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MCA-12/MSc. IT-12

Design and Analysis of Algorithm

Master of Computer Applications/
Master of Science in Information Technology
(MCA/MSc IT-11/12/16/17)

3rd Semester, Examination-2019

Time :* 3 *Hours ***[Maximum Marks : 80***

Note : This paper is of Eighty (80) marks divided into two (02) Sections A and B. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section–A

Long Answer Types Questions

Note : Section 'A' contains Five (05) long-answer-type questions of Fifteen (15) marks each. Learners are required to answer any three (03) questions only. **(3×15=45)**

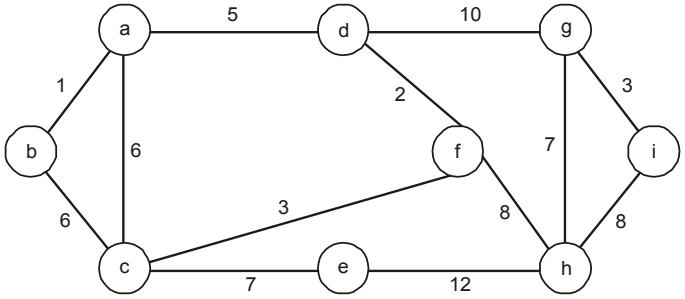
1. Analysis of an algorithm is important for programming. Explain. What are asymptotic notations? Explain with example.

2. What is recurrence relation? What are the different methods used for solving recurrence relations? Explain with example.

3. Explain basic operations in B-Tree, Construct B-Tree for the following data (order = 4) : 12, 43, 23, 54, 76, 45, 11, 98, 70, 41, 90, 32, 16, 67, 80.

4. What is the dynamic approach? How it is differ from greedy approach? Explain matrix chain multiplication problem.

5. Explain graph. What are spanning and minimum spanning trees? Find minimum spanning tree using Prim's algorithm of the following graph :



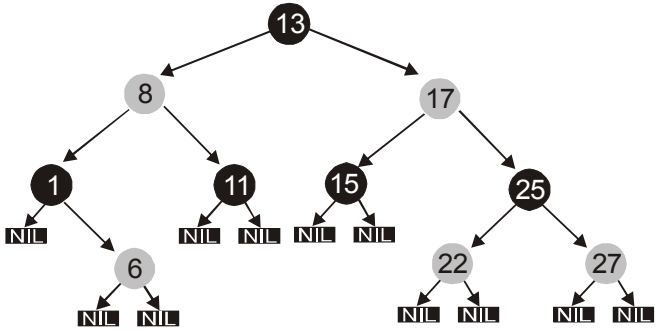
Section–B

Short Answer Types Questions

Note : Section 'B' contains Eight (08) short-answer-type questions of Seven (07) marks each.

Learners are required to answer any Five (05) questions only. **(5×7=35)**

1. Explain Rabin Karp algorithm with example.
2. Explain the Quick Sort algorithm with an example.
3. Consider the following Red-Black tree and perform the following operations :



Insert - 29, 2, 5 and 16.

Delete - 16, 2 and 25

4. How Travelling Sales person problem can be solved using backtracking.
5. Differentiate between binomial and fibonaccin heap.

6. Provide solution for n-queen problem, where $n = 4$.
7. Explain single source shortest path algorithm with example.
8. Sort the following data using quick sort :

   11, 55, 88, 33, 99, 22, 66, 77