Question Paper

Exam Date & Time: 08-Feb-2021 (10:00 AM - 01:15 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

MANIPAL SCHOOL OF INFORMATION SCIENCES, MANIPAL
FIRST SEMESTER MASTER OF ENGINEERING- ME (EMBEDDED SYSTEMS / CLOUD COMPUTING / INTERNET OF THINGS) DEGREE EXAMINATION - FEBRUARY 2021

Data Structures and Algorithms [CSE 601]

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

MONDAY, FEBRUARY 8, 2021

Answer all the questions.

1)	What is a queue? Describe the pointer implementation of queues. Write the functions en-queue and de-queue associated with this implementation (TLO 1.3) (2+4+4 Marks)	(10)
2)	Write a function to find a factorial of a number and derive the time complexity(TLO 1.2) (10 Marks)	(10)
3)	What are the properties of Binary Search Tree? Write a recursive function to add element into BST? (TLO 2.3) (5+5 Marks)	(10)
4)	Write a function for sorting 'n' numbers using quick-sort. Illustrate the working with an example. Derive its worst case time complexity (TLO 2.1) (4+3+3 Marks)	(10)
5)	Write a function for Breadth First Search traversal of a Graph. (TLO 3.1) (10 Marks)	(10)
6)	Describe Prim's and Kruskal's algorithms for finding the minimum spanning tree. (TLO 3.1) (5+5 Marks)	(10)
7)	Write divide and conquer algorithms for a) Finding the maximum & minimum of 'n' numbers. (TLO 3.2) (5 Marks) b) Searching element using binary search technique. Discuss time complexity. (TLO 3.2) (5 Marks)	(10)
8)	Write a dynamic programming algorithm for the ALL PAIRS SHORTEST PATHS problem. Illustrate this with an example. (TLO 3.1) (10 Marks)	(10)
9)	Explain separate chain hashing (using linked list) technique with required functions. (TLO 2.2) (10 Marks)	(10)
10)	Explain Priority queue. Write functions for Inserting and deleting elements from priority queue (Use Heaps). (TLO 1.3) (5+5 Marks)	(10)

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