Started on	Tuesday, 18 March 2025, 2:30 PM
State	Finished
Completed on	Tuesday, 18 March 2025, 2:45 PM
Time taken	14 mins 17 secs
Marks	19.00/20.00
Grade	**95.00** 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. Depth-First Traversal
- d. Finding the minimum spanning tree

Question 3

Complete

Mark 1.00 out of 1.00

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

- a. `TRUNCATE TABLE Employees;`
- b. `REMOVE TABLE Employees;`
- c. `DELETE 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. `ALTER`
- b. `UPDATE`
- c. `CHANGE`
- 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. Deletes all rows but retains the table structure.
- b. Returns an error if there are foreign key constraints.
- c. Deletes all rows and removes the table structure.
- d. Deletes selected rows only.

Question 6

Complete

Mark 1.00 out of 1.00

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

- a. `UPDATE`
- b. `ALTER`
- 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. Increases all employees' salary by 5000.
- b. Increases salary of only HR department employees by 5000.
- c. Throws an error due to the `WHERE` clause.
- d. Decreases salary of 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. The second statement overwrites the first one.
- b. Only the first row is inserted; the second one causes a Primary Key violation.
- c. Error due to missing `VALUES` keyword.
- d. Both rows will be inserted successfully.

Question 9

Complete

Mark 1.00 out of 1.00

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

- a. `GRANT`
- b. `REVOKE`
- 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. `user1` loses all privileges on `Employees`.
- b. Nothing happens.
- 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. `UPDATE`
- c. `ROLLBACK`
- d. `COMMIT`

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. Maximum depth of the tree
- b. Height of the tree
- c. Sum of all node values
- d. Number of nodes in 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. Only half the rows get updated.
c. An error occurs because `ROLLBACK` cannot undo an `UPDATE`.
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. Elements less than `x`
b. Elements equal to `x`
c. Elements greater than `x`
d. All elements in the tree

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

Question 17

Complete

Mark 1.00 out of 1.00

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

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

Question 18

Complete

Mark 1.00 out of 1.00

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

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

Question 19

Complete

Mark 0.00 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(V + E)
- b. $O(V^2)$
- c. O(E log V)
- d. O(V)

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. Depth-First Search (DFS) with recursion stack
- b. Dijkstra's Algorithm
- c. Kruskal's Algorithm
- d. Breadth-First Search (BFS)