

**End Semester Examinations - 2015-16 Even Semester - May 2016**

**14CS2001 Analysis of Algorithms**

**Set B**

**Time : 3 hrs**  
**Total Marks: 100**

1. Discuss about Asymptotic notations ( $O$ ,  $\Omega$ ,  $\Theta$ ) with proper examples and graphs? (20)

**OR**

2. a) Explain the mathematical analysis of recursive algorithms and non recursive algorithms in detail? (10)  
b) Write the recursive algorithm for finding number of binary digits in the binary representation of a decimal number. Draw its recursion tree and find the time complexity for the solution. (10)

3. a) Write the string matching algorithm using Brute Force technique and apply the algorithm on the below mentioned input text and pattern. Explain its best case and worst case complexities. (10)

**Text :** AAAAAAAAAAAAAAAAAA

**Pattern:** AAAH

- b) Write Selection Sort algorithm and Apply the input 20, 80, 50, 10, 70, 30, 60, 40 on the algorithm and show each steps. Find the algorithm's time complexity also. (10)

**OR**

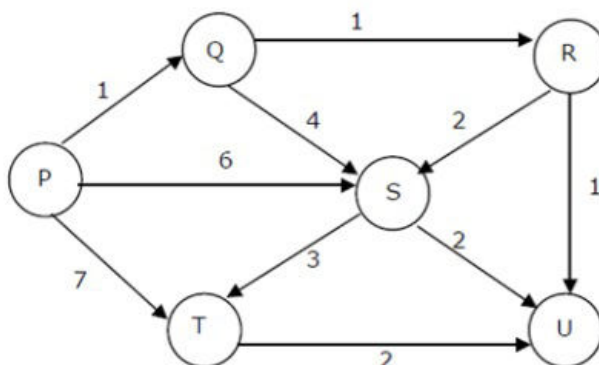
4. a) Explain Quick Sort with the pseudocode and apply the technique for sorting the numbers 90, 70, 50, 30, 10, 20, 40, 60, 80 in ascending order. Derive the worst case time complexity of the algorithm. (15)

- b) Write the pseudocode for Binary Search and explain it with a proper example. (5)

5. Using dynamic programming algorithm, find the minimum number of scalar multiplications needed for multiplying matrices A, B, C, D which are having dimensions  $10 \times 5$ ,  $5 \times 20$ ,  $20 \times 10$ ,  $10 \times 5$  respectively. (20)

**OR**

6. Explain Floyd's algorithm for finding all pairs shortest path and apply that algorithm on the below mentioned directed graph. (20)

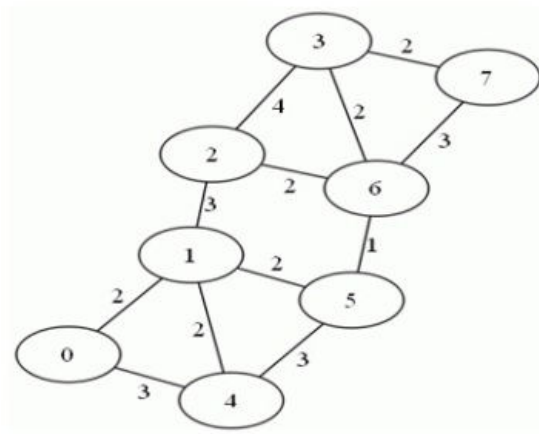


7. a) Suppose the letters a, b, c, d, e, f have probabilities  $1/2$ ,  $1/4$ ,  $1/8$ ,  $1/16$ ,  $1/32$ ,  $1/32$  respectively. Find the Huffman code of all the letters using Huffman Coding algorithm. (10)  
b) We are given 9 tasks T1, T2, T3... T9 which are having a profit and dead line. Apply Greedy Job Sequencing algorithm for finding what way we should order the tasks so that we can make maximum profit. (10)

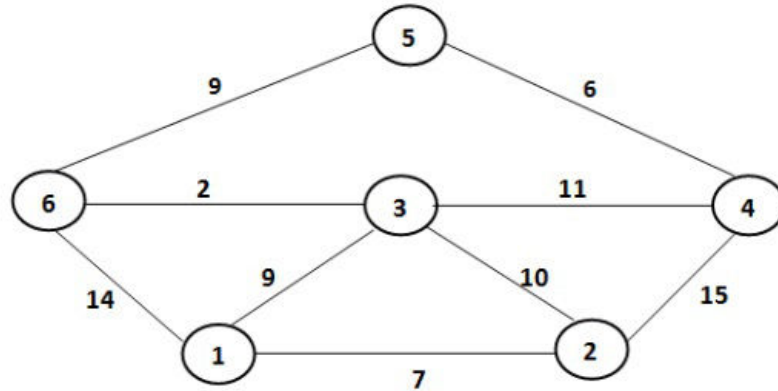
TASK	T1	T2	T3	T4	T5	T6	T7	T8	T9
PROFIT	15	20	30	18	18	10	23	16	25
DEADLINE	7	2	5	3	4	5	2	7	3

**OR**

8. a) Write the Kruskal's algorithm and Apply it on the following graph for finding the minimum spanning tree. (10)



- b) Apply Dijkstra's algorithm on the below graph to find the shortest path from vertex "1" to all the other vertices. (10)



9. a) Apply Horspool's algorithm to search for the pattern 'ATCGG' in the text 'AGCTGGAATCCTATCGGTA' and Explain how does shift take place. (10)
- b) Discuss about P, NP, NP-Complete and NP-hard classes of problems. (10)

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**Wishing you All the Best**

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