Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - −Advanced Algorithms
Course Code - PCC-MCS201

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Answer all the questions. Each question carry one mark.

9.   1.Which of the following is/are property/properties of a dynamic programming
     problem?

     Mark only one oval.

     ○ Optimal substructure

     ○ Overlapping sub problems

     ○ Greedy approach

     ○ Both optimal substructure and overlapping sub problems

10.   2.Recurrence equation formed for the tower of hanoi problem is given by
       _____

       Mark only one oval.

       ◯ T(n) = 2T(n-1)+n
       ◯ T(n) = 2T(n/2)+c
       ◯ T(n) = 2T(n-1)+c
       ◯ T(n) = 2T(n/2)+n

11.   3.Consider the two matrices P and Q which are 10 x 20 and 20 x 30 matrices
       respectively. What is the number of multiplications required to multiply the two
       matrices?

       Mark only one oval.

       ◯ 10*20
       ◯ 20*30
       ◯ 10*30
       ◯ 10*20*30

12.   4.What is the space complexity of the above dynamic programming
       implementation of the matrix chain problem?

       Mark only one oval.

       ◯ O(1)
       ◯ O(n)
       ◯ O(n^2)
       ◯ O(n^3)

13.   5.Dijkstra's Algorithm cannot be applied on _____

Mark only one oval.

◯ Directed and weighted graphs

◯ Graphs having negative weight function

◯ Unweighted graphs

◯ Undirected and unweighted graphs

14.   6.The Bellmann Ford algorithm returns _____ value.

Mark only one oval.
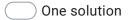
◯ Boolean

◯ Integer

◯ String

◯ Double

15.   7.How many solution/solutions are available for a graph having negative weight
       cycle?

Mark only one oval.

◯ One solution

◯ Two solutions

◯ No solution

◯ Infinite solutions

16.   8.What is the running time of Bellmann Ford Algorithm?

Mark only one oval.

◯ O(V)

◯ O(V2)

◯ O(ElogV)

◯ O(VE)

17.   9.Which of the following is false in the case of a spanning tree of a graph G?

Mark only one oval.

◯ It is tree that spans G

◯ It is a subgraph of the G

◯ It includes every vertex of the G

◯ It can be either cyclic or acyclic

18.   10.A person wants to visit some places. He starts from a vertex and then wants to visit every vertex till it finishes from one vertex, backtracks and then explore other vertex from same vertex. What algorithm he should use?

Mark only one oval.

◯ Depth First Search

◯ Breadth First Search

◯ Trim's algorithm

◯ None of the mentioned

19.   11.What is an external sorting algorithm?

Mark only one oval.

⬭ Algorithm that uses tape or disk during the sort

⬭ Algorithm that uses main memory during the sort

⬭ Algorithm that involves swapping

⬭ Algorithm that are considered â€˜in place

20.   12.You are given a knapsack that can carry a maximum weight of 60. There are 4
      items with weights {20, 30, 40, 70} and values {70, 80, 90, 200}. What is the
      maximum value of the items you can carry using the knapsack?

Mark only one oval.

⬭ 160

⬭ 200

⬭ 170

⬭ 90

21.   13.What happens when the backtracking algorithm reaches a complete solution?

Mark only one oval.

⬭ It backtracks to the root

⬭ It continues searching for other possible solutions

⬭ It traverses from a different route

⬭ Recursively traverses through the same route

22.   14.Which one of the following is an application of the backtracking algorithm?

Mark only one oval.

○ Finding the shortest path

○ Finding the efficient quantity to shop

○ Ludo

○ Crossword

23.   15.The problem of finding a list of integers in a given specific range that meets certain conditions is called?

Mark only one oval.

○ Subset sum problem

○ Constraint satisfaction problem

○ Hamiltonian circuit problem

○ Travelling salesman problem

24.   16.How many solutions are there for 8 queens on 8*8 board?

Mark only one oval.

○ 12

○ 91

○ 92

○ 93

25. 17.Of the following given options, which one of the following does not provides an optimal solution for 8-queens problem?

Mark only one oval.

- ( ) (5,3,8,4,7,1,6,2)
- ( ) (1,6,3,8,3,2,4,7)
- ( ) (4,1,5,8,6,3,7,2)
- ( ) (6,2,7,1,4,8,5,3)

26. 18.In how many directions do queens attack each other?

Mark only one oval.

- ( ) 1
- ( ) 2
- ( ) 3
- ( ) 4

27. 19.Fractional knapsack problem is also known as _____

Mark only one oval.

- ( ) 0/1 knapsack problem
- ( ) Continuous knapsack problem
- ( ) Divisible knapsack problem
- ( ) Non continuous knapsack problem

28.   20.Which of the following algorithms is the best approach for solving Huffman codes?

Mark only one oval.

⬭ Exhaustive search

⬭ Greedy algorithm

⬭ Brute force algorithm

⬭ Divide and conquer algorithm

29.   21.What is the condition for proper coloring of a graph?

Mark only one oval.

⬭ two vertices having a common edge should not have same color

⬭ two vertices having a common edge should always have same color

⬭ all vertices should have a different color

⬭ all vertices should have same color

30.   22.Calculating the chromatic number of a graph is a

Mark only one oval.

⬭ P problem

⬭ NP hard problem

⬭ NP complete problem

⬭ cannot be identified as any of the given problem types

31. 23.Kruskal's algorithm is used to _____

Mark only one oval.

( ) find minimum spanning tree

( ) find single source shortest path

( ) find all pair shortest path algorithm

( ) traverse the graph

32. 24.Which algorithm is used to solve a maximum flow problem?

Mark only one oval.

( ) Prim's algorithm

( ) Kruskal's algorithm

( ) Dijkstra's algorithm

( ) Ford-Fulkerson algorithm

33. 25.Which of the following problems is NOT solved using dynamic programming?

Mark only one oval.

( ) 0/1 knapsack problem

( ) Matrix chain multiplication problem

( ) Edit distance problem

( ) Fractional knapsack problem

34.   26. What does the given figure depict?

Mark only one oval.

( ) min cut problem

( ) max cut problem

( ) maximum flow problem

( ) flow graph

35.   27.If a problem can be solved by combining optimal solutions to non-overlapping problems, the strategy is called _____

Mark only one oval.

( ) Dynamic programming

( ) Greedy

( ) Divide and conquer

( ) Recursion

36.   28.When a top-down approach of dynamic programming is applied to a problem, it usually _____

Mark only one oval.

( ) Decreases both, the time complexity and the space complexity

( ) Decreases the time complexity and increases the space complexity

( ) Increases the time complexity and decreases the space complexity

( ) Increases both, the time complexity and the space complexity

37.   29.Which of the following problems is NOT solved using dynamic programming?

Mark only one oval.

⬭ 0/1 knapsack problem

⬭ Matrix chain multiplication problem

⬭ Edit distance problem

⬭ Fractional knapsack problem

38.   30.What is the objective of tower of hanoi puzzle?

Mark only one oval.

⬭ To move all disks to some other rod by following rules

⬭ To divide the disks equally among the three rods by following rules

⬭ To move all disks to some other rod in random order

⬭ To divide the disks equally among three rods in random order

39.   31.Minimum number of moves required to solve a tower of hanoi problem with n
        disks is _____

Mark only one oval.

⬭ 2n

⬭ 2n-1

⬭ n^2

⬭ n^2-1

40.   32.Master's theorem is used for?

Mark only one oval.

○ Solving recurrences

○ Solving iterative relations

○ Analyzing loops

○ Calculating the time complexity of any code

41.   33.What is the result of the recurrences which fall under first case of Master's
       theorem (let the recurrence be given by T(n)=aT(n/b)+f(n) and f(n)=nc?

Mark only one oval.

○ T(n) = O(nlogba)

○ T(n) = O(nc log n)

○ T(n) = O(f(n))

○ T(n) = O(n^2)

42.   34.Under what case of Master's theorem will the recurrence relation of binary
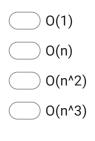   search fall?

Mark only one oval.

○ 1

○ 2

○ 3

○ It cannot be solved using master's theorem

43.   35.Consider the brute force implementation in which we find all the possible ways
       of multiplying the given set of n matrices. What is the time complexity of this
       implementation?

       Mark only one oval.

       ◯ O(n!)

       ◯ O(n^3)

       ◯ O(n^2)

       ◯ Exponential

44.   36.What is the time complexity of the above dynamic programming
       implementation of the matrix chain problem?

       Mark only one oval.

       ◯ O(1)

       ◯ O(n)

       ◯ O(n^2)

       ◯ O(n^3)

45.   37.What is the time complexity of Dijikstra's algorithm?

       Mark only one oval.

       ◯ O(N)

       ◯ O(N^3)

       ◯ O(N^2)

       ◯ O(logN)

46.   38.How many priority queue operations are involved in Dijkstra's Algorithm?

Mark only one oval.

    ◯ 1

    ◯ 3

    ◯ 2

    ◯ 4

47.   39.Bellmann ford algorithm provides solution for _____ problems.

Mark only one oval.

    ◯ All pair shortest path

    ◯ Sorting

    ◯ Network flow

    ◯ Single source shortest path

48.   40.What is the running time of Bellmann Ford Algorithm?

Mark only one oval.

    ◯ O(V)

    ◯ O(V2)

    ◯ O(ElogV)

    ◯ O(VE)

49.   41.Floyd Warshall's Algorithm is used for solving _____

Mark only one oval.

○ All pair shortest path problems

○ Single Source shortest path problems

○ Network flow problems

○ Sorting problems

50.   42.What is the running time of the Floyd Warshall Algorithm?

Mark only one oval.

○ Big-oh(V)

○ Theta(V2)

○ Big-Oh(VE)

○ Theta(V3)

51.   43.What procedure is being followed in Floyd Warshall Algorithm?

Mark only one oval.

○ Top down

○ Bottom up

○ Big bang

○ Sandwich

52.　44.Which of the following is not the algorithm to find the minimum spanning tree of the given graph?

Mark only one oval.

◯ Boruvka's algorithm

◯ Prim's algorithm

◯ Kruskal's algorithm

◯ Bellman's Ford algorithm

53.　45.What is the time complexity of Kruskal's algorithm?

Mark only one oval.

◯ O(log V)

◯ O(E log V)

◯ O(E^2)

◯ O(V log E)

54.　46.Which of the following is true?

Mark only one oval.

◯ Prim's algorithm initialises with a vertex

◯ Prim's algorithm initialises with a edge

◯ Prim's algorithm initialises with a vertex which has smallest edge

◯ Prim's algorithm initialises with a forest

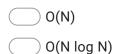55. 47.The Data structure used in standard implementation of Breadth First Search is?

Mark only one oval.

◯ Stack

◯ Queue

◯ Linked List

◯ None of the mentioned

56. 48.Which data structure is used for implementing a LIFO branch and bound strategy?

Mark only one oval.

◯ Stack

◯ Queue

◯ Array

◯ Linked list

57. 49.What is the average case running time of an insertion sort algorithm?

Mark only one oval.

◯ O(N)

◯ O(N log N)

◯ O(log N)

◯ O(N^2)
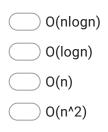
58.   50.What will be the number of passes to sort the elements using insertion sort? 14, 12,16, 6, 3, 10

Mark only one oval.

⬭ 6

⬭ 5

⬭ 7

⬭ 1

59.   51.What is the worst case complexity of selection sort?

Mark only one oval.

⬭ O(nlogn)

⬭ O(logn)

⬭ O(n)

⬭ O(n^2)

60.   52.Which of the following methods can be used to solve the Knapsack problem?

Mark only one oval.

⬭ Brute force algorithm

⬭ Recursion

⬭ Dynamic programming

⬭ All of the mentioned
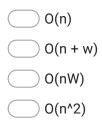
61.   53.What is the time complexity of the brute force algorithm used to solve the
        Knapsack problem?

        Mark only one oval.

        ◯ O(n)

        ◯ O(n!)

        ◯ O(2n)

        ◯ O(n^3)

62.   54.What is the time complexity of the above dynamic programming
        implementation of the Knapsack problem with n items and a maximum weight of
        W?

        Mark only one oval.

        ◯ O(n)

        ◯ O(n + w)

        ◯ O(nW)

        ◯ O(n^2)

63.   55.Which of the problems cannot be solved by backtracking method?

        Mark only one oval.

        ◯ n-queen problem

        ◯ Subset sum problem

        ◯ Hamiltonian circuit problem

        ◯ Travelling salesman problem

64.   56.Backtracking algorithm is implemented by constructing a tree of choices called
      as?

      Mark only one oval.

      ( ) State-space tree

      ( ) State-chart tree

      ( ) Node tree

      ( ) Backtracking tree

65.   57.In what manner is a state-space tree for a backtracking algorithm constructed?
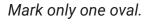
      Mark only one oval.

      ( ) Depth-first search

      ( ) Breadth-first search

      ( ) Twice around the tree

      ( ) Nearest neighbor first

66.   58.Who coined the term "backtracking"?

      Mark only one oval.

      ( ) Lehmer

      ( ) Donald

      ( ) Ross

      ( ) Ford

67.   59._____ enumerates a list of promising nodes that could be computed to give the possible solutions of a given problem.

Mark only one oval.

◯ Exhaustive search

◯ Brute force

◯ Backtracking

◯ Divide and conquer

68.   60.Who published the eight queen's puzzle?

Mark only one oval.

◯ Max Bezzel

◯ Carl

◯ Gauss

◯ Friedrich

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