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Question Paper Code: R2C05

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2024

Second Semester

Computer Science and Business Systems

R21UCB205- ALGORITHMS AND DATA STRUCTURES

(Regulations 2021)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. To measure Time complexity of an algorithm Big O notation is used which: CO1-U
 - (a) describes limiting behaviour of the function
 - (b) characterises a function based on growth of function
 - (c) upper bound on growth rate of the function
 - (d) all of the mentioned
2. Asymptotic analysis is _____ bound. CO1-U
 - (a) output
 - (b) input
 - (c) outer
 - (d) inner
3. Linked lists are not suitable to for the implementation of CO1-U
 - (a) Insertion sort
 - (b) Radix sort
 - (c) Polynomial manipulation
 - (d) Binary search
4. Linked list is considered as an example of _____ type of memory allocation CO1-U
 - (a) Dynamic
 - (b) Static
 - (c) Compile time
 - (d)Heap
5. The leaves of an expression tree always contain? CO1-U
 - (a) operators
 - (b) operands
 - (c) null
 - (d)expression
6. An expression tree is a kind CO1-U
 - (a) Binary search tree
 - (b)Fibonacci tree
 - (c) Binary Tree
 - (d) Treap

7. Dijkstra's Algorithm is used to solve _____ problems. CO1-U
 (a) All pair shortest path (b) Single source shortest path
 (c) Network flow (d) sorting
8. Which of the following is not the algorithm to find the minimum spanning tree of the given graph? CO1-U
 (a) Boruvka's algorithm (b) Prim's algorithm
 (c) Kruskal's algorithm (d) Bellman–Ford algorithm
9. What will be the number of passes to sort the elements using insertion sort? 14,12,16,6,3,10 CO1-U
 (a) 6 (b) 5 (c) 7 (d) 1
10. What is the best case complexity of selection sort? CO1-U
 (a) $O(n \log n)$ (b) $O(\log n)$ (c) $O(n)$ (d) $O(n^2)$

PART – B (5 x 2= 10 Marks)

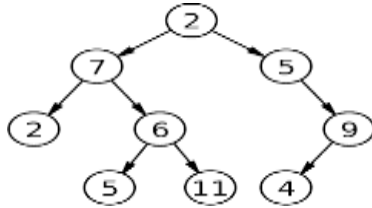
11. Define Big Omega Notations. CO1-U
12. Define circular linked list. CO1-U
13. Define AVL Tree CO1-U
14. Compare DFS and BFS CO1-U
15. Define Collision. CO1-U

PART – C (5 x 16= 80 Marks)

16. (a) Explain the Concept of Algorithm specification and Recursion with an Example. CO1 - U (16)
 Or
 (b) Describe how asymptotic notation can be applied to analyze the space complexity of algorithms. CO1 - U (16)
17. (a) Write a C program to implement the following operations in Queue with an example. CO2-App (16)
 (i) Enqueue (ii) Dequeue
 Or

- (b) Write a C program to implement the following operations in Single Linked List. CO2-App (16)
 (i) Insert at the End (ii) Insert at the beginning
 (iii) Insert middle

18. (a) Write all the three tree traversal for the following tree and Explain Tree Traversals in detail. CO2-App (16)



Or

- (b) Construct a Binary Search tree for the following data 10, 5, 15, 3, 4, 19, 18, 20, 1,7and perform deletion of data 1, 15, 10 orderly. CO2-App (16)

19. (a) Explain algorithms for testing graph connectivity, such as depth-first search (DFS) or breadth-first search (BFS). CO1- U (16)

Or

- (b) Construct the minimum spanning tree (MST) for the Kruskal's Algorithm. CO1- U (16)

20. (a) Explain how sorting algorithms such as bubble sort, merge sort, and quicksort can be applied to arrays. CO1- U (16)

Or

- (b) Write a C Program to Perform Linear and Binary Search. CO1- U (16)

