Subject : Design and Analysis of Algorithms

Class : III -I Semester Section A & Section B

Department : Artificial Intelligence & Machine Learning

1. An algorithm is \_\_\_\_\_\_\_\_\_\_? [ ]

a) A Problem b) A procedure for solving a problem

c) A real-life mathematical problem d) None of the above

1. To main measures of the efficiency of an algorithm are? [ ]

a) Data and Space b) Processor and Memory c) Time and Space Complexity d) None

1. Which of the following is not basic control structure\_\_\_\_\_\_\_\_\_\_\_\_\_ [ ]
2. the loop b) the decision c)the process d)the sequential
3. Algorithm can be represented as [ ]
4. Flowchart b) Pseudocode c) All of the above d)None
5. \_\_\_\_\_\_is the first step in solving the problem [ ]
6. Understanding the Problem b) Identify the Problem c)Evaluate the Solution d)None
7. \_\_\_ within the limit deals with the behaviour of a function for sufficiently large values of its parameter. [ ]  
   a) Asymptotic notation b)Big-Oh notation c)Omega notation d)Theta notation
8. The asymptotic notation for defining the average time complexity is [ ]
9. Equivalence b) Symmetric c) Reflexive d) Both (b) and (c)
10. Upper bound is denoted as \_\_\_\_\_\_\_ [ ]
11. Ω b)Θ c)ω d)O
12. Which one of the following helps in calculating the longest amount of time taken for the completion of the algorithm? [ ]  
    a) Theta notation b)Big-Oh notation c)Omega notation d)Time complexity
13. Which of the following case does not exist in complexity theory? [ ]
14. Best case b)Worst case c)Average case d)Null case
15. Straight selection sort is basically a method of repeated [ ]
16. Interchange b) searching c) position adjustment d) None of the above
17. O(n2) means computing time is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [ ]
18. Constant b) Quadratic c) Linear d) Cubic
19. Which of the following sorting algorithms provide the best time complexity in the worst-case scenario? [ ]
20. Quick Sort b)Bubble Sort c) Merge Sort d)Selection Sort
21. Which of the following data structure is used to perform recursion? [ ]
22. Linked List b) Queue c) Array d) Stack
23. Which of the following is a Divide and Conquer algorithm? [ ]
24. Bubble Sort b) Selection Sort c) Heap Sort d) Merge Sort
25. An algorithm that calls itself directly or indirectly is known as [ ]
26. Sub algorithm b) Recursion c) Polish notation d)Traversal algorithm
27. Identify the best case time complexity of Quick sort? [ ]
28. O(nlogn) b) O(n) c) O(n^2) d) O(1)
29. Another name of the fractional knapsack is? [ ]
30. Non-Continuous Knapsack Problem

b) Divisible Knapsack Problem

c) 0/1 Knapsack Problem

d) Continuous Knapsack Problem

1. What is the time complexity of the following code snippet in C++? [ ]

void solve() {

string s = "scaler";

int n = s.size();

for(int i = 0; i < n; i++) {

s = s + s[i];

}

cout << s << endl;

}

1. O(n)
2. O(n^2)
3. O(1)
4. O(logn)
5. What is the time complexity of the binary search algorithm? [ ]
6. O(n)
7. O(n^2)
8. O(1)
9. O(log2n)
10. Which Data Structure is used to perform Recursion? [ ]  
    a) Array b) queue c) stack d) linked list
11. Which method is practical to perform a single search in an unsorted list of elements? [ ]

a) Sequential searchc) Bubble sort  
b) Horspool’s method of string matching  
d) Brute force method of string matching

1. \_\_\_ are node-based data structures used in many system programming applications for managing dynamic sets [ ]  
   a) Stack b) Queue c) Binary search trees d) List
2. For converting recursive algorithm to non-recursive algorithm, store the values of all \_\_\_ parameters in the stack. [ ]  
   a) Negative b) Global c) Pass by reference d) Pass by value
3. \_\_\_ is the maximum amount of time an algorithm takes to execute a specific set of inputs. [ ]  
   a) Running time b) Average case time complexity c) Worst case time complexity d) None
4. Which of the following methods can be used to solve the Knapsack problem? [ ]
5. Sorting Algorithm b) Monte-Carlo Algorithm

c) Divide And Conquer d) Brute Force, Recursion And Dynamic Programming

1. What is tail recursion? [ ]
2. A function where the recursive functions leads to an infinite loop
3. A recursive function that has two base cases
4. A recursive function where the function doesn’t return anything and just prints the values
5. A function where the recursive call is the last thing executed by the function\
6. Time complexity of Merge sort is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [ ]

a) O(log n) b) O(1) c) O(n) d) O(n log n)

1. The time complexity to find the longest common subsequence of two strings of length M and N is? [ ]
2. O(N) b) O(M \* N) c) O(M) d) O(log N)
3. Identify the sorting technique which compares adjacent elements in a list and switches whenever necessary? [ ]
4. Merge Sort b) Quick Sort c) Bubble Sort d) Selection Sort
5. The worst-case time complexity of Quicksort is? [ ]
6. O(n) b) O(1) c) O(log2n) d) O(n^2)
7. What will be the best sorting algorithm given that the array elements are small (<= 1e6)?[ ]
8. Bubble Sort b)Selection Sort c) Heap Sort d) Counting Sort
9. What is the time complexity of the binary search algorithm? [ ]
10. O(n) b) O(n^2) c) O(1) d) O(log2n)
11. Select the types of Kanpsack problems [ ]
12. Non-Continuous Knapsack Problem b) Divisible Knapsack Problem

c) 0/1 Knapsack Problem d) Continuous Knapsack Problem

35. Identify the best case time complexity of Quick sort? [ ]

a) O(nlogn) b) O(n) c) O(n^2) d) O(1)

36. An algorithm that calls itself directly or indirectly is known as [ ]

a) Sub algorithm b) Recursion c) Polish notation d) Traversal algorithm

37. Which of the following is a Divide and Conquer algorithm? [ ]

a) Bubble Sort b) Selection Sort c) Heap Sort d) Merge Sort

38. Which of the following case does not exist in complexity theory? [ ]

a) Best case b) Worst case c) Average case d) Null case

39. Upper bound is denoted as \_\_\_\_\_\_\_ [ ]

a) Ω b) Θ c) ω d) O

40. Which of the following is not basic control structure\_\_\_\_\_\_\_\_\_\_\_\_\_ [ ]

1. the loop b) the decision c) the process d) the sequential

41. Which of the following is false in the case of a spanning tree of a graph G? [ ]  
a) It is tree that spans G  
b) It is a subgraph of the G  
c) It includes every vertex of the G  
d) It can be either cyclic or acyclic

42. Every graph has only one minimum spanning tree. [ ]  
 a) True b) False

43.  Consider a complete graph G with 4 vertices. The graph G has \_\_\_\_ spanning trees. [ ]

a) 15 b) 8 c) 16 d) 13

44. If all the weights of the graph are positive, then the minimum spanning tree of the graph . [ ]

is a minimum cost subgraph.  
 a) True b) False

45. Which of the following is not the algorithm to find the minimum spanning tree [ ]

of the given graph?  
 a) Boruvka’s algorithm  
 b) Prim’s algorithm  
 c) Kruskal’s algorithm  
 d) Bellman–Ford algorithm

46. What is an external sorting algorithm? [ ]  
 a) Algorithm that uses tape or disk during the sort  
 b) Algorithm that uses main memory during the sort  
 c) Algorithm that involves swapping  
 d) Algorithm that are considered ‘in place’

47. What is the average case complexity of bubble sort? [ ]  
 a) O(nlogn)  
 b) O(logn)  
 c) O(n)  
 d) O(n2)

48.  What is the auxiliary space complexity of merge sort? [ ]  
 a) O(1)  
 b) O(log n)  
 c) O(n)  
 d) O(n log n)

49. What is the worst case time complexity of merge sort? [ ]  
 a) O(n log n)  
 b) O(n2)  
 c) O(n2 log n)  
 d) O(n log n2)

50. Which of the following is true? [ ]  
 a) Prim’s algorithm initialises with a vertex  
 b) Prim’s algorithm initialises with a edge  
 c) Prim’s algorithm initialises with a vertex which has smallest edge  
 d) Prim’s algorithm initialises with a forest

51. Prim’s algorithm is a \_\_\_\_\_\_ [ ]  
 a) Divide and conquer algorithm  
 b) Greedy algorithm  
 c) Dynamic Programming  
 d) Approximation algorithm

52. Kruskal’s algorithm is best suited for the sparse graphs than the prim’s algorithm. [ ]  
 a) True  
 b) False

53. Prim’s algorithm is also known as \_\_\_\_\_\_\_\_\_\_ [ ]  
 a) Dijkstra–Scholten algorithm  
 b) Borůvka’s algorithm  
 c) Floyd–Warshall algorithm  
 d) DJP Algorithm

54. Which of the following is false about Prim’s algorithm? [ ]  
 a) It is a greedy algorithm  
 b) It constructs MST by selecting edges in increasing order of their weights  
 c) It never accepts cycles in the MST  
 d) It can be implemented using the Fibonacci heap

55. Kruskal’s algorithm is used to \_\_\_\_\_\_ [ ]  
 a) find minimum spanning tree  
 b) find single source shortest path  
 c) find all pair shortest path algorithm  
 d) traverse the graph

56. Kruskal’s algorithm is a \_\_\_\_\_\_ [ ]  
 a) divide and conquer algorithm  
 b) dynamic programming algorithm  
 c) greedy algorithm  
 d) approximation algorithm

57. What is the time complexity of Kruskal’s algorithm? [ ]  
 a) O(log V)  
 b) O(E log V)  
 c) O(E2)  
 d) O(V log E)

58. Which of the following is true? [ ]  
 a) Prim’s algorithm can also be used for disconnected graphs  
 b) Kruskal’s algorithm can also run on the disconnected graphs  
 c) Prim’s algorithm is simpler than Kruskal’s algorithm  
 d) In Kruskal’s sort edges are added to MST in decreasing order of their weights

59. Which of the following is false about the Kruskal’s algorithm? [ ]  
 a) It is a greedy algorithm  
 b) It constructs MST by selecting edges in increasing order of their weights  
 c) It can accept cycles in the MST  
 d) It uses union-find data structure

60. Consider the following statements. [ ]  
 S1. Kruskal’s algorithm might produce a non-minimal spanning tree.  
 S2. Kruskal’s algorithm can efficiently implemented using the disjoint-set data structure.  
 a) S1 is true but S2 is false  
 b) Both S1 and S2 are false  
 c) Both S1 and S2 are true  
 d) S2 is true but S1 is false