Question Bank

(55 Multiple choice questions,

30 Short answer type questions,

20 Descriptive type questions)

of

Database Management Systems

Subject Code: CS 313
Class: ICD Vth Semester

Prepared by:

Dr. Jagdeep Singh

Assistant Professor (CSE)

Department
of
Computer Science and Engineering

Sant Longowal Institute of Engineering and Technology, Longowal, India

October 2024

Syllabus

Title of the course : **Database Management Systems**

Subject Code : **CS-313**

Weekly load : 7 Hrs LTP 3-0-4

Credit : 5 (Lecture 3; Practical 2)

Course Outcomes: At the end of the course, the student will be able to:

CO1	Understand functional components of the DBMS.
CO2	Design database schema and study different data models.
CO3	Understand the concept of normalization.
CO4	Understand the concepts of PL/SQL.

CO/PO Mapping : (Strong(S)/Medium(M)/Weak(W) indicates strength of correlation)

COs	Programme Outcomes (POs)									
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10
CO1		S								S
CO2		S								S
CO3		S								S
CO4		S	M	M						S

Theory

Unit	Main Topics	Course outlines	Lecture(s)
Unit-1	1. Introduction	Database Systems, Database and its purpose, Characteristics of the database approach, Advantages and disadvantages of database systems.	06
	2. Classification of DBMS Users	Classification of DBMS Users; Actors on the scene, Database Administrators, Database Designers, End Users, System Analysts and Application Programmers, Workers behind the scene	06
	3. Database System Concepts and Architecture	Data models, schemas, instances, data base state. DBMS Architecture; The External level, The conceptual level, The internal level	06

	4. Mappings	Mappings. Data Independence; Logical data Independence, Physical data Independence.	03
Unit-2	5. Data Models	Relational Data Model, Network Data Model, Hierarchical Model	08
	6. Data Modeling using E.R. Model	Entities and Attributes, Entity types and Entity sets, attribute and domain of attributes, Relationship among entities.	05
	7. Keys	Key, Different types of keys, Integrity Principles.	06
	8. Normalization	Functional dependencies, First, Second and Third normal forms, Boyce/Codd normal form.	08

Total=48

TEXT BOOKS:

1. Data base System Concepts, Silberschatz, Korth, McGraw hill, Sixth Edition.
2. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATA McGraw Hill 3rd Edition.

REFERENCE BOOKS:

1. Fundamentals of Database Systems, Elmasri Navathe Pearson Education.
2. An Introduction to Database systems, C.J. Date, A.Kannan, S.Swami Nadhan, Pearson, Eight Edition

Multiple Choice Questions:

1. What is the primary purpose of a database?
   a) Data redundancy
   b) Data storage and retrieval
   c) Data inconsistency
   d) Data warehousing

2. Which of the following is not an advantage of using a database system?
   a) Improved data sharing
   b) Data redundancy
   c) Data security
   d) Improved data access

3. Which term best describes a database system's ability to provide better data integrity and consistency?
   a) Database approach
   b) Data integration
   c) Database management
   d) Data redundancy

4. Which user is responsible for the overall control and maintenance of the database?
   a) Enduser
   b) Database Designer
   c) Database Administrator
   d) Application Programmer

5. Who are typically involved in creating the schema of a database?
   a) End Users
   b) Database Designers
   c) System Analysts

d) Database Administrators

6. Which of the following is a "worker behind the scene" in a database environment?

a) Enduser

b) System Analyst

c) Database Designer

d) Metadata manager

7. The primary task of an application programmer in a DBMS environment is:

a) Managing storage

b) Writing application programs

c) Defining the schema

d) Performing database backups

8. Which of the following refers to the actual data stored in a database at a particular time?

a) Database schema

b) Database instance

c) Database state

d) Database structure

9. The level of DBMS architecture that describes what data is stored and how it is related is:

a) External level

b) Conceptual level

c) Internal level

d) Physical level

10. In DBMS, the physical structure of the database is defined by the:

a) Conceptual level

b) External level

c) Internal level

d) Application level

11. Which data model represents data in tables and relationships in rows and columns?

a) Hierarchical

b) Relational

c) Network

d) Objectoriented

12. The term "logical data independence" means:

a) Changes in the schema at one level should not affect the other levels

b) Users should be able to access data logically

c) Data should be physically independent

d) Users can freely modify data physically

13. Which type of mapping allows changes in the conceptual schema without affecting the external schema?

a) ConceptualInternal mapping

b) Physical mapping

c) Logical mapping

d) ExternalConceptual mapping

14. Which data model is based on parentchild relationships?

a) Relational

b) Hierarchical

c) Network

d) Objectoriented

15. In which data model are records organized in the form of a graph where each record can have multiple parent and child records?

a) Hierarchical

b) Relational

c) Network

d) Objectoriented

16. In the relational model, data is represented as:

a) Trees

b) Tables

c) Graphs

d) Arrays

17. In an ER Model, attributes that uniquely identify entity instances are called:

a) Candidate attributes

b) Unique attributes

c) Key attributes

d) Secondary attributes

18. A relationship in an E.R. model is:

a) An association between entities

b) A collection of attributes

c) A set of operations

d) A data entity

19. The domain of an attribute represents:

a) The primary key of the attribute

b) The set of all possible values of the attribute

c) A subset of the attribute's values

d) The foreign key

20. Which symbol is used in an ER diagram to represent entities?

a) Diamond

b) Rectangle

c) Circle

d) Arrow

21. A primary key is:

a) A key that can accept null values

b) A unique identifier for a table's records

c) A foreign key in another table

d) An optional field

22. Which of the following is not a type of key?

a) Primary key

b) Foreign key

c) Composite key

d) Secondary key

23. Which integrity principle ensures that foreign key values correspond to primary key values in another table?

a) Referential integrity

b) Entity integrity

c) Domain integrity

d) Schema integrity

24. Which key can uniquely identify records but is not necessarily chosen as the primary key?

a) Primary key

b) Foreign key

c) Composite key

d) Candidate key

25. Which of the following conditions is necessary for a table to be in the First Normal Form (1NF)?

a) Each column should have a unique value

b) Each column should contain atomic values

c) All columns must depend on the primary key

d) Every column must be a primary key

26. In which normal form does each nonkey attribute depend on the primary key?

a) First Normal Form

b) Second Normal Form

c) Third Normal Form

d) BoyceCodd Normal Form

27. A functional dependency between a primary key and a nonprimary key attribute satisfies the condition for:

a) First Normal Form

b) Second Normal Form

c) Third Normal Form

d) BoyceCodd Normal Form

28. In the BoyceCodd Normal Form (BCNF), which of the following is true?

a) Every determinant is a candidate key

b) Each table contains only atomic values

c) All attributes depend on a single primary key

d) No transitive dependency exists

29. Which of the following represents a transitive dependency?

a) A > B and B > C, therefore A > C

b) A > B, B > A

c) B > C and C > A

d) A > B, A > C

30. What is the purpose of normalization in database design?

a) To increase redundancy

b) To remove anomalies and redundancy

c) To make tables larger

d) To increase the number of tables

31. Which of the following is a characteristic of a database system?

a) Data redundancy

b) Data consistency

c) Decentralized data storage

d) Data scattering

32. Which component of a database system is responsible for ensuring data security?

a) Data Definition Language

b) Database Manager

c) Database Query Processor

d) Application Layer

33. A DBMS reduces data redundancy primarily by:

a) Organizing data into flat files

b) Storing data in tables without keys

c) Enforcing primary and foreign key constraints

d) Repeating data across multiple tables

34. Which of the following best describes a casual user in a DBMS?

a) User who directly manages database operations

b) User who accesses the database infrequently and uses simple queries

c) User responsible for developing applications

d) User who designs the database schema

35. Which type of user primarily interacts with database applications through predefined, simple interfaces?

a) Database Administrator

b) System Analyst

c) Enduser

d) Application Programmer

36. The concept of a database schema is best described as:

a) The contents of the database at a specific time

b) The structure and organization of the database

c) The relationships between entities

d) The storage requirements for the database

37. The internal level of a DBMS is responsible for:

a) Managing the physical storage of data

b) Defining user views of data

c) Managing security constraints

d) Providing an abstract view of the data

38. Which of the following is an example of a logical database structure?

a) Indexes

b) Tables

c) Physical files

d) Data pages

39. In which type of independence does the DBMS allow modification of physical storage structures without affecting the schema?

a) Logical data independence

b) Physical data independence

c) Conceptual independence

d) External independence

40. Why is logical data independence important in DBMS?

a) It reduces the time taken for query execution.

b) It allows changes to the conceptual schema without affecting user views.

c) It eliminates data redundancy.

d) It increases data retrieval speed.

41. Which data model is designed to handle more complex data structures by grouping objects and relationships into classes?

a) Relational model

b) Network model

c) Hierarchical model

d) Objectoriented model

42. The network model organizes data using:

a) Tables and rows

b) Parentchild relationships

c) Sets and records

d) Nodes and pointers

43. Which of the following is an attribute that depends solely on the primary key for its value?

a) Derived attribute

b) Simple attribute

c) Composite attribute

d) Multivalued attribute

44. In an E.R. Model, which of the following best describes a weak entity?

a) An entity with no primary key

b) An entity that cannot exist without being related to another entity

c) An entity with a composite primary key

d) An entity with multiple attributes

45. Which relationship type is used when an entity can be associated with many instances of another entity?

a) OnetoOne

b) OnetoMany

c) ManytoOne

d) ManytoMany

46. A foreign key in a database:

a) Uniquely identifies each row in a table

b) Links rows between different tables

c) Can have multiple values

d) Is always unique across tables

47. Which key is used to link two tables together based on a common attribute?

a) Primary key

b) Unique key

c) Composite key

d) Foreign key

48. Which of the following statements about Second Normal Form (2NF) is true?

a) It removes all transitive dependencies.

b) It ensures that all attributes depend on the entire primary key.

c) It allows nonprime attributes to depend on other nonprime attributes.

d) It does not address partial dependencies.

49. In Third Normal Form (3NF), which of the following must be true?

a) The table is in 2NF and has no transitive dependencies.

b) The table has only atomic values.

c) All attributes are functionally dependent on nonkey attributes.

d) The table contains no redundant data.

50. Which form of normalization requires every determinant to be a candidate key?

a) First Normal Form

b) Second Normal Form

c) Third Normal Form

d) BoyceCodd Normal Form

Advanced Database Questions

51. What is the primary function of an index in a database?

a) To increase data redundancy

b) To reduce data storage requirements

c) To speed up data retrieval

d) To enforce referential integrity

52. In a distributed database, what does "replication" refer to?

a) Creating copies of data across multiple servers

b) Storing data only on one server

c) Using pointers to access data

d) Segmenting data into nonoverlapping tables

53. Which type of database lock allows read operations while restricting write operations?

a) Exclusive lock

b) Shared lock

c) Update lock

d) Implicit lock

54. Which database storage technique is used to efficiently handle large amounts of unstructured data?

a) Partitioning

b) Clustering

c) Sharding

d) Data Lake

55. In transaction management, which isolation level allows a transaction to read only committed data?

a) Read Uncommitted

b) Read Committed

c) Repeatable Read

d) Serializable

Correct Answers:

1. b
2. b
3. a
4. c
5. b
6. d
7. b
8. c
9. b
10. c
11. b
12. a
13. d
14. b
15. c
16. b
17. c
18. a
19. b
20. b
21. b
22. d
23. a
24. d
25. b
26. b
27. c
28. a
29. a
30. b
31. b
32. b
33. c
34. b
35. c
36. b
37. a
38. b
39. b
40. b
41. d
42. c
43. b
44. b
45. d
46. b
47. d
48. b
49. a
50. d
51. c
52. a
53. b
54. d
55. b

Short Answer Type Questions:

1. What is a database, and what is its primary purpose?
2. Explain the main characteristics of the database approach.
3. List three advantages of using a database system.
4. Identify two disadvantages of database systems.
5. Who are the primary actors on the scene in a DBMS environment?
6. Describe the role of a Database Administrator.
7. What are the responsibilities of a Database Designer?
8. Differentiate between endusers and system analysts.
9. Who are considered "workers behind the scene" in a DBMS?
10. Define a data model in the context of a DBMS.
11. What is the difference between schema and instance in a database?
12. Describe the three levels of DBMS architecture: external, conceptual, and internal.
13. Explain the concept of a "database state."
14. What is meant by data independence in a DBMS?
15. Distinguish between logical data independence and physical data independence.
16. What is the relational data model, and why is it widely used?
17. Give a brief description of the network data model.
18. Describe the hierarchical model and its structure.
19. Define an entity and an attribute with examples.
20. What is an entity set, and how does it differ from an entity type?
21. Explain the concept of domain in relation to attributes.
22. How are relationships among entities represented in an E.R. Model?
23. What is a key in a database, and why is it important?
24. List different types of keys and provide a brief explanation of each.
25. What is meant by "integrity principles" in a database?
26. Explain the concept of functional dependency.
27. Describe the purpose of First Normal Form (1NF).
28. What is Second Normal Form (2NF), and how does it differ from 1NF?
29. Define Third Normal Form (3NF) and its requirements.
30. What is BoyceCodd Normal Form (BCNF), and how is it different from 3NF?

Descriptive Type Questions:

1. Explain the primary purpose of database systems and discuss their significance in modern data management.
2. Discuss the key characteristics of the database approach. How does it differ from traditional file-based systems?
3. Outline the major advantages and disadvantages of using database systems. Provide examples to illustrate your points.
4. Describe the classification of DBMS users and their roles within a database system.
5. Who are the 'actors on the scene' in a database environment, and what roles do they play in database management?
6. Explain the roles and responsibilities of a Database Administrator (DBA). Why is this role critical to database management?
7. Differentiate between end-users, system analysts, and application programmers, providing examples of tasks each performs in relation to database systems.
8. Define data models, schemas, and instances in the context of a database system. How do they contribute to database organization?
9. Explain the different levels of DBMS architecture—external, conceptual, and internal—and the purpose of each level.
10. Describe the concept of a database state and discuss how it reflects the current state of data within the system.
11. Explain the concept of mappings in database systems. Why are mappings essential for effective data management?
12. Differentiate between logical and physical data independence. Why is data independence important for the longevity and adaptability of database systems?
13. Describe the relational data model, including its key components such as tables, rows, and columns. Why is it widely used in database systems?
14. Compare and contrast the network and hierarchical data models. Discuss scenarios where each model may be more advantageous.
15. Explain the concept of entities and attributes in the E.R. model. How do they form the foundation of data modeling?
16. What is an entity set, and how does it differ from an entity type? Provide examples to illustrate your explanation.
17. Discuss the relationship among entities in an E.R. model. How do relationships contribute to database structure and design?
18. Define different types of keys in database systems (e.g., primary key, foreign key, candidate key) and explain the significance of each.
19. What are integrity principles in database design, and why are they essential? Explain the entity integrity and referential integrity principles with examples.
20. Explain the process of normalization and discuss its importance in database design. Describe First, Second, and Third normal forms with examples.