**UNIT-1**

**CONCEPT OF DBMS**

**1.What is database ?**

**A)** A database can be defined as a collection of inter related relevant data stored together to serve multiple applications.

**2. What is Data Processing ?**

**A)** data processing is defined as: " a sequence of operations on data to convert it into useful information". The important operations that can be performed on data are:

* Arithmetic and logical operations.
* To send and receive data from one location to another.
* Classification of data.
* Arranging data into a specific order etc.

**3. What is a DBMS ?**

**A)** A Database Management System (DBMS) can be defined as a collection of programs or software packages those are used to define, manipulate, control and processing the database.

**4. What are components of DBMS ?**

**A)** he database management system can be divided into five major components, they are:

1. Hardware
2. Software
3. Data
4. Procedures
5. Database Access Language

**5.Define Instance?**

**A)** The data stored in database at a particular moment of time is called instance of database. Database schema defines the variable declarations in tables that belong to a particular database; the value of these variables at a moment of time is called the instance of that database.

**6.** **Define Schema and Sub-Schema?**

**A) Schema:** The overall design of the database is called the database ‘schema’. Schemas are changed frequently.

 **Subschema:** It can be defined as the subset or sub-level of schema that has the same properties as the schema. In simple words it is just a effective plan or the schema for the view. The logical view of data as it appears to the application can be called as sub schema.

**7.What is data independence?**

**A)** 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. They are Physical Data Independence Logical Data Independence.

**8.** **What is difference between physical and logical data Independence?**

**A)**

* The **physical schema** is the lowest level of a schema which describes how the data stored on the disk or the physical storage.
* The **logical schema** is the intermediate level of a schema which describes the structure of the database to the database designers. It also specifies what relationship exists between the data.
* The **external schema** or **subschema** is the highest level of a schema which defines the views for the end users.

**9.** **Who will be called as DBA?**

**A)** Database Administrator is a person who has central control over the system is called data base administrator. DBA is the final authority on deciding the structure accessing strategies, storage criteria, user preventing data base from frauds.

**10.** **What is Meta data or Data Dictionary ?**

**A)** The result of compilation of DDL statements is a set of tables that is stored in a special file called ‘Data dictionary’ or “data directory.

 A data dictionary is a file that contains metadata, i.e. Data about data. This file is consulted before actual data are read or modified in the database system.

**11.** **What the three levels of data abstraction ?**

**A)** Levels of Abstraction: basically, Abstraction can be divided in to 3 levels. Those are:

 1. Physical Level

 2. Logical Level (Conceptual Level)

 3. View Level

**12. Write different types of database users?**

**A)** Database users are the one who really use and take the benefits of database. There will be different types of users depending on their need and way of accessing the database:

 1. Application Programmers

 2. Sophisticated Users

 3. Specialized Users

 4. Stand-alone Users

 5. Native Users

 6. Database Administrators (DBA)

**13.** **Expand the terms DDL, DML, DCL?**

**A)**  **DDL :** Data Definition Language.

 **DML:** Data Manipulation Language.

 **DCL:** Data Control Language.

**14.** **Write the commands of DDL, DML, DCL?**

**A)** The DDL commands are Create, Alter, Drop.

 The DML commands are SELECT, INSERT, UPDATE, DELETE

 The DCL commands are GRANT, REVOKE, COMMIT, ROLLBACK

**Long Answers Type Questions**

**15.** **What are the advantages of DBMS over File Processing system**

**A)** The data base approach offers a number of potential advantages compared to traditional file processing system. The primary advantages are:

 Program data independence

 Minimal data Redundancy

 Improved data consistency

 Improved data sharing

 Increased productivity of application development.

 Enforcement of standards Improved data Quality Improved data

 accessibility and responsibility.

 Reduced program maintenance.

**Program data Independence**: The separation of data description of metadata from the application programs that use for data is called data independence.

**Minimal data redundancy**: The data base approach does not eliminate redundancy entity, but it allows designers to carefully control the amount of redundancy.

**Improved data consistency**: By eliminating data redundancy we can greatly reduce the for data inconsistency.

**Improved data sharing**: The data is designed as a shared corporate resource authorized internal and external users and granted the permission to use data base and each user is provided one or more user view to facilitate this use.

**Increased productivity of application development**: The major advantages of the data base approach are that greatly reduces the coast and time for developing new business application.

**Enforcement standards**: These standards will include naming convention, data quality standards, a number of uniform processors for accessing, updating protecting the data.

**Improved data quality:** The database approach provides a number of tools and processes to improve data quality. Two of the more important are constraints and cleanup.

**Improved data accessibility and responsibility:** With relational database the users can experience without programming knowledge to retrieve and display the data using SQL.

 **Reduced Program Maintenance:** Stored data must be changed frequently for a variety of reasons new data item types are added, data formats are changed and so on.

**16.** **Explain about different data models?**

**A)** Data Model is a logical structure of Database. It describes the design of database to reflect entities, attributes, relationship among data, constrains etc. The data models have been broadly classified in to :

 Object based data models

 Record – based data models

 Physical data models.

**Object based data models:**

Object – based data models are used in describing data and data – relationships in accordance with concept.

**The Entity-relationship Model :**

 This data model is based on a perception of real world that consists of a collection of basic objects, Entities, Entity sets, relationship and relationships sets. Some of they are:

 Rectangles :Which represent entity sets.

 Ellipses : Which represent attributes

 Diamonds : Which represent relationship sets

 Lines :Which link attributes to entity sets and entity sets

 to relationship sets.

**The Object-Oriented Model :**

 This model is based on a collection of objects. An object contains values stored in instance variables within the object. An object also contains bodies of code that operate on the object. These bodies of code are called Methods.

**Record – Based data Models:**

 These models are used to specify the overall logical structure of the database. With some models a higher-level description of the implementation of the structure of the database can also be specified explicitly. The data integrity constraints cannot be specified with these models. The three widely accepted. record – based data models are ᜀ

 Relational model

 Hierarchical model.

 Network model

**Physical Data models:**

 A physical data model defines all of the logical database components and services that are required to build a database or can be the layout of an existing database.

 A physical data model consists of the table’s structure, column names and values, foreign and primary keys and the relationships among the tables. These models are used to have higher level description of the storage structure of the database and their access mechanism.

 A very few physical data models have been proposed so far. TWO of these well known models are the **unifying model** and the **frame memory model.**

**17. What is data abstraction? Explain in detail ?**

**A)**  A DBMS is a collection of interrelated files and set of programs which allows the users to access and modify these files. A major purpose of a database system is to provide users with an abstract view of the data.

Levels of Abstraction: basically, Abstraction can be divided in to 3 levels. Those are:

**Physical Level :**

 The lowest level of data abstraction describes how the data are actually stored in the database. At the physical level, complex low-level data structures are described in detail.

**Logical Level (Conceptual Level) :**

 This is the next higher level of abstraction. It describes what data are stored in the database, and what relationship exist among those data. This level of abstraction is used by Database Administrator (DBA), Who decides what information is to be kept in the database.

**View Level:**

 This is the Highest level of data abstraction. It describes only a part of the entire database. The use of simpler structures at the logical level, some complexity remains, because of the large databases.



**18.** **Explain DDL, DML and DCL commands with examples?**

**A)** There are five types of SQL commands: DDL, DML, DCL, TCL, and DQL.



1. Data Definition Language (DDL)

* DDL changes the structure of the table like creating a table, deleting a table, altering a table, etc.
* All the command of DDL are auto-committed that means it permanently save all the changes in the database.

Here are some commands that come under DDL:

* CREATE
* ALTER
* DROP
* TRUNCATE

**a. CREATE** It is used to create a new table in the database.

**Syntax:**

1. CREATE TABLE TABLE\_NAME (COLUMN\_NAME DATATYPES[,....]);

**Example:**

1. CREATE TABLE EMPLOYEE(Name VARCHAR2(20), Email VARCHAR2(100), DOB DATE);

**b. DROP:** It is used to delete both the structure and record stored in the table.

**Syntax**

1. DROP TABLE ;

**Example**

1. DROP TABLE EMPLOYEE;

**c. ALTER:** It is used to alter the structure of the database. This change could be either to modify the characteristics of an existing attribute or probably to add a new attribute.

**Syntax:**

To add a new column in the table

1. ALTER TABLE table\_name ADD column\_name COLUMN-definition;

To modify existing column in the table:

1. ALTER TABLE MODIFY(COLUMN DEFINITION....);

**EXAMPLE**

1. ALTER TABLE STU\_DETAILS ADD(ADDRESS VARCHAR2(20));
2. ALTER TABLE STU\_DETAILS MODIFY (NAME VARCHAR2(20));

**d. TRUNCATE:** It is used to delete all the rows from the table and free the space containing the table.

**Syntax:**

1. TRUNCATE TABLE table\_name;

**Example:**

1. TRUNCATE TABLE EMPLOYEE;

2. Data Manipulation Language

* DML commands are used to modify the database. It is responsible for all form of changes in the database.
* The command of DML is not auto-committed that means it can't permanently save all the changes in the database. They can be rollback.

Here are some commands that come under DML:

* INSERT
* UPDATE
* DELETE

**a. INSERT:** The INSERT statement is a SQL query. It is used to insert data into the row of a table.

**Syntax:**

1. INSERT INTO TABLE\_NAME
2. (col1, col2, col3,.... col N)
3. VALUES (value1, value2, value3, .... valueN);

Or

1. INSERT INTO TABLE\_NAME
2. VALUES (value1, value2, value3, .... valueN);

**For example:**

1. INSERT INTO javatpoint (Author, Subject) VALUES ("Sonoo", "DBMS");

**b. UPDATE:** This command is used to update or modify the value of a column in the table.

**Syntax:**

1. UPDATE table\_name SET [column\_name1= value1,...column\_nameN = valueN] [WHERE CONDITION]

**For example:**

1. UPDATE students
2. SET User\_Name = 'Sonoo'
3. WHERE Student\_Id = '3'

**c. DELETE:** It is used to remove one or more row from a table.

**Syntax:**

1. DELETE FROM table\_name [WHERE condition];

**For example:**

1. DELETE FROM javatpoint
2. WHERE Author="Sonoo";

3. Data Control Language

DCL commands are used to grant and take back authority from any database user.

Here are some commands that come under DCL:

* Grant
* Revoke

**a. Grant:** It is used to give user access privileges to a database.

**Example**

1. GRANT SELECT, UPDATE ON MY\_TABLE TO SOME\_USER, ANOTHER\_USER;

**b. Revoke:** It is used to take back permissions from the user.

**Example**

1. REVOKE SELECT, UPDATE ON MY\_TABLE FROM USER1, USER2;

4. Transaction Control Language

TCL commands can only use with DML commands like INSERT, DELETE and UPDATE only.

These operations are automatically committed in the database that's why they cannot be used while creating tables or dropping them.

Here are some commands that come under TCL:

* COMMIT
* ROLLBACK
* SAVEPOINT

**a. Commit:** Commit command is used to save all the transactions to the database.

**Syntax:**

1. COMMIT;

**Example:**

1. DELETE FROM CUSTOMERS
2. WHERE AGE = 25;
3. COMMIT;

**b. Rollback:** Rollback command is used to undo transactions that have not already been saved to the database.

**Syntax:**

1. ROLLBACK;

**Example:**

1. DELETE FROM CUSTOMERS
2. WHERE AGE = 25;
3. ROLLBACK;

**c. SAVEPOINT:** It is used to roll the transaction back to a certain point without rolling back the entire transaction.

**Syntax:**

1. SAVEPOINT SAVEPOINT\_NAME;

**19.** **What are the responsibilities of Database Manager ? Explain?**

**A) Responsibilities of Database Manager:**

 **Interaction with File Manager** : The row data is stored on the disk using the file system which is usually provided by conventional operating system.

 **Integrity Enforcement**: The data values stored in the database must satisfy certain types of consistency constraints.

 **Security Enforcement:** Not every user of the database needs to have access to the entire content of the database.

 **Backup and Recovery :** It is the responsibility of database manager to detect such failures and restore the database to a state that existed prior the occurrence of the failure this is usually accomplished through the backup and recovery processor.

 **Concurrency Control**: It is necessary for the system to control the interaction among the concurrent users, and achieving such control is one of the responsibilities of database manager.

 **Authorization Control** :This module checks that the user has necessary authorization to carry out the required function.

 **Command Processor :**Once the system has checked that the user has authority to carry out the operation control satisfies all necessary integrity constraints such as key constraints.

 **Query Optimizer:** This module determines on optional strategy for the query execution.

**20. What are the functions of DBA?**

**A) DBA** is the final authority on deciding the structure accessing strategies, storage criteria, user preventing data base from frauds. The functions or responsibilities of DBA includes:

 Schema Definition.

 Storage Structure and access method definition.

 Schema physical Organization and Modification.

 Granting of authorization for data access.

 Routine maintenance

 **Schema Definition:** The DBA creates the original database schema by executing a set of definition statements in the DDL.

 **Storage structure and access Method Definition:** DBA will decide the actual storage structure and different access methodologies for the database.

 **Schema Physical Organization and Modification:** The DBA carries out changes to the schema and physical organization to reflect the changing needs of the organization, are to alter the physical organization to improve performance.

 **Granting of Authorization for data access:** By granting different types of authorization, the database administrator can regulate which of the database various users can access.

 **Routine Maintenance:** DBA is the final authority to regulate the daily activities.

**21.** **Discuss briefly about different types database users?**

**A)** Database users are the one who really use and take the benefits of database. There will be different types of users depending on their need and way of accessing the database.

 **Aplication Programmers -** They are the developers who interact with the database by means of DML queries. These DML queries are written in the application programs like C, C++, JAVA, Pascal etc.These queries are converted into object code to communicate with the database.

For example, writing a C program to generate the report of employees who are working in particular department will involve a query to fetch the data from database. It will include a embedded SQL query in the C Program.

**Sophisticated Users -** They are database developers, who write SQL queries to select/insert/delete/update data. They do not use any application or programs to request the database. They directly interact with the database by means of query language like SQL. These users will be scientists, engineers, analysts who thoroughly study SQL and DBMS to apply the concepts in their requirement. In short, we can say this category includes designers and developers of DBMS and SQL.

**Specialized Users -** These are also sophisticated users, but they write special database application programs. They are the developers who develop the complex programs to the requirement.

**Stand-alone Users -** These users will have stand –alone database for their personal use. These kinds of database will have readymade database packages which will have menus and graphical interfaces.

**Native Users -** these are the users who use the existing application to interact with the database. For example, online library system, ticket booking systems, ATMs etc. which has existing application and users use them to interact with the database to fulfil their requests.