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Note: I found these screen shots in a Facebook group

Fundamentals of Algorithms (CS502)

Question: 1 (Marks: 1) Attempted Questions: 0 Total Questions: 50

After partitioning array in Quick sort, pivot is placed in a position such that

Choices:

- Values smaller than pivot are on left and larger than pivot are on right
- Values larger than pivot are on left and smaller than pivot are on right
- Pivot is the first element of array
- Pivot is the last element of array

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Question: 2 (Marks: 1) Attempted Questions: 1 Total Questions: 50

Which of the following is not true about Dijkstra's algorithm?

Choices:

- The length of the shortest path to the start vertex is always zero
- It can find the shortest paths to all other vertices in the same worst case time that it needs to find the shortest path to a single vertex
- It will work on any weighted graph with positive weights
- The running time of Bellman - Ford Algorithm is greater than Dijkstra's algorithm

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Question: 3 (Marks: 1) Attempted Questions: 2 Total Questions: 50

In the clique cover problem, for two vertices to be in the same group, they must be _____each other.

Choices:

- Apart from
- Far from
- Near to
- Adjacent to

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Question: 4 (Marks: 1) Attempted Questions: 3 Total Questions: 50

_____ is not a characteristic of Random Access Machine.

Choices:

- Single-Processor
- Assigning a value to a variable
- Locality of reference
- Executing an arithmetic instruction

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Question: 5 (Marks: 1) Attempted Questions: 4 Total Questions: 50

The *"0-1"* knapsack problem belongs to the domain of_____ problems.

Choices:

- NP Completeness
- Optimization
- Sorting
- Searching

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Question: 6 (Marks: 1) Attempted Questions: 5 Total Questions: 50

In strongly connected components, the component digraph is _____.

Choices:

- necessarily cyclic
- necessarily acyclic
- not necessary it can be both cyclic and acyclic
- cyclic with some other constraints

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Question: 7 **(Marks: 1)** **Attempted Questions: 6** **Total Questions: 50**

Given a set of **n** points, $P = \{p_1, p_2, \ldots, p_n\}$ in 2-D space a point is said to be _____ if it is not dominated by any other point in P.

Choices:

- Minimal
- Equal
- Different
- Maximal

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Question: 8 **(Marks: 1)** **Attempted Questions: 7** **Total Questions: 50**

_____algorithm is used to implement topological sort.

Choices:

- Depth First Search
- Level ordered search
- Breadth First Search
- Depth and Breadth First Search

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Question: 9 (Marks: 1) Attempted Questions: 13 Total Questions: 50

_____ algorithm is used for all-pairs shortest-paths problem.

Choices:

- Bellman Ford
- Breadth First Search
- Floyd-Warshall
- Depth First Search

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Question: 10 (Marks: 1) Attempted Questions: 13 Total Questions: 50

If there were a polynomial solution for even a single NP-complete problem, then every problem in _____ will be solvable in polynomial time.

Choices:

- NP
- P
- NP hard
- NPC

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Question: 11 (Marks: 1) Attempted Questions: 0 Total Questions: 50

A Minimum Spanning Tree (MST) of a graph G of n vertices have:

Choices:

- n Cycles
- n-1 Cycles
- Zero Cycle
- One Cycle

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Question: 12 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Optimal solution using dynamic programming for money change problem takes_____.

Choices:

- O(k)
- O(N)
- O(kN)
- $O(2^k)$

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Question: 14 (Marks: 1) **Attempted Questions: 0** **Total Questions: 50**

Consider two characters x and y with the smallest probabilities. Then there is optimal Huffman code tree in which these two characters are siblings at the _____ depth in the tree.

Choices:

- Lowest
- Maximum
- Minimum
- Top

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Question: 15 (Marks: 1) **Attempted Questions: 0** **Total Questions: 50**

_____ can be stored in array without using any pointers.

Choices:

- Linked list
- Heap
- Pointers
- Tree

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Fundamentals of Algorithms (CS502)

Question: 16 **(Marks: 1)** **Attempted Questions: 0** **Total Questions: 50**

Think of Bellman-Ford as a sort of bubble-sort analog for shortest path. The shortest path information is propagated sequentially along each _____ path in the graph.

Choices:

- Longest
- Medium
- Shortest
- Circular

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Question: 17 **(Marks: 1)** **Attempted Questions: 0** **Total Questions: 50**

In Geometric series, If $0 < x < 1$ then this is $\Theta(1)$, and if_____, then this is $\Theta(x^n)$.

Choices:

- $x = 1$
- $x > 1$
- $x \neq 1$
- $x < 1$

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Question: 18 (Marks: 1) Attempted Questions: 0 Total Questions: 50

The _____is a problem for which the greedy algorithm approach provides an optimal solution.

Choices:

- Activity selection
- Knapsack Problem
- NP complete problem
- Dynamic programming

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Question: 19 (Marks: 1) Attempted Questions: 0 Total Questions: 50

The time complexity of Huffman algorithm_____.

Choices:

- Can be improved up to O (n log n)
- Can be improved up to O($\sqrt{n}$ log n)
- Is always O (n^3)
- Is always O (n^2)

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Question: 20 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Prim's algorithm builds MST by starting with any vertex and at any time the subset of edges form:

Choices:

- A single tree.
- A forest.
- Many trees.
- No tree.

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Question: 21 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Adding any edge to a free tree:

Choices:

- keeps it the free tree and increases the size of the tree.
- creates a unique cycle.
- it is not allowed to add the edge in free tree.
- creates multiple cycles.

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Question: 22 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Bellman Ford algorithm is for the:

Choices:

- multiple-source shortest path finding problem and does allow negative edges.
- single source shortest path finding problem and does allow negative edges.
- single source shortest path finding problem and does allow negative cycles.
- single source shortest path finding problem and does allow negative edges and negative cycles.

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Question: 23 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Dijkstra's algorithm is based

Choices:

- on the notion of performing repeated relaxations and maintain the subset of vertices.
- on the notion that the cut that respects for the subset of vertices.
- on cross edges logic and follow bubble sort.
- the greedy approach that allows the negative edges in the graph.

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Question: 24 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Bellman Ford algorithm applies relaxation to every

Choices:

- edge of the graph and repeats exactly v-1 times.
- vertex of the graph and repeats exactly E-1 times.
- edge of the graph and repeats exactly E-1 times.
- edge but use the back edges for the completion.

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Question: 28 (Marks: 1) Attempted Questions: 0 Total Questions: 50

The function having complexity $O(n^k)$ belongs to _____ .

Choices:

- Co-NP Class
- NP-prime Class
- P-Class
- NP -Class

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Question: 29 (Marks: 1) Attempted Questions: 0 Total Questions: 50

If a problem "S" is NP- complete it must be :

Choices:

- NP and NP-hard
- NP not necessarily NP-Hard
- NP-hard means it is NP complete as well
- in P and NP

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Question: 30 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Polynomial time certificates :

Choices:

- use in reductions to verify for the NP-problems classes
- use in Polynomial classes to interchange the problems
- indicate there are polynomial solutions for NP –class problems
- are the tools to solve the problems in P class in P time

Not Sure

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Question: 31 (Marks: 1) Attempted Questions: 0 Total Questions: 50

_____denotes the time complexity of Breadth First Search (BFS) algorithm, where (V – number of vertices, E – number of edges).

Choices:

- O(V)
- O(E)
- O(V + E)
- O(V*E)

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Question: 32 (Marks: 1) Attempted Questions: 0 Total Questions: 50

The number of simple paths in a Graph can be _____.

Choices:

- n
- n^2
- n!
- 2^n

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Question: 33 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Which of the following ways can be used to represent a graph?

Choices:

- Adjacency List
- Incidence Matrix
- Adjacency List, Adjacency Matrix
- No way to represent

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Question: 34 (Marks: 1) Attempted Questions: 0 Total Questions: 50

A Hamiltonian cycle is a cycle _____.

Choices:

- that visits every edge in the graph exactly once
- that visits every vertex in the graph exactly once
- that visits both vertex and edge exactly once
- that visits all vertices without any constraint

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Question: 35 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Using ASCII standard the string "abacdaacac" will be encoded with _____ bytes.

Choices:

- 10
- 16
- 32
- 8 ✓

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Question: 36 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Heap sort is _____.

Choices:

- In place and stable
- Out place and stable
- Out place but not stable
- In place but not stable ✓

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Question: 37 (Marks: 1) Attempted Questions: 0 Total Questions: 50

If we can solve a single NP problem in P time:

Choices:

- All NP-problems can be solved
- All P problems can be solved
- We cannot predict about the solution of other NP problems
- This can be never possible to solve the NP problem in P time

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Question: 39 (Marks: 1) Attempted Questions: 0 Total Questions: 50

Catalan numbers are related the number of different binary trees on ____ nodes.

Choices:

- n^2
- 2n
- n
- n-1

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Question: 40 (Marks: 1) Attempted Questions: 0 Total Questions: 50

In Prim's algorithm, once a vertex is added then some _____ that crossed the cut we remove the last column?

Answer:

Edges

Nodes

Cycle

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Question: 41 (Marks: 3) Attempted Questions: 0 Total Questions: 50

What is the edit distance of the following two words? Also determine the edit distance If we remove the last column?

A L G O R- I- T H M
A L- T R U I S T I C

Answer:

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Question: 42 (Marks: 3) Attempted Questions: 0 Total Questions: 50

How many Bytes are required to encode a string "Algorithms" using 8-bit ASCII?

Answer:

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Question: 43 (Marks: 3) Attempted Questions: 0 Total Questions: 50

How the Kruskal's algorithm works?

Answer:

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Question: 44 (Marks: 3) Attempted Questions: 0 Total Questions: 50

Answer YES or NO and give a brief explanation for your choice.
If problem *A* reduces to problem *B* and *B* is in P, then *A* is in P.

Answer:

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Question: 45 (Marks: 3) Attempted Questions: 0 Total Questions: 50

What is the difference between Trees and Graphs? Mention at least one difference.

Answer:

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Question: 47 (Marks: 5) Attempted Questions: 0 Total Questions: 50

Which condition is necessary to provide an optimal solution for the coin change problem using a greedy approach? Also, mention an example in which a greedy approach does not work for the coin change problem?

Answer:

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Question: 48 (Marks: 5) Attempted Questions: 0 Total Questions: 50

Suppose Prim's algorithm is applied to the weighted graph shown here starting at vertex "a" to find a minimum cost spanning tree. State the edges that would be added to the tree in the order that they are added.
(Name an edge using its endpoints, in alphabetical order. For example, the edge joining vertices p and q should be called {p, q}, not {q, p}. Given a choice of edges at any point, choose the one that would be first alphabetically. For example, given the possibility of choosing either {x, z} or {w, y}, you should choose {w, y} (because w proceeds x).)

Answer:

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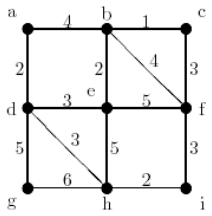
Question: 48 (Marks: 5) **Attempted Questions: 0** **Total Questions: 50**

(Name an edge using its endpoints, in alphabetical order. For example, the edge joining vertices p and q should be called {p, q}, not {q, p}. Given a choice of edges at any point, choose the one that would be first alphabetically. For example, given the possibility of choosing either {x, z} or {w, y}, you should choose {w, y} (because w proceeds x).)



Answer:

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Question: 49 (Marks: 5) **Attempted Questions: 0** **Total Questions: 50**

Categorise the given problem domains into the corresponding Complexity Class;

Problem Domain	Complexity Class (P / NP / NP-Hard / NPC)
Minimum Spanning Tree (MST)	
Graph Isomorphism	
Hamiltonian Cycle	
Quantified Boolean Formulas	
0/1 Knapsack	

Answer:

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Fundamentals of Algorithms (CS502)

Question: 50 (Marks: 5) **Attempted Questions: 0** **Total Questions: 50**

The adjacency list representation of an undirected graph is given below. Convert it into adjacency matrix representation.

a → a → b → c → e
b → a → d
c → a → d → e → f
d → b → c → f
e → a → c → f
f → c → d → e
g

Answer: