Unit – I

1. Identify the challenges of normal File Processing System.

Problems with File Processing System:

- Data redundancy and inconsistency
- Difficulty in accessing data
- Difficulty in data isolation
- Integrity problems
- Atomicity problems
- Concurrent-access anomalies
- Security problems

We can solve the above problems using Database System.

2. Define Data Abstraction and list the levels of Data Abstraction.

A major purpose of a database system is to provide users with an abstract view of the data. That is, the system hides certain details of how the data are stored and maintained. Since many database systems users are not computer trained, developers hide the complexity from users through several levels of abstraction, to simplify users' interaction with the System: Physical level, Logical Level, View Level.

3. Define DBMS.

A Database-management system consists of a collection of interrelated data and a set of programs to access those data. The collection of data, usually referred to as the database, contains information about one particular enterprise.

4. Define 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, and Logical data independence.

5. Define Data Models and list the types of Data Model.

Underlying the structure of a database is the data model: a collection of conceptual tools for describing data, data relationships, data semantics, and consistency constraints

6. Discuss about Object-Based Logical Models.

Object-based logical models are used in describing data at the logical and view levels. They provide fairly flexible structuring capabilities and allow data constraints to be specified explicitly.

There are many different models: entity-relationship model, object-oriented model, semantic data model, and functional data model.

7. Define E-R model.

The entity-relationship data modal is based on perception of a real world that consists of a collection of basic objects, called entities, and of relationships among these objects. The overall logical structure of a database can be expressed graphically by an E-R diagram, which is built up from the following components:

- ➢ Rectangles, which represent entity sets.
- ➢ Ellipses, which represent attributes
- ➢ Diamonds, which represent relationships among entity sets
- ➢ Lines, which link attributes to entity sets and entity sets to relationships.

E.g.)

8. Define entity and entity set.

An entity is a “thing” or “object” in the real world that is distinguishable from other objects. For example, each person is an entity, and bank accounts can be considered to be entities. The set of all entities of the same type are termed an entity set.

Refer example in question no: 7

9. Define relationship and relationship set.

A relationship is an association among several entities. For example, a Depositor relationship associates a customer with each account that she has. The set of all relationships of the same type, are termed a relationship set.

Refer example in question no: 7

10. Define Object-Oriented Model.

The object-oriented 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. Objects that contain the same types of values and the same methods are grouped together into classes. The only way in which one object can access the data of another object is by invoking a method of that other object. This action is called sending a message to the object.

11. Define Record-Based Logical Models.

Record-based logical models are used in describing data at the logical and view levels. They are used both to specify the overall structure of the database and to provide a higher-level description of the implementation. Record-based models are so named because the database is structured in fixed-format records of several types. Each record type defines a fixed number of fields, or attributes, and each field is usually of fixed length. The three most widely accepted record-based data models are the relational, network, and hierarchical models.

12. Define Relational Model.

The relational model uses a collection of tables to represent both data and the relationships among those data. Each table has multiple columns, and each column has a unique name.

13. Define Network Model.

Data in the network model are represented by collections of records, and relationships among data are represented by links, which can be viewed as pointers. The records in the database are organized as collections of arbitrary graphs.

14. Define Hierarchical Model.

The hierarchical model is similar to the network model in the sense that data and relationships among data are represented by records and links, respectively. It differs from the network model in that the records are organized as collection of trees rather than arbitrary graphs.

15. Define DDL.

A database schema is specified by a set of definitions expressed by a special language called a data-definition language. The result of compilation of DDL statements is a set of tables that is stored in a special file called data dictionary. A data dictionary is a file that contains metadata-that is, data about data. The storage structure and access methods used by the database system are specified by a set of definitions in a special type of DDL called a data storage and definition language.

16. Define DML.

By data manipulation, we mean

- The retrieval of information stored in the database.
- The insertion of new information into the database
- The deletion of information from the database
- The modification of information stored in the database.

A DML is a language that enables users to access or manipulate data as organized by the appropriate data model. There are two types: Procedural DMLs and Nonprocedural DMLs.

17. Define Query and Query language.

A query is a statement requesting the retrieval of information. The portion of a DML that involves information retrieval is called query language.

18. List the role of DBA.

The person who has central control over the system is called the database administrator. The functions of the DBA include the following:

- Schema definition
- Storage structure and access-method definition
- Schema and physical-organization modification
- Granting of authorization for data access
- Integrity-constraint specification

19. List the different types of database-system users.

There are four different types pf database-system users, differentiated by the way that they expect to interact with the system.

- Application programmers
- Sophisticated Users
- Specialized users
- Naïve users.

20. Write about the role of Transaction manager.

TM is responsible for ensuring that the database remains in a consistent state despite system failures. The TM also ensures that concurrent transaction executions proceed without conflicting.

21. Write about the role of Storage manager.

A SM is a program module that provides the interface between the low-level data stored in the database and the application programs and queries submitted to the system. The SM is responsible for interaction with the data stored on disk.

22. Define Attributes.

Entities are described in a database by a set of attributes. For example, the attributes account-number and balance describe one particular account in a bank.

An attribute, as used in the E-R model, can be characterized by the following attribute types.

- Simple and composite attributes
- Single-valued and multi valued attributes

- Null attributes
- Derived attributes.

23. Define Mapping Constraints.

An E-R enterprise schema may define certain constraints to which the contents of a database must conform. Two of the most important types of constraints are
Mapping Cardinalities: express the number of entities to which another entity can be associated via a relationship set.
Existence Dependencies: If the existence of entity x depends on the existence y, then x is said to be existence dependent on y.

24. Define Super key.

A super key is a set of one or more attributes that, taken collectively, allow us to identify uniquely an entity in the entity set. For example, the social-security attribute of the entity set customer is sufficient to distinguish one customer entity from another. Similarly, the combination of customer-name and social security is a super key for the entity set customer.

25. Define Primary key.

Superkeys for which no proper subset is a super key. Such minimal superkeys are called candidate keys or primary keys. For example, the social-security attribute of the entity set customer is sufficient to distinguish one customer entity from another.

25. Define Weak Entity Sets.

An entity set may not have sufficient attributes to form a primary key. Such an entity set is termed a Weak Entity Set. As an illustration, consider the entity set payment, which has the three attributes: payment-number, payment-date, and payment-amount. Although each payment entity is distinct, payments for different loans may share the same payment number. Thus, this entity set does not have a primary key; it is a weak entity set.

26. Define Strong Entity Set.

An entity set that has a primary key is termed Strong Entity set. E.g.) Customer entity set.