Started on	Tuesday, 18 March 2025, 2:31 PM
State	Finished
Completed on	Tuesday, 18 March 2025, 2:43 PM
Time taken	11 mins 55 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^2)
- d. (h log h)

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. Depth-First Traversal
- c. Finding the minimum spanning tree
- d. Breadth First Traversal

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. `DELETE TABLE Employees;`
- c. `DROP TABLE Employees;`
- d. `REMOVE 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. `MODIFY`
- d. `CHANGE`

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 and removes the table structure.
- b. Returns an error if there are foreign key constraints.
- c. Deletes all rows but retains 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. `MODIFY`
- b. `ALTER`
- c. `INSERT`
- d. `UPDATE`

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. Throws an error due to the `WHERE` clause.
- c. Increases all employees' salary by 5000.
- 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. Only the first row is inserted; the second one causes a Primary Key violation.
- c. The second statement overwrites the first one.
- 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. `REVOKE`
- b. `GRANT`
- c. `ACCESS`
- d. `ALTER`

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. `ROLLBACK`
b. `UPDATE`
c. `COMMIT`
d. `SAVEPOINT`

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. Number of nodes in the tree
b. Height of the tree
c. Maximum depth of the tree
d. Sum of all node values

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. An error occurs because `ROLLBACK` cannot undo an `UPDATE`.
b. The salaries of IT employees will increase by 5000.
c. No change will happen in the Employees table.
d. Only half the rows get updated.

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. The height of the tree is always `log n`
b. Every node has either 0 or 2 children
c. The tree is always balanced
d. Every level is completely filled

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. All elements in the tree
d. Elements greater than `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 maximum value in the BST
b. The minimum value in the BST
c. The sum of all nodes
d. The height of 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(n log n)
d. O(1)

Question 18

Complete

Mark 1.00 out of 1.00

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

a. It works correctly with negative-weight cycles
b. It finds the shortest path between all pairs of nodes
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(E log V)
b. O(V)
c. $O(V^2)$
d. O(V + E)

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