

UNIT-III: Relational Model, File Organization and Indexing

I. Choose the correct answer:

1. The Relational Model was proposed by:

- a) Charles Babbage
- b) E.F. Codd
- c) Alan Turing
- d) Dennis Ritchie

Answer: b) E.F. Codd

2. In the relational model, data is stored in the form of:

- a) Trees
- b) Graphs
- c) Tables
- d) Files

Answer: c) Tables

3. A row in a relation is also known as:

- a) Attribute
- b) Domain
- c) Tuple
- d) Schema

Answer: c) Tuple

4. A column in a relation is called:

- a) Tuple
- b) Attribute
- c) Relation
- d) Domain set

Answer: b) Attribute

5. The overall design of a database is called:

- a) Tuple
- b) Attribute
- c) Database Schema
- d) Domain

Answer: c) Database Schema

6. Which of the following is a unary relational algebra operation?

- a) Union
- b) Join
- c) Selection
- d) Cartesian Product

Answer: c) Selection

7. The selection operation in relational algebra is represented by:

- a) π
- b) σ
- c) $\cup$
- d) $\times$

Answer: b) σ

8. The projection operation is represented by:

- a) π
- b) σ
- c) $\cap$
- d) $\div$

Answer: a) π

9. Which relational algebra operation combines tuples from two relations?

- a) Projection
- b) Selection
- c) Join
- d) Rename

Answer: c) Join

10. Relational calculus is a:

- a) Procedural language
- b) Non-procedural language
- c) Programming language
- d) Data definition language

Answer: b) Non-procedural language

11. Which file organization stores records sequentially?

- a) Sequential File Organization
- b) Hashed File Organization
- c) Indexed File Organization
- d) Heap File Organization

Answer: a) Sequential File Organization

12. In Heap File Organization, records are stored:

- a) In sorted order
- b) In random order
- c) Alphabetically
- d) By key value

Answer: b) In random order

13. An index is mainly used to:

- a) Increase storage space
- b) Speed up data retrieval
- c) Reduce security
- d) Delete records

Answer: b) Speed up data retrieval

14. Which index contains one entry for every search key value?

- a) Sparse Index
- b) Dense Index
- c) Secondary Index
- d) Multilevel Index

Answer: b) Dense Index

15. A sparse index contains:

- a) An index entry for every record
- b) Few index entries
- c) Duplicate entries only
- d) No entries

Answer: b) Few index entries

16. Which data structure is commonly used for tree-structured indexing?

- a) Queue
- b) Stack
- c) B+ Tree
- d) Linked List

Answer: c) B+ Tree

17. Hash-based indexing uses:

- a) Sorting technique
- b) Hash function
- c) Queue structure

d) Stack structure

Answer: b) Hash function

18. In relational algebra, the union operation is represented by:

a) $\times$

b) $\cap$

c) $\cup$

d) $\div$

Answer: c) $\cup$

19. Which operation returns only selected columns from a relation?

a) Selection

b) Projection

c) Join

d) Union

Answer: b) Projection

20. B+ Tree indexing is widely used because:

a) It supports efficient searching and insertion

b) It consumes no memory

c) It does not require balancing

d) It stores data randomly

Answer: a) It supports efficient searching and insertion

Fill in the Blanks

1. The relational model was proposed by _____.

Answer: E.F. Codd

2. In the relational model, a table is called a _____.

Answer: Relation

3. A row in a relation is known as a _____.

Answer: Tuple

4. A column in a relation is called an _____.

Answer: Attribute

5. The complete logical structure of a database is called the database _____.

Answer: Schema

6. The _____ operation selects rows that satisfy a given condition.

Answer: Selection

7. The _____ operation retrieves specific columns from a relation.

Answer: Projection

8. Relational calculus is a _____ query language.

Answer: non-procedural

9. The symbol for selection operation is _____.
Answer: σ
10. The symbol for projection operation is _____.
Answer: π
11. In sequential file organization, records are stored in _____ order.
Answer: sequential
12. In heap file organization, records are stored in _____ order.
Answer: random
13. An _____ is used to speed up data retrieval operations.
Answer: index
14. A _____ index has an index entry for every search key value.
Answer: dense
15. A _____ index contains index entries for only some search key values.
Answer: sparse
16. Tree-structured indexing commonly uses _____ Trees.
Answer: B+
17. Hash-based indexing uses a _____ function to locate records.
Answer: hash
18. The _____ operation combines tuples from two relations based on a condition.
Answer: Join
19. The union operation combines tuples from two _____.
Answer: relations
20. B+ Trees are examples of _____ structured indexing.
Answer: tree