Printed Page:- Subject Code:- AMTCSE0101

Roll. No:

NOIDA INSTITUTE OF ENGINEERING AND TECHNOLOGY, GREATER NOIDA

(An Autonomous Institute Affiliated to AKTU, Lucknow)

M.Tech.

SEM: II - CARRY OVER THEORY EXAMINATION - JUNE (2021 - 2022)

Subject: ADVANCED DATA STRUCTURES AND ALGORITHMS

Time: 3 Hours Max. Marks: 70

General Instructions:

1. The question paper comprises three sections, A, B, and C. You are expected to answer them as directed.
2. Section A - Question No- 1 is 1 marker & Question No- 2 carries 2 mark each.
3. Section B - Question No-3 is based on external choice carrying 4 marks each.
4. Section C - Questions No. 4-8 are within unit choice questions carrying 7 marks each.
5. No sheet should be left blank. Any written material after a blank sheet will not be evaluated/checked.

SECTION A 15

1. Attempt all parts:-

1-a. Process of removing an element from stack is called _____(CO1) 1

(a) Create
(b) Push
(c) Evaluation
(d) Pop

1-b. What is/are the disadvantages of implementing tree using normal arrays? (CO2) 1

(a) difficulty in knowing children nodes of a node
(b) difficult in finding the parent of a node
(c) have to know the maximum number of nodes possible before creation of trees
(d) difficult to implement

1-c. A binary tree is a rooted tree but not an ordered tree. (CO3) 1

(a) TRUE
(b) FALSE

1-d. The complexity of linear search algorithm is _____ (CO4) 1

(a) O(n)
(b) O(log n)
(c) O(n2)
(d) O(n log n)

1-e. Backtracking algorithm is implemented by constructing a tree of choices called as? (CO5) 1

(a) State-space tree
(b) State-chart tree
(c) Node tree
(d) Backtracking tree

2. Attempt all parts:-

2.a. Write the name of any 5 data structure. (CO1) 2

2.b. Draw a complete binary tree with exactly six nodes. Put a different value in each node. (CO2) 2

2.c. Regarding implementation of Breadth First Search using queues, what is the maximum distance between two nodes present in the queue? (CO3) 2

2.d. Define an algorithm? What is the need for that? (CO4) 2

2.e. State the applications of backtracking? (CO5) 2

SECTION B 20

3. Answer any five of the following:-

3-a.	Describe abstract data type with example. (CO1)	4
3-b.	Write the prefix and postfix form for: A+B*(C-D)/(E-F) (CO1)	4
3-c.	Given a set of input representing the nodes of a binary tree, write a non-recursive algorithm that must be able to output the three traversal orders. (CO2)	4
3-d.	Write a Binary Search program. (CO2)	4
3.e.	Write an algorithm for depth first search and apply it on an un-directed graph. (CO3)	4
3.f.	Write an algorithm for finding maximum element of an array; perform best and average case complexity with appropriate order notations? (CO4)	4
3.g.	Explain NP complete problems with example? (CO5)	4

SECTION C 35

4. Answer any one of the following:-

4-a.	Convert the following infix expression into a postfix expression i) (((A/(B*C))+(D*E))-(A*C)) ii) A^B*C-D+E/F/(G+H) (CO1)	7
4-b.	Write a c function i)to insert an element at the rear end of a queue ii)to delete an element from the front end of the queue (CO1)	7

5. Answer any one of the following:-

5-a.	What are B-trees? Construct a B-Tree of order 3 for the following set of Input data: (CO2) 69, 19, 43, 16, 25, 40, 132, 100, 145, 7, 15, 18	7
5-b.	Construct AVL Tree for the following sequence of numbers- (CO2) 50 , 20 , 60 , 10 , 8 , 15 , 32 , 46 , 11 , 48	7

6. Answer any one of the following:-

6-a.	Explain the Floyd Warshall algorithm with example. (CO3)	7
6-b.	Explain Kruskal’s Algorithm With an example. (CO3)	7

7. Answer any one of the following:-

7-a.	Describe the Travelling salesman problem & discuss how to solve it using Dynamic Programming? (CO4)	7
7-b.	Explain the 0/1 knapsack with an algorithm? (CO4)	7

8. Answer any one of the following:-

8-a.	Discuss Non-Deterministic algorithms in detail with examples? (CO5)	7
8-b.	Discuss Amortized Analysis in detail with examples? (CO5)	7