23SI-BCAP-MA-02-03001

Seat No. _____

BACHELOR OF COMPUTER APPLICATION Examination

BCA Semester - 2 JUNE 2024 (NEP) JUNE - 2024

CS-08: DATA STRUCTURE USING C LANGUAGE

Faculty Code : 003

Subject Code : 23SI-BCAP-MA-02-03001

Time : 2 Hours] **[Total Marks : 50**

Q.1 (A) Fill in the Blanks: 3

(1) _____ and _____ are two main measures of the efficiency of an algorithm.

(2) The _____ function in C programming language is used to deallocate memory.

(3) Malloc function returns _____ .

Q.1 (B) What is Big-Oh notation? Provide a brief explanation. 2

Q.1 (C) Compare and contrast Big-Oh and Big-Omega notations in algorithm analysis. 5

OR

Q.1 (A) Fill in the Blanks: 3

(1) _____ function is used to open a file in C.

(2) _____ is the return type of the fopen() function in C.

(3) _____ function is used to close a file in C.

Q.1 (B) Explain the purpose of the fopen() function in file handling. 2

Q.1 (C) How does feof() function work in file handling? Give an example. 5

Q.2 (A) Fill in the blanks: 3

(1) The time complexity of Bubble Sort is _____ .

(2) _____ sorting algorithm is based on the idea of repeatedly dividing the list into smaller sublists and then sorting those sublists.

(3) In _____ Sort, elements are compared and swapped in one direction.

Q.2 (B) Explain the basic principle behind Bubble Sort and its time complexity. 2

Q.2 (C) Discuss the advantages and disadvantages of using Quick Sort over Merge Sort forsorting large datasets. 5

OR

Q.2 (A) Fill in the blanks: 3

(1) Binary Search can only be applied to a _____ list.

(2) _____ searching technique checks each element in the list one by one until the desired element is found.

(3) The time complexity of Binary Search is _____ .

Q.2 (B) Describe the process of Binary Search. Also, mention its time complexity. 2

Q.2 (C) Differentiate between Index Searching and Sequential Searching. When is eachmethod preferred? 5

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Q.3 (A)	Fill in the blanks: (1) The data structure used to evaluate postfix expressions is called _____. (2) In the context of data structures, the acronym FIFO stands for _____. (3) The process of removing an element from a stack is commonly referred to as_____.	3
Q.3 (B)	Differentiate stack and queue.	2
Q.3 (C)	Write a note on the circular queue.	5
	OR	
Q.3 (A)	Fill in the blanks: (1) The primary purpose of a deque is to allow insertion and deletion from both_____. (2) The function used to insert an element into a queue is called _____. (3) Recursion in data structures can be implemented using _____.	3
Q.3 (B)	Write down applications of stack and queue.	2
Q.3 (C)	Write a note on deque.	5
Q.4 (A)	Fill in the blanks: (1) In a singly linked list, each node contains a reference to the _____ node in the sequence. (2) Traversing the entire linked list involves starting from the _____ node and moving to each subsequent node until reaching the end. (3) To insert a node after a specified node in a singly linked list, you need to update the _____ reference of the preceding node.	3
Q.4 (B)	Differentiate Singly and Doubly Linked List.	2
Q.4 (C)	Write an algorithm to insert new node in the beginning of the singly linked list.	5
	OR	
Q.4 (A)	Fill in the blanks: (1) In a doubly linked list, each node contains references to both the _____ and_____ nodes. (2) Circular linked lists are characterized by the last node pointing back to the_____ node, creating a loop. (3) Traversing a header linked list involves starting from the _____ node and moving to each subsequent node until reaching the end.	3
Q.4 (B)	Write down applications of the linked list.	2
Q.4 (C)	Write an algorithm to delete last node from singly linked list.	5
Q.5 (A)	Fill in the blanks: (1) A binary tree is a tree in which each node has at most _____ children. (2) The process of visiting all the nodes in a tree data structure, exactly once, in a specific order is called _____. (3) In tree ____ node has no children.	3
Q.5 (B)	Define a binary tree and mention two properties of binary trees.	2
Q.5 (C)	Describe the implementation of in-order, pre-order, and post-order traversals of abinary tree. Write an algorithm for any one of the traversals.	5
	OR	
Q.5 (A)	Fill in the blanks: (1) In-order traversal of a binary tree first visits the _____ child, then the root,	3

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and finally the _____ child.
(2) Pre-order traversal of a binary tree first visits the root, then the _____ child, and finally the _____ child.
(3) Post-order traversal of a binary tree first visits the _____ child, then the_____ child, and finally the root.

Q.5 (B) Explain the concept of graph traversal. Differentiate between depth-first search(DFS) and breadth-first search (BFS). 2

Q.5 (C) Briefly explain the concept of a minimal spanning tree in a graph. 5

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