Started on	Tuesday, 18 March 2025, 2:30 PM
State	Finished
Completed on	Tuesday, 18 March 2025, 2:40 PM
Time taken	9 mins 30 secs
Marks	18.00/20.00
Grade	**90.00** out of 100.00

Question 1

Complete

Mark 1.00 out of 1.00

What is the maximum number of nodes in a binary tree of height `h` (where height is counted as the number of edges from root to the deepest node)?

- ⦿ a. $(2^{h+1} - 1)$
- ◯ b. $(2^h - 1)$
- ◯ c. $(h \log h)$
- ◯ d. (h^2)

Question 2

Complete

Mark 1.00 out of 1.00

What is the output of the following function when applied to an undirected graph represented as an adjacency list?

Function BFS(Node start):

   Queue Q

   Add start to Q

   While Q is not empty:

     Node u = Q.dequeue()

     print u

     For each neighbor v of u:

       If v is not visited:

         Mark v as visited

         Add v to Q

- ◯ a. Detection of cycles
- ⦿ b. Breadth First Traversal
- ◯ c. Finding the minimum spanning tree
- ◯ d. Depth-First Traversal

Question 3

Complete

Mark 0.00 out of 1.00

Which of the following SQL statements is used to remove an entire table including its structure?

- ○ a.   `REMOVE TABLE Employees;`
- ⦿ b.   `DELETE TABLE Employees;`
- ○ c.   `TRUNCATE TABLE Employees;`
- ○ d.   `DROP TABLE Employees;`

Question 4

Complete

Mark 1.00 out of 1.00

Which of the following SQL commands can be used to modify the structure of an existing table?

- ○ a.   `UPDATE`
- ○ b.   `CHANGE`
- ⦿ c.   `ALTER`
- ○ d.   `MODIFY`

Question 5

Complete

Mark 1.00 out of 1.00

What will happen if we execute the following command?

TRUNCATE TABLE Orders;

- ○ a.   Returns an error if there are foreign key constraints.
- ○ b.   Deletes selected rows only.
- ⦿ c.   Deletes all rows but retains the table structure.
- ○ d.   Deletes all rows and removes the table structure.

Question 6

Complete

Mark 1.00 out of 1.00

Which SQL command is used to modify existing data in a table?

- ○ a.   `ALTER`
- ⦿ b.   `UPDATE`
- ○ c.   `INSERT`
- ○ d.   `MODIFY`

Question 7

Complete

Mark 1.00 out of 1.00

Consider the following SQL query:

UPDATE Employees

SET Salary = Salary + 5000

WHERE Department = 'HR';

What does this query do?

- ○ a.   Decreases salary of HR department employees by 5000.
- ○ b.   Increases all employees' salary by 5000.
- ○ c.   Throws an error due to the `WHERE` clause.
- ◉ d.   Increases salary of only HR department employees by 5000.

Question 8

Complete

Mark 1.00 out of 1.00

What will happen if you execute the following SQL statement?

INSERT INTO Students (ID, Name) VALUES (101, 'John');

INSERT INTO Students (ID, Name) VALUES (101, 'Mike');

- ○ a.   Error due to missing `VALUES` keyword.
- ○ b.   Both rows will be inserted successfully.
- ○ c.   The second statement overwrites the first one.
- ◉ d.   Only the first row is inserted; the second one causes a Primary Key violation.

Question 9

Complete

Mark 1.00 out of 1.00

Which SQL statement is used to give a user access to a database?

- ○ a.   `REVOKE`
- ◉ b.   `GRANT`
- ○ c.   `ALTER`
- ○ d.   `ACCESS`

Question 10

Complete

Mark 1.00 out of 1.00

What will be the result of the following SQL statement?

REVOKE INSERT, UPDATE ON Employees FROM user1;

○ a.   Nothing happens.

○ b.   `user1` loses all privileges on `Employees`.

◉ c.   `user1` loses INSERT and UPDATE privileges on `Employees`.

○ d.   `user1` loses SELECT privilege on `Employees`.

Question 11

Complete

Mark 1.00 out of 1.00

Which SQL command is used to permanently save a transaction?

○ a.   `SAVEPOINT`

○ b.   `ROLLBACK`

◉ c.   `COMMIT`

○ d.   `UPDATE`

Question 12

Complete

Mark 1.00 out of 1.00

Consider the following pseudo-code for a function `func(Node root)` applied to a binary tree. What does it compute?

Function func(Node root):

  if root is NULL:

    return 0

  return 1 + func(root.left) + func(root.right)

○ a.   Sum of all node values

○ b.   Maximum depth of the tree

◉ c.   Number of nodes in the tree

○ d.   Height of the tree

Question 13

Complete

Mark 1.00 out of 1.00

Consider the following SQL sequence:

BEGIN;

UPDATE Employees SET Salary = Salary + 5000 WHERE Department = 'IT';

ROLLBACK;

○ a.   The salaries of IT employees will increase by 5000.

○ b.   An error occurs because `ROLLBACK` cannot undo an `UPDATE`.

○ c.   Only half the rows get updated.

◉ d.   No change will happen in the Employees table.

Question 14

Complete

Mark 1.00 out of 1.00

Which of the following is always true for a full binary tree with `n` nodes?

◉ a.   Every node has either 0 or 2 children

○ b.   The height of the tree is always `log n`

○ c.   Every level is completely filled

○ d.   The tree is always balanced

Question 15

Complete

Mark 1.00 out of 1.00

Given a BST, which of the following elements will always be found in the left subtree of a node with value `x`?

○ a.   All elements in the tree

○ b.   Elements greater than `x`

◉ c.   Elements less than `x`

○ d.   Elements equal to `x`

Question 16

Complete

Mark 1.00 out of 1.00

What is the output of the following function when applied to a BST?

Function findMin(Node root):

  if root is NULL:

    return NULL

  if root.left is NULL:

    return root.data

  return findMin(root.left)

- ○ a. The sum of all nodes
- ○ b. The maximum value in the BST
- ◉ c. The minimum value in the BST
- ○ d. The height of the BST

Question 17

Complete

Mark 0.00 out of 1.00

What is the worst-case time complexity of deleting a node in an unbalanced BST with `n` nodes?

- ◉ a. O(n log n)
- ○ b. O(log n)
- ○ c. O(1)
- ○ d. O👎

Question 18

Complete

Mark 1.00 out of 1.00

Which of the following statements is true for Dijkstra's Algorithm?

- ○ a. It guarantees the shortest path in all cases
- ◉ b. It works only for graphs with non-negative weights
- ○ c. It works correctly with negative-weight cycles
- ○ d. It finds the shortest path between all pairs of nodes

Question 19

Complete

Mark 1.00 out of 1.00

What is the time complexity of Depth-First Search (DFS) on a graph with `V` vertices and `E` edges using an adjacency matrix?

○ a.   O(E log V)

○ b.   O(V)

○ c.   O(V + E)

◉ d.   O(V²)

Question 20

Complete

Mark 1.00 out of 1.00

Which traversal method should be used to determine if a directed graph contains a cycle?

○ a.   Kruskal's Algorithm

◉ b.   Depth-First Search (DFS) with recursion stack

○ c.   Dijkstra's Algorithm

○ d.   Breadth-First Search (BFS)