

SUMMARY

We have studied in this chapter about the basic concepts of databases and database management systems. To model a real world situation, we draw ER diagrams. These diagrams are converted to the corresponding relations. Various models have also been discussed and compared but the relational model has been dealt in detail.

MULTIPLE CHOICE QUESTIONS [MCQs]

1. The first generation of DBMS is represented by systems
 - (a) Hierarchical and CODASYL systems
 - (b) Relational model
 - (c) Network model
 - (d) None of the above
2. Data is a
 - (a) Raw fact and figure
 - (b) Metadata
 - (c) Information only
 - (d) None of the above
3. An important deliverable of the data integration process is
 - (a) Information
 - (b) Metadata
 - (c) Design plan
 - (d) None of the above
4. Which of the following is correct
 - (a) Data + DBMS = Databases
 - (b) Data + Databases = DBMS
 - (c) Database + DBMS = Database system
 - (d) None of the above.
5. A general mode for data use is
 - (a) Queries
 - (b) Transactions
 - (c) Both (a) and (b)
 - (d) None of the above.
6. A repository of information about a database is known as a
 - (a) Data Dictionary
 - (b) Distributed database
 - (c) File
 - (d) None of the above.
7. DBA stands for –
 - (a) Database Access
 - (b) Database Administration
 - (c) Database Authority
 - (d) None of the above.
8. The overall description of the database is known as
 - (a) Instance
 - (b) Schema
 - (c) Snapshot
 - (d) None of the above.
9. How many schemas will be there per level, per database ?
 - (a) One
 - (b) Three
 - (c) Two
 - (d) Four.
10. Schema is same as an
 - (a) Extension of the database
 - (b) Intension of the database
 - (c) Subschema
 - (d) None of the above.
11. ANSI-SPARC model consists of
 - (a) 2-layered model
 - (b) 3-layered model
 - (c) 4-layered model
 - (d) None of the above.
12. Anything which exists and is distinguishable from one another is known as
 - (a) Entity
 - (b) Attribute
 - (c) Relationship
 - (d) None of the above.
13. The physical storage structures or devices could be changed without affecting the conceptual schema. This is known as

- (a) Physical data independence
 (c) External data independence
 (d) None of the above.
14. DDL stands for
 (a) Data domain language
 (c) Data definition language
 (b) Logical data independence
 (d) None of the above.
15. Create, Alter and Drop are the examples of
 (a) DDL
 (c) VDL
 (b) DML
 (d) SDL
 (b) Procedural DML
 (d) None of the above.
16. PL/SQL is a
 (a) Non-procedural DML
 (c) Formal Query Language
 (b) Commercial query language.
 (d) None of the above.
17. SQL, QBE, QUEL are the examples of
 (a) Formal Query language
 (c) DDL
 (b) View data language
 (d) None of the above.
18. Which of the following is true for a Data Sub Language (DSL)
 (a) DSL = DDL + DML
 (c) DSL = DDL + SDL
 (b) DSL = DDL - DML
 (d) None of the above.
19. VDL stands for
 (a) Very-small data language
 (c) View definition language
 (b) Structured Query Language
 (d) None of the above.
20. SQL stands for
 (a) Small Query Language
 (c) Simple Query Language
 (b) 4GL
 (d) None of the above.
21. SQL, Spreadsheets, Report Generators, Code Generators are the examples of
 (a) 3GL
 (c) 5GL
 (b) 4GL
 (d) None of the above.
22. GRANT and REVOKE are
 (a) DDL
 (c) DCL
 (b) DML
 (d) None of the above.
23. A compiler that converts embedded DML statements to normal procedure calls is known as
 (a) C++ compiler
 (c) Embedded DML precompiler
 (b) DML compiler
 (d) None of the above.
24. IMS, IMB, system 2000, NOMAD are the examples of
 (a) Hierarchical model
 (c) Network model
 (b) Relational model
 (d) None of the above.
25. The term 'relation' was chosen by
 (a) Dr. Berry Boehm.
 (c) Dr. Jacobson
 (b) Dr. E.F. Codd.
 (d) None of the above.
26. Each row of data is known as a
 (a) Tuple
 (c) Degree
 (b) Cardinality
 (d) None of the above.
27. The number of tuples in a relation is known as
 (a) Cardinality
 (c) Modality
 (b) Degree
 (d) None of the above.

28. An ER-model was introduced by
 (a) E.F. Codd
 (b) P.P. Chen
 (c) Constantine
 (d) None of the above.
29. The primary key of a weak entity needs to be formed. It is known as the
 (a) Discriminator or partial key
 (b) Foreign key
 (c) Weak key
 (d) None of the above.
30. The process of minimizing the differences between entities by identifying their common characteristics is known as
 (a) Specialization
 (b) Generalization
 (c) Multiplicity
 (d) None of the above.
31. The complement of Generalization is
 (a) Specialization
 (b) Relation
 (c) Distribution
 (d) None of the above.
32. The process of compiling information on an object, thereby abstracting a higher level object is known as
 (a) Specialization
 (b) Generalization
 (c) Aggregation
 (d) None of the above.
33. The relationship between a weak entity-set is called as the
 (a) Weak relationship
 (b) Identifying relationship
 (c) Connecting relationship
 (d) Associative relationship.
34. An ER-diagram that shows the concepts of Specialization and Generalization are known as
 (a) Extended ER-diagrams
 (b) Effective ER-diagrams
 (c) Expanded ER-diagrams
 (d) Enhanced ER-diagrams.
35. The need of EER diagram arises depending upon the
 (a) Nature of problem
 (b) Nature of entities
 (c) Preferences of the database designer
 (d) All of the above.

ANSWERS

- | | | | | | | | |
|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (a) | 2. (a) | 3. (b) | 4. (c) | 5. (c) | 6. (a) | 7. (b) | 8. (b) |
| 9. (a) | 10. (b) | 11. (b) | 12. (b) | 13. (a) | 14. (c) | 15. (a) | 16. (b) |
| 17. (b) | 18. (a) | 19. (c) | 20. (b) | 21. (b) | 22. (c) | 23. (c) | 24. (a) |
| 25. (b) | 26. (a) | 27. (a) | 28. (b) | 29. (a) | 30. (b) | 31. (a) | 32. (c) |
| 33. (b) | 34. (d) | 35. (d) | | | | | |

CONCEPTUAL SHORT QUESTIONS WITH ANSWERS

Q.1. What is the difference between the Fact based and Heuristic knowledge?
Ans. Let us tabulate the differences between them.

S. No.	Fact Based Knowledge	Heuristic Knowledge
1.	The knowledge gained from the fundamentals and through experiments, is known as the fact	The Knowledge of good practice, experience and good judgement is known as the Heuristic knowledge.

retrieve where t .balance -
range of t is ORDERS
range of s is SUPPLIERS
retrieve ($s.sname$, $s.item$, $s.price$)
where $t.cname = "HCL"$ and $t.item = s.item$.

SUMMARY

In this chapter we have studied the important terminologies related to the most common and popular model—Relational Model. We have studied various Relational Integrity Rules. Dr. E.F. Codd (in 1970s) gave certain rules called as Codd Rules. A good DBMS must satisfy some or all of these rules. We now know the purpose of views also. Relational algebra and calculus have been dealt completely with many solved examples.

MULTIPLE CHOICE QUESTIONS [MCQs]

1. A table with columns and rows is called as a
 - (a) Table
 - (c) Key
 2. Entities are nothing else but
 - (a) Relations
 - (c) Attributes
 3. Attributes correspond to
 - (a) Rows of a table
 - (c) Degree of a table
 4. A row of a relation is called as a
 - (a) Domain
 - (c) Relation
 5. A set of tuples at any given instant of time is called as
 - (a) Table
 - (c) Extension
 6. The number of tuples of a relation is its
 - (a) Degree
 - (c) Cardinality.
 7. A relation with degree, N, is known as
 - (a) N-ary relation.
 - (c) 2-ary relation
 8. Which of the following is a correct form of the equation
 - (a) CK = SK + PK.
 - (c) CK = SK * PK
 9. Those candidate keys which are not currently selected as the primary key are called as
 - (a) Super keys
 - (c) Alternate key
 10. Which of the following is correct if AK = Alternate key, CK = Candidate key and PK = Primary key
 - (a) AK = CK - PK
 - (c) AK = SK - PK
- (b) Relation
- (d) None of the above.
- (b) DBMS
- (d) None of the above.
- (b) Columns of a table
- (d) None of the above.
- (b) Tuple
- (d) None of the above.
- (b) Relation
- (d) None of the above.
- (b) Intension
- (d) None of the above.
- (b) 1-ary relation
- (d) None of the above.
- (b) Candidate key
- (d) None of the above.
- (b) AK = CK + PK
- (d) None of the above.

11. A key that has no meaning to the business or organization is
 (a) Candidate key
 (c) Artificial key
 (b) Alternate key
 (d) None of the above.
12. The column in the child table that references a primary key of the parent table is called as
 (a) Candidate key
 (c) Composite key
 (b) Foreign key
 (d) None of the above.
13. A rule that states that in a base relation, the value of attribute of a primary key cannot be null is called as
 (a) Entity integrity rule
 (c) Security integrity rule
 (b) Referential integrity rule
 (d) None of the above.
14. A NULL means
 (a) Unknown
 (c) known partially
 (b) Known
 (d) None of the above.
15. Dr. E.F. Codd gave
 (a) 10-rules
 (c) 12-rules
 (b) 11-rules
 (d) 13-rules.
16. A virtual relation is also known as a
 (a) View
 (c) Snapshot
 (b) Table
 (d) None of the above.
17. In order to perform Union operation on two relations, both operand and relations must be
 (a) Union-compatible
 (c) Difference-compatible
 (b) Set-compatible
 (d) None of the above.
18. Which is true out of the following
 (a) $(A - B) = (B - A)$
 (c) $(B - A) = (B - C)$
 (b) $(A - B) \neq (B - A)$
 (d) None of the above.
19. Select-operator (σ) works row wise whereas project-operator (π) works
 (a) Row-wise only
 (c) Both 'a' and 'b'
 (b) Column wise
 (d) None of the above.
20. When we want to display records with attributes from many relations then we use
 (a) SELECT operation
 (c) JOIN operation
 (b) PROJECT operation
 (d) None of the above.
21. Relational calculus describes about
 (a) 'How' to evaluate a query
 (c) 'When' to evaluate a query
 (b) 'What' is to be retrieved
 (d) None of the above.
22. QUEL is a TRC language of which RDBMS -
 (a) INGRESS
 (c) Oracle 8i
 (b) DB2
 (d) None of the above.
23. How many tables can be joined to create a view
 (a) 1
 (c) Depends on DBMS
 (b) 2
 (d) None of the above.
24. What is the cardinality of a table with 50 rows and 5 columns?
 (a) 50
 (c) 250
 (b) 5
 (d) None of the above.
25. What is the degree of a table with 50 rows and 5 columns?
 (a) 50
 (c) 250
 (b) 5
 (d) None of the above.

ANSWERS

1. (b) 2. (a) 3. (b) 4. (b) 5. (c) 6. (c) 7. (a) 8. (b)
 9. (c) 10. (a) 11. (c) 12. (b) 13. (a) 14. (a) 15. (c) 16. (a)
 17. (a) 18. (b) 19. (b) 20. (c) 21. (b) 22. (a) 23. (d) 24. (a)
 25. (b)

CONCEPTUAL SHORT QUESTIONS WITH ANSWERS

Q.1. Give some properties of Relations?

Ans. A relation has the following properties :

1. A relation has a name that is distinct from all other relation names in the relational schema.
2. Each cell of the relation contains exactly one atomic (single) value.
3. Each attribute has a distinct name.
4. The values of an attribute are all from the same domain.
5. Each tuple is distinct. There are no duplicate tuples.
6. The order of attributes has no significance.
7. Theoretically, the order of tuples has no significance.

Q.2. Write down the differences between the select and project operator?

Ans.

S. No.	Select	Project
1.	It is represented by a Greek letter, σ (sigma)	It is represented by a Greek letter, π (pi)
2.	It selects entire row that satisfies the given condition.	It selects one or more than one column out of the rows that satisfies the given condition.
3.	It does not eliminate duplicated rows.	It eliminates any duplicated rows.

Q.3. Records in a file can be either of fixed length or of variable length. How are they different?

Ans. In a file with fixed-length records, all records on the page are of same slot length. The record slots are uniform and records are arranged consecutively within a page. Hence insertion and deletion for files are simple to implement.

```
    ELSE
        RETURN ('N');
    END IF;
END DELETE;
END OPERATION;
```

SUMMARY

Oracle is an RDBMS. SQL*PLUS is an extension to the standard SQL. It has an editor and interpreter. Users can create program files and generate formatted reports. PL/SQL stands for Procedural Language/Structured Query Language. It is an extension of SQL. PL/SQL is the superset of SQL. With PL/SQL mechanism called exception handling will 'bullet proof' our program so that it continues operating in the presence of errors.

The Oracle engine uses a work area to execute SQL statements and store information. A cursor is a PL/SQL construct that allows us to name these work areas and store data. This data that is stored in the cursor is called as an active data. Subprograms are named PL/SQL blocks that allow parameter passing and calling anywhere. We can even group these functions, procedures, variables, constants, exceptions and SQL as a package.

MULTIPLE CHOICE QUESTIONS [MCQs]

1. SQL stands for
 - (a) Structured Questioning Language
 - (b) Structured Query Language
 - (c) Simple Query Language
 - (d) None of the above.
2. DDL stands for
 - (a) Data Definition Language
 - (b) Data Design Language
 - (c) Data Development Language
 - (d) None of the above.

SQL

3. INSERT, DELETE, UPDATE and SELECT are put under
 - (a) DDLs
 - (b) TCLs
 - (c) DMLs
 - (d) VDLs.
4. The process of joining of multiple strings is known as
 - (a) Selection
 - (b) Projection
 - (c) Concatenation
 - (d) None of the above.
5. To sort records we use
 - (a) ORDER BY clause
 - (b) HAVING clause
 - (c) GROUP clause
 - (d) None of the above.
6. % and _(underscore) are
 - (a) Relational operators
 - (b) Arithmetic operators
 - (c) Like operators
 - (d) None of the above
7. The logical tables of data extracted from existing tables are known as
 - (a) Records
 - (b) Views
 - (c) Queries
 - (d) None of the above.
8. Oracle provides a special table that can be used to test any function. This table is
 - (a) DUAL table
 - (b) EMPLOYEE table
 - (c) SALARY table
 - (d) None of the above.
9. To substitute any NULL value with a user specified value, we use
 - (a) TO_CHAR function
 - (b) NVL function
 - (c) DATE function
 - (d) None of the above.
10. ROLLBACK, COMMIT and SAVEPOINT are
 - (a) DMLs
 - (b) DDLs
 - (c) VDLs
 - (d) TCLs
11. Hash functions are used in which of these indexing methods
 - (a) Ordered indexing
 - (b) Hashed indexing
 - (c) Pinned indexing
 - (d) None of the above.
12. Primary indexing is also known as
 - (a) Clustering index
 - (b) Non-clustering index
 - (c) Hashed index
 - (d) None of the above.
13. ODBC stands for
 - (a) Open Database Connectivity
 - (b) Open Data Connection
 - (c) Online Database Connection
 - (d) None of the above.
14. A query within a query is called as
 - (a) Subquery
 - (b) New query
 - (c) Parent query
 - (d) None of the above.
15. The command used to set the top title for each page of a report is
 - (a) BTITLE
 - (b) CTITLE
 - (c) TTITLE
 - (d) None of the above.
16. PL/SQL stands for
 - (a) Procedural Language/Structured Query Language
 - (b) Primary Language/Simple Query Language
 - (c) Parallel Language/Simple Query List
 - (d) None of the above.
17. A buffer use to store results of the recent query
 - (a) Cursor
 - (b) Triggers
 - (c) Packages
 - (d) Exceptions.

18. The OUT parameter behaves like a
(a) Constant
(b) Uninitialized variable
(c) Regular variable
(d) None of the above.

19. Functions return value and they use which of these statements for the same
(a) Call
(b) Return
(c) Return <datatype> <function_name>
(d) None of the above.

20. Group of procedures, functions, variables, constants, cursors, exceptions and SQL statements are put in a single unit called as
(a) Class
(b) Package
(c) PL/SQL
(d) None of the above.

ANSWERS

1. (b) 2. (a) 3. (c) 4. (c) 5. (a) 6. (c) 7. (b) 8. (a)
9. (b) 10. (d) 11. (b) 12. (a) 13. (a) 14. (a) 15. (c) 16. (a)
17. (a) 18. (b) 19. (b) 20. (b)

CONCEPTUAL SHORT QUESTIONS WITH ANSWERS

- Q.1.** Consider the following Employee database
employee (employee_name, street, city)

Now, we need to decompose TRANS relation into two relations given below -

1. R_1 (Sno, Course, Grade) : Here, the domain constraint is Sno being 8-digit, course being 3-digit in the range 000 to 900 and Grade in the set = {A, B, C, D, F}. The PK is (Sno, Course).
2. R_2 (Sno, Course, Grade) : Here the domain constraint is all satisfied but the Grade is in set = {E, F}. The PK is (Sno, Course) only.

SUMMARY

One of the main challenges during database design is to design a non-redundant and consistent database. With minimum redundancy, our query becomes efficient. In this chapter, emphasis has been made on the normalization of databases. We have discussed 1NF, 2NF, 3NF, 4NF, 5NF and finally, DKNF.

MULTIPLE CHOICE QUESTIONS [MCQs]

1. The process of decomposition of a table is known as
 - (a) Specialization
 - (b) Generalization
 - (c) Normalization
 - (d) None of the above.
2. The process of Normalization was proposed by
 - (a) Dr. E.F. Codd
 - (b) Dr. Berry Boehm
 - (c) Jacobson
 - (d) None of the above.
3. An association between two attributes of the same table is known as
 - (a) FD
 - (b) MVD
 - (c) JD
 - (d) None of these.
4. A table which is in 2NF, must be in
 - (a) 1NF
 - (b) 2NF
 - (c) 3NF
 - (d) 4NF.
5. After normalization, the original table can be obtained by -
 - (a) Delete operation
 - (b) Cascade operation
 - (c) Join operation
 - (d) None of the above.
6. A table in 3NF must not have
 - (a) FDs
 - (b) MVDs
 - (c) TDs
 - (d) JDs
7. BCNF stands for
 - (a) Babbage-codd Normal Form
 - (b) Boyce-codd Normal Form
 - (c) Bakus-codd Normal Form
 - (d) None of the above.

8. MVD stands for
 (a) Multi-Valued Dependency
 (b) Many-Value Dependency
 (c) Many-Volume Dependent
 (d) None of the above.
9. A rule to transform a relation into 4NF was given by
 (a) Fagin
 (b) E.F Codd
 (c) Jacobson
 (d) None of these
10. 5NF is also known as
 (a) PJNF
 (b) DKNF
 (c) BCNF
 (d) None of the above.
11. The process of Normalization is
 (a) Reversible
 (b) Non-reversible
 (c) Iterative
 (d) Recursive.
12. Every BCNF is in
 (a) 1NF
 (b) 2NF
 (c) 3NF
 (d) None of the above.
13. Which normal form is most desirable
 (a) DKNF
 (b) 3NF
 (c) BCNF
 (d) 4NF.
14. Let F_1 and F_2 be two sets of FDs. Then F_1 and F_2 are equivalent if
 (a) $F_1 + F_2 = F_1$
 (b) $F + 1 = F + 2$
 (c) $F_1 - F_2 = F_1$
 (d) $F_1 = F_2$
15. If a relation has 7 attributes then there will be how many subsets of these attributes
 (a) $2^7 (= 128)$
 (b) $2^4 (= 16)$
 (c) $2^2 (= 4)$
 (d) None of these.

ANSWERS

1. (c) 2. (a) 3. (a) 4. (a) 5. (c) 6. (c) 7. b 8. (a)
 9. (a) 10. (a) 11. (a) 12. (c) 13. (a) 14. (b) 15. (a)

CONCEPTUAL SHORT QUESTIONS WITH ANSWERS