Question Paper

Exam Date & Time: 20-Nov-2018 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SCHOOL OF INFORMATION SCIENCES

FIRST SEMESTER MASTER OF ENGINEERING - ME (BIG DATA AND DATA ANALYTICS)

Algorithms and Data Structures for Big Data [BDA 601]

Marks: 100

Duration: 180 mins.

Answer all the questions.

- ¹⁾ With example, show how do you compute space and time ⁽¹⁰⁾ of a given algorithm.
- What is a stack? List at least four applications. Provide (10) python class for unlimited size stack with basic operations.
 Write test cases to test the stack functionalities.
- ³⁾ Design unique-queue, which takes only unique elements. If ⁽¹⁰⁾ try to add an element which is already present, it should reject. Queue should be of limited size.
- ⁴⁾ Design Single linked list using python. Provide methods to ⁽¹⁰⁾ delete an element from tail, search a given node and display max value (of a node) with O(1) time.
- ⁵⁾ For the given list 53 24 96 15 38 6 125 90 47 62 83 ⁽¹⁰⁾ sort in the descending order using merge sort. Show all steps during sorting (No code is required). Discuss the time complexity of Merge Sort.
- ⁶⁾ Given a list 54 85 32 51 68 74 91 12 build maximum ⁽¹⁰⁾ heap. Draw all the stages of building heap. Add a new element 88 and show how heap modified to add new element.
- ⁷⁾ Design a python class to represent BST and provide ⁽¹⁰⁾ methods to delete element from BST.
- ⁸⁾ What is Hashing? What is collision in hashing? Give any one ⁽¹⁰⁾ efficient hash function.
- ⁹⁾ Write python code for Single source all destinations ⁽¹⁰⁾ (Dijkstra's) algorithm for a given graph. Assume that graph

is already built.

¹⁰⁾ Write python code for binary search. What is the pre requisite for Binary Search? Derive its worst case time.

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(10)