PRESIDENCY UNIVERSITY
BENGALURU

SCHOOL OF INFORMATION SCIENCE
END TERM EXAMINATION - JAN 2023

Semester : Semester III - 2021
Course Code : CSA2005
Course Name : Sem III - CSA2005 - Analysis of Algorithms
Program : BCA (All)

Date : 12-JAN-2023
Time : 9.30AM - 12.30PM
Max Marks : 100
Weightage : 50%

Instructions:
(i) Read all questions carefully and answer accordingly.
(ii) Question paper consists of 3 parts.
(iii) Scientific and non-programmable calculator are permitted.

PART A

ANSWER ALL THE FOLLOWING QUESTIONS   10 X 2 = 20M

1. Give the order of growth for brute force string matching algorithm in any 2 cases.

   (CO1) [Knowledge]

2. What is basic effeciency class and give its order of growth.

   (CO1) [Knowledge]

3. Consider the array A={25, 9, 15, 30, 11, 17, 22}.
   Apply bubble sort on A and find which element is present at index 2 after third pass.

   (CO2) [Knowledge]

4. List the worst case's equations with the help of Master's theorem.

   (CO3) [Knowledge]

5. Explain general method of decrease and conquer technique in brief.

   (CO3) [Knowledge]

6. Obtain the worst case time complexity for the linear search.

   (CO2) [Knowledge]

7. Explain path matrix in brief and name the algorithm which is used to generate the path matrix.

   (CO4) [Knowledge]

8. Mention the time complexity of prims and kruskal's algorithm.

   (CO4) [Knowledge]

9. Explain distance matrix in brief and name the algorithm which is used to generate the distance matrix.

   (CO4) [Knowledge]

10. Define backtracking in brief.

   (CO5) [Knowledge]

PART B

ANSWER ALL THE FOLLOWING QUESTIONS   **5 X 10 = 50M**

11. Define asymptotic notation. Explain all three notations used to express the order of growth of an algorithm in detail.

                                                    (CO1) [Comprehension]

12. Write any one sorting algorithm which uses brute force technique, Also give its order of growth by analyzing it.

                                                    (CO2) [Comprehension]

13. Write merge sort algorithm along with its purpose, input and output. Also give its analysis.

                                                    (CO3) [Comprehension]

14. Define Transitive closure. Write Warshall algorithm and also do its analysis.

                                                    (CO4) [Comprehension]

15. Define Backtracking in detail. Apply backtracking technique to solve 4 Queen's problem.

                                                    (CO5) [Comprehension]

PART C

ANSWER ALL THE FOLLOWING QUESTIONS   **2 X 15 = 30M**

16. Explain the Dynamic Knapsack problem in detail with all the necessary terminologies. Derive the three equations required to solve the dynmaic knapsack problem. Also write its algorithm.

                                                    (CO4) [Application]

17. Construct the Minimum Spanning Tree using both prim's and Kruskal's algorithm for the graph whose details is
    a) It contains 6 vertices namely A, B,C,D,E and F.
    b) A to B is 5, A to E is 4, A to F is 2, B to C is 3, B to E is 3, E to F is 1, E to C is 5, E to D is 4, C to D is 6 and F to D is 5.
    c) Assume it is Undirected graph.
    d) Assume starting vertex is A.

                                                    (CO4) [Application]

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