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WEEK 12 ASSESSMENT 8

Assignment not submitted **Due date: 2024-04-21, 23:59 IST.**

1) In B-tree insertion, when a node overflows, what operation is performed to maintain the tree's balance? ***1 point***

- Merge
- Split
- Delete
- Traversal

2) _____ is the minimum number of children a non-root internal node can have in a B-tree of order m? ***1 point***

- [m/2]
- 0
- ⌊m/2⌋
- m

3) Which of the following algorithm design paradigms is primarily concerned with breaking down a problem into smaller subproblems and solving each subproblem independently before combining their solutions? ***1 point***

- Dynamic Programming
- Greedy Algorithms
- Divide and Conquer
- Backtracking

4) Which of the following is NOT a step in the insertion process of a key into a B+ tree? ***1 point***

- Insert the key into the leaf node
- Search for the leaf node to insert the key

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- (●) Propagate the key upwards if the leaf node is full
- ( ) Split the leaf node if it's not full

5) In a B+ tree, during insertion, if a leaf node splits, which of the following is true? ***1 point***

- ( ) Only one node splits at a time
- (●) Exactly two nodes split at a time
- ( ) Multiple nodes can split at a time
- ( ) No node splits during insertion

6) Which of the following is NOT a condition for a B+ tree node to undergo a merge during deletion? ***1 point***

- (●) The node is a leaf node
- ( ) The node is underflowing
- ( ) The node has fewer keys than the minimum required
- ( ) The sibling node has enough keys to accommodate the merging keys

7) In a B+ tree, which traversal method provides keys in ascending order? ***1 point***

- ( ) Pre-order traversal
- (●) In-order traversal
- ( ) Post-order traversal
- ( ) Level-order traversal

8) When deleting a key from a B+ tree, if the key to be deleted is found in an internal node, what action is taken? ***1 point***

- ( ) The key is removed from the internal node
- ( ) The key is replaced with its predecessor
- (●) The key is replaced with its successor
- ( ) The entire node is deleted

9) Which of the following statements regarding B+ tree traversal is FALSE? ***1 po***

- ( ) In-order traversal of a B+ tree yields keys in sorted order
- ( ) Pre-order traversal visits the root node first
- (●) Post-order traversal visits leaf nodes first
- ( ) Level-order traversal visits nodes level by level

10) During the deletion process in a B+ tree, if a leaf node becomes empty after deletion, what action is taken? ***1 point***

- ( ) The leaf node is removed from the tree
- (●) The leaf node is merged with its sibling
- ( ) The leaf node is split into two new nodes
- ( ) The empty leaf node is retained

11) Which of the following is NOT a step in the deletion process of a key from a B+ tree? **1 point**

- ○ Search for the key to delete
- ○ Remove the key from the leaf node
- ○ Propagate the deletion upwards if necessary
- ◉ Merge the leaf node with its sibling

12) In a B+ tree, if the root node becomes empty after deletion, what action is taken? **1 point**

- ○ The root node is merged with its child
- ○ The root node is removed from the tree
- ◉ The root node's child becomes the new root
- ○ The root node remains empty

13) Which of the following operations is NOT affected by the height of a B+ tree? **1 point**

- ○ Insertion
- ○ Deletion
- ○ Search
- ◉ Traversal

14) What is the maximum number of keys a node in a B-tree of order m can have? **1 point**

- ○ m
- ◉ m-1
- ○ m-2
- ○ 2m

15) Which of the following is a disadvantage of B-trees compared to binary search trees (BSTs)? **1 point**

- ○ B-trees require more memory
- ○ B-trees have slower search operations
- ◉ B-trees have higher height
- ○ B-trees have more complex insertion and deletion algorithms

16) In B-tree deletion, if a node underflows, what operation is performed to maintain the tree's balance? **1 po**

- ◉ Merge
- ○ Split
- ○ Delete
- ○ Traversal

17) What is the worst-case time complexity of searching in a B-tree of order m with height h? **1 point**

- ○ O(log m)

- ○ O(m log n)
- ◉ O(h)
- ○ O(h log m)

18) In a B-tree, the root node is a leaf node when _____ ***1 point***

- ○ The tree is empty
- ◉ The tree has only one node
- ○ The tree has more than one node
- ○ None of the above

19) Which traversal technique is commonly used to traverse a B-tree? ***1 point***

- ◉ In-order traversal
- ○ Pre-order traversal
- ○ Post-order traversal
- ○ Level-order traversal

20) Which of the following operations is not directly supported by a B-tree? ***1 point***

- ○ Insertion
- ○ Deletion
- ○ Search
- ◉ Sorting

You are allowed to submit this assignment only once.

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