

AE-819

M.Sc. (Previous)
Term End Examination, 2016-17

COMPUTER SCIENCE

Analysis and Design of Algorithm

Time : Three Hours] [Maximum Marks : 100
[Minimum Pass Marks : 36

Note : Answer any **five** questions. All questions carry equal marks.

1. (a) What is the difference between time and space complexity? Also describe asymptotic notation used for describing the complexity.
- (b) With a suitable algorithm explain the problem of finding maximum and minimum element in a set of n elements.

(2)

2. (a) Write an algorithm for Quicksort and write its complexity. Also apply Quicksort to the list 5, 3, 1, 9, 8, 2, 4, 7.

- (b) Construct a Huffman code for the following data :

Character : A B C D E

Probability : 0.4 0.1 0.25 0.2 0.15

- (i) Encode the text ABACABAD using generated code.

- (ii) Decode the text whose encoding is 10001011100101.

3. (a) What is Data Structure ? Explain the different types of Data Structure.

- (b) Solve the following recurrence relation :

(i) $T(n) = 2T\left(\frac{n}{2}\right) + n \log n$

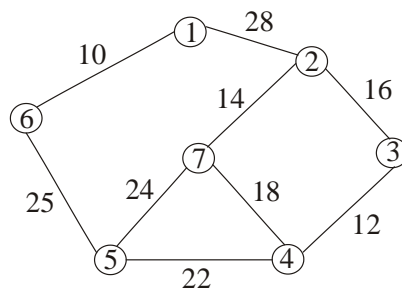
(ii) $T(n) = 2T\left(\frac{n}{3}\right) + T\left(\frac{2n}{3}\right) + C_n$

4. (a) Briefly explain Strassen's matrix multiplication. How it uses divide and conquer method ?

- (b) Explain merge sort problem using divide and conquer technique. Give an example.

(3)

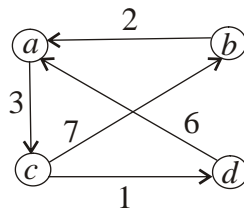
5. (a) Apply Prim's algorithm to find minimum spanning tree in the following graph :



- (b) Write algorithm for solving Knapsack problem ? Apply the algorithm to the following given data :

Item	Weight	Value
1	18	25
2	15	14
3	10	15
4	20	20

6. (a) Apply Floyd's Algorithm to find all pair shortest path for the graph given below.



(4)

- (b) Explain how dynamic programming is used to solve travelling salesman problem.
 - 7. (a) Describe branch and bound method with suitable example.
(b) Explain backtracking algorithm with N Queen problem.
 - 8. (a) Write complete LC branch and bound algorithm for the job sequencing with deadlines problem.
(b) Write an algorithm to compute 0/1 Knapsack problem.
 - 9. (a) Define string matching problem and describe any string matching algorithm in detail.
(b) Explain the clique decision problem.
 - 10. (a) Explain the need for approximation algorithm. How they can be used for NP hard problem ?
(b) Explain P, NP and NP complete problem.
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