

# CS6302-DATABASE MANAGEMENT SYSTEMS

## UNIT-I

### INTRODUCTION TO DBMS

#### PART - I

##### 1. What is database?

A database is logically coherent collection of data with some inherent meaning, representing some aspect of real world and which is designed, built and populated with data for a specific purpose.

##### 2. Define Database Management System.

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

##### 3. Advantages of DBMS?

- ☐ Redundancy is controlled
- ☐ Unauthorized access is restricted.
- ☐ Providing multiple user interface
- ☐ Enforcing integrity constraints.
- ☐ Providing backup and recovery.

##### 4. Disadvantages in File Processing System.

- ☐ Data redundancy & inconsistency
- ☐ Difficult in accessing data
- ☐ Data isolation
- ☐ Data integrity
- ☐ Concurrent access is not possible.
- ☐ Security Problems.

##### 5. Define Data independence.

The ability to modify a schema definition in only level without affecting a Schema definition in the next higher level is called data independence.

##### 6. Define Data Models and list the types of Data Model.

Underlying the structure of database is the data model: a collection of conceptual tools for describing data, data relationships, data semantics and consistency constraints. The various data model that have been proposed fall in to three different groups: Object-based logical model, record-based logical model and physical model.

##### 7. What is E-R model?

The entity-relationship data model is based on perception of a real world that consists of a collection of basic objects, called entities and of relationships among these object

##### 8. Define entity and entity set.

A entity is a “thing” or “object” in the real world that is distinguishable from other objects. For example ,each person in an entity. The set of all entities of the same type are termed an entity set.

### **9. What is Weak entity set?**

An entity set may not have sufficient attributes to form a primary key, and its primary key compromises of its partial key and primary key of its parent entity, the its is said to be Weak Entity set.

### **10. Define relationship and relationship set.**

A relation ship is an association among several entities. For example, a depositor relationship associated a customer with each account. The set of all relationships of the same type are termed a relationship set.

### **11.What is object Oriented Model?**

The model is based on collection of object. An objects contains values stored in instance variables with in the object. An object also contains bodies of code that operate on the object. These bodies of code are called methods. Objects that contain same type of values and the same methods are grouped together into classless

### **12. Define Record-Based Logical Models.**

Record-based logical models are used in describing data at the logical and levels. They are used both to specify the overall structure of the database and provide a high-level description of the implementation.

### **13. 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 columns has a unique name.

### **14. Define Network model.**

Data in the networks model are represented by collection 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.

### **15. Define Hierarchical Model**

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

### **16. List the role of DBA.**

The person who has central control over the system is called database administrator. The function 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

### **17. List the different type of database system user.**

There are four different type of database-system users, differentiated by the way they expect to interact with the system.

- ☐ Application programmers

- ☐ Sophisticated Users
- ☐ Specialized users
- ☐ Naïve users.

**18. 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.

**19. Write about 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.

**20. 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.

**21. 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 relationship set.

**22. Define Relational algebra.**

A general expression in the relational algebra is constructed out of smaller sub expressions.

**23. Define Relational calculus.**

A tuple relational calculus expression is of the form  $\{t/P(t)\}$  where P is a formula. Several tuple variables may appear in a formula.

**24. List possible operations in Relation algebra**

Select, project, theta join, equijoin, union, intersection, difference, Cartesian product, division.

**25. Is it possible for several attributes to have the same domain? Illustrate your answer with a suitable example.**

Yes, several attributes can have the same domain. Attributes: name, address, belong to same domain contain all text strings of certain length.

**26. What are the problems in data redundancy?**

Multiple update, storage space is wasted

### 16/10/8 Marks Questions

1. With a neat diagram, explain the structure of a DBMS.
2. What is data integrity? Explain the types of integrity constraints.
3. Explain 1NF, 2NF, 3NF and BCNF with suitable example.
4. What are the pitfalls in relational database design? With a suitable example, explain the role of functional dependency in the process of normalization.
5. Construct an E-R diagram for a car-insurance company whose customers own one or more cars each. Each car has associated with it zero to any number of recorded accidents. State any assumptions you make.
6. What is aggregation in an ER model? Develop an ER diagram using aggregation that captures the following information :  
Employees work for projects. An employee working for a particular project uses various machinery. A unnecessary attributes. State any options you make. Also discuss about the ER diagram you have designed.
7. With relevant examples discuss the various operations in Relational Algebras
8. Define a functional dependency. List and discuss the six inference rules for functional dependencies. Give relevant examples.
9. Explain the three different groups of data models with examples.
10. Discuss Join Dependencies and Fifth Normal Form, and explain why 5NF?