

Question Paper

Exam Date & Time: 04-Jan-2023 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

Manipal School of Information Sciences (MSIS), Manipal
First Semester Master Engineering - ME (Embedded Systems) Degree Examination - January 2023

Data Structures and Algorithms [ESD 5102]

Marks: 100

Duration: 180 mins.

Wednesday, January 4, 2023

Answer all the questions.

- 1) Write about a queue. Describe the pointer implementation of queues. Write the functions en-queue and de-queue associated with this implementation. (TLO 1.3) (10)
- 2) Explain how do you analyze the performance of an algorithm? (TLO 1.1) (10)
- 3) Write functions for the following and give worst-case time (TLO 2.1) (5+5 Marks) (10)
 - (a) Extracting Maximum element from the Heap
 - (b) Inserting element into the Heap
- 4) Discuss the following with respect to the divide and conquer technique (TLO 3.2) (5+5 Marks) (10)
 - (a) Strassen's Matrix Multiplication
 - (b) Multiplication of long integers
- 5) Write code for the SINGLE SOURCE SHORTEST PATHS problem. Illustrate this with an example. (TLO 3.2) (10)
- 6) Write a function for level order traversal of a binary tree. Illustrate with an example. (TLO 2.3) (10)
- 7) Write a dynamic programming algorithm for matrix chain multiplication. What is its time complexity? (TLO 3.2) (10)
- 8) Describe a recursive backtracking algorithm for the sum of subsets problem. (TLO 3.2) (10)
- 9) Write short notes on (TLO 2.2) (5+5 Marks) (10)
 - (a) Separate chain Hashing (linked list) (b) Closed Hashing (array)
- 10) With respect to the Greedy approach, write the following algorithms with examples (TLO 3.2) (5+5 Marks) (10)
 - (a) Knapsack problem. (b) Job sequencing with deadlines.

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