Question Paper

Exam Date & Time: 25-Nov-2023 (02:00 PM - 05:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal School of Information Sciences (MSIS), Manipal
First Semester Master of Engineering - ME (Artificial Intelligence and Machine Learning / Big Data Analytics) Degree Examination - November / December 2023

Algorithms and Data Structures for Big Data [BDA 5101]

Marks: 100 **Duration: 180 mins.**

Saturday, November 25, 2023

Answer all the questions.

1)	Illustrate with examples the parameters required to evaluate the performance of algorithms. (CO1) (6 + 4 marks)	(10)
2)	Define Stack data structure. List its applications. Design data structure with required methods to implement Unlimited Stack. (CO.2) (2+2+6 marks)	(10)
3)	Define Queue data structure. List applications of queue data structure. Implement CircularQueue with required methods. (CO2) (1+2+7 marks)	(10)
4)	Design data structure for singly linked list required to store information of students. Data need to store are, name, registration number, program and CGPA. Write methods to add students into linked list at tail position and retrieve maximum CGPA with O(1) time. It is assumed that there is no deletion of nodes. (CO2) (5+3+2 marks)	(10)
5)	Design data structure for Binary Search Tree. Data to be stored are student marks. Write methods to delete specified node and find number of terminal nodes in BST. (CO3) (3+4+3 marks)	(10)
6)	Implement bubble sort and insertion sort. Compare the time complexity for both technique. (CO 3) (5+5 marks)	(10)
7)	Define hashing. Explain different Hashing Tables used. List merits and demerits of each hash table. (CO 3) (2+5+2 marks)	(10)
8)	Define Minimum Spanning Tree. Describe Kruskals algorithm with suitable example.(CO 3) (2+5+3 marks)	(10)
9)	Give the pre requisite for Binary Search operation. Implement binary search using divide and conquer method. Derive the time complexity of binary search. (CO3) (1+6+3 marks)	(10)
10)	Implement brute force pattern matching algorithm. Discuss its performance. (CO4) (7+3 marks)	(10)

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