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(FOR THE CANDIDATES ADMITTED DURING THE ACADEMIC YEAR 2023 ONLY) **23UDA205**

REG.NO.

N.G.M.COLLEGE (AUTONOMOUS) : POLLACHI

END-OF-SEMESTER EXAMINATIONS : MAY 2024

BSC CS WITH DA **MAXIMUM MARKS: 75**

SEMESTER-II **TIME : 3 HOURS**

PART - III

23UDA205-DATA STRUCTURE

SECTION – A (10 X 1 = 10 MARKS)

ANSWER THE FOLLOWING QUESTIONS. (K1)

1. What is the primary advantage of using a linked list to implement a queue over an array?
   (a) Faster random access (b) Smaller memory footprint (c) Easier implementation (d) No advantage
2. In a linked queue, which operation removes an element from the front of the queue?
   (a) Enqueue (b) Dequeue (c) Front (d) Peek
3. What is the maximum number of children a node can have in a binary tree?
   (a) 2 (b) 3 (c) 1 (d) unlimited
4. Which of the following is used as a key in a hash table?
   (a) Index (b) Value (c) Hash Function (d) Both A and B
5. Which searching algorithm requires the list to be sorted?
   (a) Linear Search (b) Binary Search (c) Hashing (d) Depth-First Search

ANSWER THE FOLLOWING IN ONE (OR) TWO SENTENCES (K2)

6. Differentiate Stack and Queue.
7. Define. Singly Linked List
8. Expand. BST
9. What is the purpose of a primary key in a database file organization?
10. Which sorting algorithm works by repeatedly swapping adjacent elements if they are in the wrong order?

SECTION – B (5 X 5 = 25 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K3)

11. a) Describe the process of searching an element in an array.

(OR)

b) Define a queue and describe its fundamental operations.

(CONT….2)

12. a) Describe the structure of a doubly linked list.

(OR)

b) List examples of real-world applications where linked stacks are particularly useful.

13. a) Describe the terminologies and types of binary tree.

(OR)

b) Discuss different methods for representing graphs and compare the advantages and limitations of each representation

14. a) Discuss scenarios where hash tables outperform or complement other structures.

(OR)

b) Discuss scenarios where direct file organization is preferable over sequential organization.

15. a) Illustrate the transpose sequential search technique with its steps.

(OR)

b) Explain why Radix Sort is particularly well-suited for sorting numerical data.

SECTION – C (5 X 8 = 40 MARKS)

ANSWER EITHER (a) OR (b) IN EACH OF THE FOLLOWING QUESTIONS. (K4 (Or) K5)

16. a) Explain the fundamental operations associated with a stack.

(OR)

b) Discuss the advantages of using a circular queue and provide an example of a situation where it would be beneficial.

17. a) Discuss in detail the structure of a node in a linked queue and the operations involved in managing the queue.

(OR)

b) Explore how dynamic memory allocation is handled in linked stacks. Discuss the advantages and challenges associated with dynamic memory in the context of stacks.

18. a) Explain the threading process and scenarios where threaded trees are beneficial.

(OR)

b) Explain in detail graph traversals and its applications.

19. a) Discuss the challenges associated with deleting elements in a hash table that uses linear open addressing.

(OR)

b) Explain the concept of sequential file organization. Discuss the advantages and limitations of organizing data sequentially in a file.

20. a) Compare and contrast linear search and binary search algorithms.

(OR)

b) Interpret the divide and conquer strategy in the context of sorting algorithms. Explain how algorithms like Merge Sort and Quick Sort utilize this approach.

ETHICAL PAPER

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