


**Faculty of Engineering**

School of Computing and I.T.

Department of Computer Science and Engineering

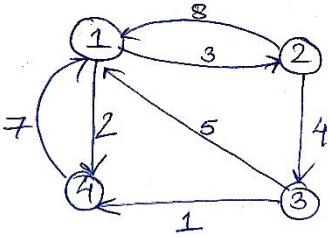
V SEM. B.Tech – CSE, CCE &amp; IT

ODD Semester End Term Examination 2020-21

CS1501 Design and Analysis of Algorithms

**Time: 01 Hour 15 mins.**
**MAX.MARKS: 20**
*Instructions to Candidates*

- Answer all four questions in your own words in given order only.
- Missing data, if any, may be assumed suitably.

Q. No.	Question Script	Marks	CO Mapping																									
1a.	Solve the following recurrence relation $T(n) = \sqrt{2}T(n/\sqrt{2}) + n\log n$	[2]	CO1																									
1b.	Apply Strassen's Matrix Multiplication to find product of following matrices: $\begin{bmatrix} 1 & 1 & 1 & 1 \\ 1 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \end{bmatrix} \times \begin{bmatrix} 0 & 1 & 0 & 1 \\ 1 & 0 & 1 & 0 \\ 1 & 1 & 1 & 1 \\ 1 & 0 & 0 & 1 \end{bmatrix}$	[3]	CO2																									
2a.	Find the solution to maximize the profit on given data and return the $X_i$ (solution) vector for following data; Number of items: $n = 8$ , Total Capacity $M=17$ . Profit $P = \{10, 15, 8, 7, 3, 15, 8, 27\}$ and weight $W = \{5, 4, 3, 7, 2, 3, 2, 6\}$ .	[2]	CO3																									
2b.	Refer below graph, find the all pair shortest path using Floyd-Warshall Algorithm. 	[3]	CO3																									
3	<p>The aim of problem is to assign a unique query to every database engine such that the total cost of query processing is minimized. The constrained is defined as follows:</p> $\sum_{i=1}^n x_{ij} = 1 \text{ or } \sum_{j=1}^n x_{ij} = 1 \text{ with } x_{ij} = \begin{cases} 1 & \text{if assigned} \\ 0 & \text{if unassigned} \end{cases} \forall i, j = 1, 2, \dots, n$ $f = \sum_{j=1}^n \sum_{i=1}^n c_{ij} x_{ij}$ <p>You need to minimize the objective function <math>f</math> where <math>c_{ij}</math> is the cost assigning <math>i</math> to <math>j</math>.</p> <table border="1" data-bbox="464 1749 1016 1944"><thead><tr><th></th><th>Query1</th><th>Query2</th><th>Query3</th><th>Query4</th></tr></thead><tbody><tr><td>Engine1</td><td>7</td><td>42</td><td>47</td><td>10</td></tr><tr><td>Engine2</td><td>12</td><td>28</td><td>4</td><td>20</td></tr><tr><td>Engine3</td><td>34</td><td>14</td><td>15</td><td>10</td></tr><tr><td>Engine4</td><td>12</td><td>26</td><td>14</td><td>8</td></tr></tbody></table>		Query1	Query2	Query3	Query4	Engine1	7	42	47	10	Engine2	12	28	4	20	Engine3	34	14	15	10	Engine4	12	26	14	8	[5]	CO4
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4	<p>Given the following Text and Pattern</p> <p><b>Text:</b>        <b>abcxab@dababbcdabab@abcy</b></p> <p><b>Pattern:</b>    <b>abab@abcy</b></p> <p>@ is a special character that can me match with any other letter. Find out the Prefix table and use KMP to find whether pattern is present in string or not. Show step by step working of KMP and list down all the index at which mismatch occur.</p>	[5]	CO5
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