LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

M.C.A. DEGREE EXAMINATION – COMPUTER APPLICATIONS

FIRST SEMESTER – NOVEMBER 2018

16/17/18PCA1MC04– DATA STRUCTURES AND ALGORITHMS

Date: 01-11-2018   Dept. No.   Max. : 100 Marks
Time: 01:00-04:00

PART A

Answer ALL Questions   **(10 X 2 = 20)**

1. Define queue.

2. Change the following from infix to prefix and postfix expressions:

(A + B) / (C – (D * B))

3. Define Heap Tree.

4. What are AVL trees?

5. What is the degree of a Graph?

6. What is completed graph?

7. Define Knapsack Problem.

8. What is the time complexity of Merge sort?

9. Define Bellman's Principle of Optimality.

10. What is branch and bound?

PART B

Answer ALL Questions   **(5 X 8 = 40)**

11a. Write down the applications of linked list.

(OR)

b. What are abstract data types? Justify stack as a abstract data type.

12 a. What are B-Trees? Specify the operations on B-Trees with example.
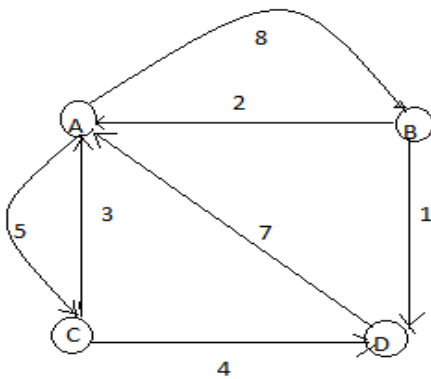
(OR)

b. Explain bubble sort with an example.

13 a. Write Prim's algorithm to find a minimum spanning tree. Illustrate the algorithm with an

example.

(OR)

b. Find the all pairs shortest path for the following problem using Warshall's algorithm.

14 a. Explain the role of Asymptotic notations in analysis of algorithms.

(OR)

b. What is Merge sort? Sort the following through Merge sort and specify the Algorithm.

     28   11   34   9   2   42   21

15 a. What are multi-stage graphs? Find the shortest path through forward approach and backward approach of following graph
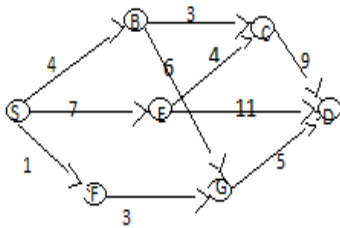
(OR)

b. Describe the algorithm to solve 8-Queen Problem.

PART C
Answer any TWO Questions   (2 x 20 = 40)

16 i) Explain the basic operations on Arrays with examples.
   ii) Explain binary search tress with the operations 'add' and 'search'.

17 i) ExplainDijkstra's Algorithm with an example .
   ii) How Strassen's matrix multiplication improves computational efficiency of sorting.
Explain with example.

18 i) How can theTraveling Salesman problem be solved using branch and bound method?
Explain with an example.
   ii) Explain quick sort algorithm and apply for the following data.
      13   10   8   40   2   11   25

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