Question Paper

MANIPAL UNIVERSITY

SCHOOL OF INFORMATION SCIENCES
FIRST SEMESTER Master of Engineering - ME (Medical software/ Embedded Systems/ Embedded Systems & Instrumentation/ Embedded and Wireless Technology/ Computing Technologies and Virtualization)
DEGREE EXAMINATION - NOVEMBER 2017
DATE : Wednesday, November 15, 2017
TIME : 10:00AM - 1:00PM

Data Structures and Algorithms [ESD 601]

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

A

Answer all the questions.

1) Write the data structures required to implement single linked list. Write functions to add an element at the tail position and count the number of elements in the list. (10)

(4+4+2)

2) With required data structures, write functions to create stack, push and peek element from linked list based stack. (10)

(3+2+3+2)

3) What is circular queue? What is its advantage over normal queue? With required data structures, write functions to check whether queue is full, queue is empty and delete an element from a circular queue. (10)

(2+1+2+5)

4) What are the properties of Binary Search Tree? Provide the data structure required to implement Binary Search Tree. Write a recursive function for inserting elements into Binary Search Tree. (10)

(4+2+4)

5) Implement Quick sort and Insertion sort, Discuss its time complexity. (6+4) (10)

6) Write code for the SINGLE SOURCE SHORTEST PATHS problem. Illustrate this with an example. (10)

7) Provide different techniques for representing graph. (10)

Describe Prim's algorithm with example.

(4+4+2)

8) Write the N-Queen's algorithm using backtracking technique, Illustrate with an example. (10)

9) Write the following algorithm (10)

A. Write binary search algorithm using divide & Conquer technique. (5)

B. Give all-pairs shortest path algorithm using dynamic programming. (5)

10) Write functions to (10)

A. Extract element from Maximum heap (5)

B. Insert element into Maximum heap (5)

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