefore, a company needs to consider the overhead cost of implementing a new database system.

Training new personnel:- When an organization plans to adopt a database system, it may need to hire a specialized data administration group, which can coordinate with different user-groups for designing views, establishing recovery procedures and fine tuning the data structures to meet the requirements of the organization. Hiring such professionals is expensive.

Explicit backup and recovery:- A shared corporate database must be accurate and available at all times. Therefore, a system using online updating requires explicit backup and recovery procedures.

System failure:- When a computer system containing the database fails, all users have to wait until the system is functional again. Moreover, if DBMS or the application program fails, a permanent damage may occur to the database.

Q2) What are the different kinds of Database users?

Answer:- These are seven types of database users in DBMS and they are:-
1)Database Administrator.
2)Naive Users.
3)System Analyst.
4)Sophisticated Users.
5)Database Designers.
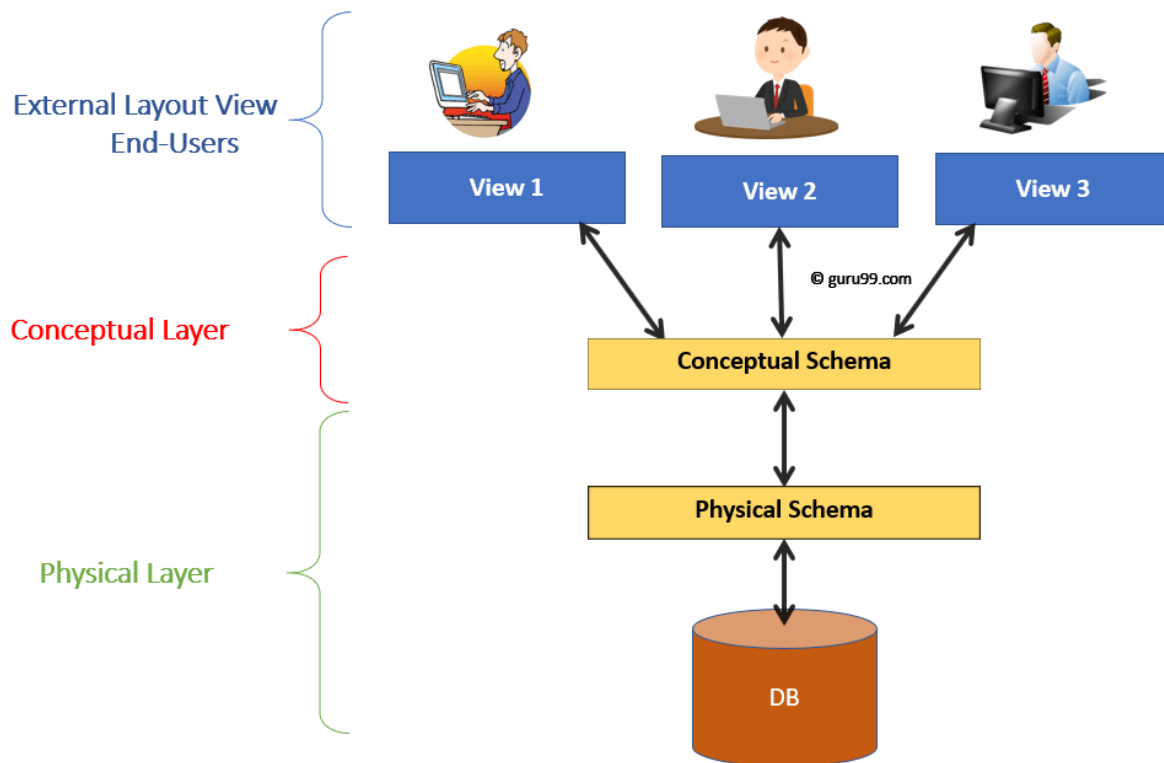6)Application Program.
8)Casual Users.

Q3) Who is a DBA? What are the various responsibilities of a DBA?

Answer:- A Database Administrator shortly DBA is a person who is responsible for controlling, maintenance, coordinating, and operation of database management system.Their role also varies from configuration, database design, migration, security, troubleshooting, backup, and data recovery.

1)Decides hardware:-They decide economical hardware, based upon cost, performance and efficiency of hardware and best suits organization. It is hardware which is the interface between end users and the database.

2) Manages data integrity and security:- Data integrity needs to be checked and managed accurately as it protects and restricts data from unauthorized use. DBA eyes on relationships within data to maintain data integrity.

3) Database design:- DBA is held responsible and accountable for logical, physical design, external model design, and integrity and security control.

4) Database implementation:-DBA implements DBMS and checks database loading at time of its implementation.

5) Query processing performance:- DBA enhances query processing by improving their speed, performance and accuracy.

6)Tuning Database Performance:- If a user is not able to get data speedily and accurately then it may lose organization business. So by tuning SQL commands DBA can enhance the performance of the database.

Q4) Explain three level architecture of a DBMS with an example.

Answer:- Three Level Architecture of DBMS helps in design , develop , implement and maintain the Database Management System. Three-tier architecture of DBMS helps in achieving the abstraction.

External Layout View
End-Users

Conceptual Layer

Physical Layer

View 1   View 2   View 3

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Conceptual Schema

Physical Schema

DB

1) **Physical Level:-** The lowest level of architecture of a database system is the physical level in DBMS, also known as the internal level. The data is stored in the external hard drives in bits and bytes at the physical level. It is also responsible for the Compression and Encryption of data. It can be viewed in the form of files.

2) **Conceptual Level:-** Conceptual level describes the structure of the whole database for a group of users. It is also called the logical model or data model.The conceptual level of architecture of a database system specifies the relationships between various data tables and describes how the database looks to the users conceptually.The conceptual level does not have any relation to how the data in the database is stored.Generally, programmer and administrator work at conceptual or logical level.

3) **External Level:-** The highest level in the three tier architecture of DBMS is the external level and closest to the user. It is also called the view level or superficial level.This schema also contains subschema. Each subschema describes each view of the database.External level shows only the relevant data to the users in the form of views and hides the remaining data.

Q5) Elaborate on a) DDL , DML , TCL. b)Physical and logical data independence.

Answer:- a) DDL:- Data Definition Language (DDL) is a subset of SQL. It is a language for describing data and its relationships in a database. These database objects include views, schemas, tables, indexes, etc. DDL does not show up as a different language in an SQL database, but does define changes in the database

schema. DDL commands are used for altering the database structure such as creating new tables or objects along with all their attributes. Commonly used DDL in SQL querying are CREATE, ALTER, DROP, and TRUNCATE.

CREATE:- This command is used to create the database or its objects.

DROP:- This command is used to delete objects from the database.

ALTER:- This is used to alter the structure of the database.

TRUNCATE:- This is used to remove all records from a table, including all spaces allocated for the records are removed.

Other commonly used commands include RENAME and COMMENT.

COMMENT:- This is used to add comments to the data dictionary.

RENAME:- This is used to rename an object existing in the database.

DML:- A data manipulation language (DML) is a family of computer languages including commands permitting users to manipulate data in a database. This manipulation involves inserting data into database tables, retrieving existing data, deleting data from existing tables and modifying existing data. DML is mostly incorporated in SQL databases. Commonly used DDL in SQL querying are SELECT, UPDATE, INSERT INTO and DELETE FROM.

SELECT:- This command is used to retrieve rows from a table.

UPDATE:- This command modifies data of one or more records.

INSERT:- This command adds one or more records to a database table.

DELETE:- This command removes one or more records from a table according to specified conditions.

TCL:-Transaction Control Language commands are used to manage transactions in the database. These are used to manage the changes made by DML-statements. It also allows statements to be grouped together into logical transactions. Examples of TCL commands are:

COMMIT: Commit command is used to permanently save any transaction into the database.

ROLLBACK: This command restores the database to the last committed state. It is also used with the savepoint command to jump to a savepoint in a transaction.

SAVEPOINT:- Savepoint command is used to temporarily save a transaction so that you can rollback to that point whenever necessary.

b) Physical and logical data independence:-

Logical data independence:- Logical data is data about a database, that is, it stores information about how data is managed inside. Logical Data Independence is mainly concerned with the structure or changing the data definition. Examples of changes under logical data independence are Add/Modify/Delete a new attribute, merging two records into one, breaking an existing record into two or more records.

Physical data independence:- All the schemas are logical, and the actual data is stored in bit format on the disk. Physical data independence is the power to change the physical data without impacting the schema or logical data.Compared to Logical Independence it is easy to achieve physical data independence.Examples of changes under Physical Data Independence are Switching to different data structures, Changing the access method, Modifying indexes.

Q6) What are the different types of DATA models ? Elaborate.

Answer:- There are three types of data models.They are:-

a) <u>Relational Data Model:</u>- Relational model can represent as a table with columns and rows. Each row is known as a tuple. Each table of the column has a name or attribute.

   Domain:- It contains a set of atomic values that an attribute can take.

   Attribute:- It contains the name of a column in a particular table. Each attribute Ai must have a domain, dom(Ai).

   Relational instance:- In the relational database system, the relational instance is represented by a finite set of tuples. Relation instances do not have duplicate tuples.

   Relational schema:- A relational schema contains the name of the relation and name of all columns or attributes.

   Relational key:- In the relational key, each row has one or more attributes. It can identify the row in the relation uniquely.

b) <u>Conceptual Data Model:</u>- A Conceptual Data Model is an organized view of database concepts and their relationships. The purpose of creating a conceptual data model is to establish entities, their attributes, and relationships. In this data modeling level, there is hardly any detail available on the actual database structure. Business stakeholders and data architects typically create a conceptual data model. The three basic tenets of Conceptual Data Model are

Entity:- A real-world thing.

Attribute:- Characteristics or properties of an entity.

Relationship:- Dependency or association between two entities

c) <u>Hierarchical Data Model</u>:- A hierarchical data model was one of the earliest data models. This model was a file based model built like a tree. In this tree, a parent could be associated with multiple child nodes, but a child node could have only one parent. This can be represented as
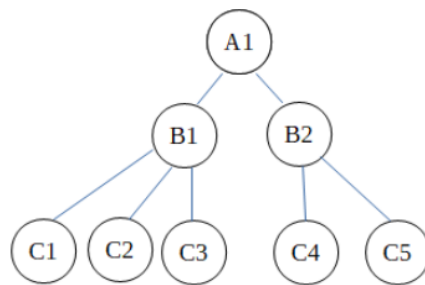
Q7) Explain the various functional components of a DBMS.

<u>Answer:-</u> Components of DBMS describe what are the different parts that work together for creating, managing the database that forms a complete system named DBMS.

The Components of the DBMS Environment

1. Hardware:- Can range from a PC to a network of computers.

2. Software:- DBMS, operating system, network software and also the application programs.

3. Data:-Data constitutes the database's central component through which information is generated.

4. Procedures:-Instructions and rules that should be applied to the design and use of the database and DBMS.Also, designed to accomplish desired activities

5. People:-Perform different functions within the environment .