ADS CCEE Mock Test1

Total points   13/40   ?

0 of 0 points

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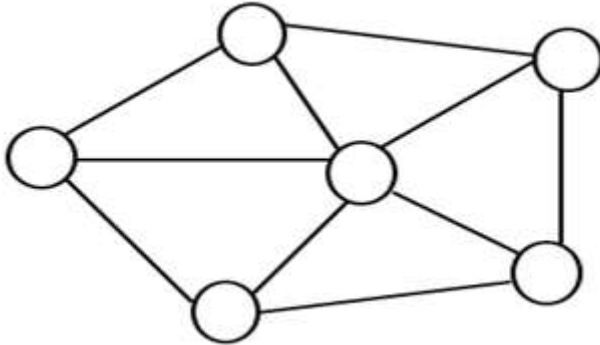12345678963222

MCQ   13 of 40 points

✗ What would be the order in which edges are added to form a minimum   *0/1
   spanning tree using Kruskal's and Prim's algorithms for the following
   graph:

○ Kruskal's - AB CD CF AE FE and Prim's - AB AE FE CF CD   ✗

○ Kruskal's - AB CD CF FE AE and Prim's – AB AE FE CF CD

○ Kruskal's - AB CD CF FE AE and Prim's - AB AE FE CD CF

○ Kruskal's – CD AB CF FE AE and Prim's - AB AE FE CF CD

Correct answer

⦿ Kruskal's - AB CD CF FE AE and Prim's – AB AE FE CF CD

✕ The recurrence relation capturing the optimal time of the Tower of Hanoi *0/1
problem with n discs is.---

⦿ T(n) = 2T(n-2)+2   ✕

○ T(n) = 2T(n-1)+n

○ T(n) = 2T(n/2)+1

○ T(n) = 2T(n-1)+1

Correct answer

⦿ T(n) = 2T(n-1)+1

✓ In which of the following tree do the height of the left subtree and the *1/1
height of the right subtree differ at most by one?

⦿ AVL Tree   ✓

○ Expression Tree

○ Threaded Binary Tree

○ Binary Search Tree

✗ A complete n-ary tree is a tree in which each node has n children or no   *0/1
children. Let I be the number of internal nodes and L be the number of
leaves in a complete n-ary tree. If L = 41, and I = 10, what is the value of
n?

○ 6

◉ 3   ✗

○ 4

○ 5

Correct answer

◉ 5

✓ **Statement 1:** When applying the Backtracking algorithm, all choices   *1/1
made can be undone when needed.

Statement 2: When applying the Backtracking algorithm, the worst-case
scenario is, that it exhaustively tries all paths, traversing the entire search
space

◉ Both, Statements 1 and 2, are true   ✓

○ Statement 1 is true, Statement 2 is false

○ Statement 2 is true, Statement 1 is false

○ Both, Statements 1 and 2, are false

✓ Which is the safest method to choose a pivot element? *   1/1

- ⦿ Choosing a random element as a pivot   ✓
- ◯ Choosing the first element as a pivot
- ◯ Choosing the last element as a pivot
- ◯ Median-of-three partitioning method

✗ Which of the following algorithm solves the all-pair shortest path algorithm?   *0/1

- ⦿ Prim's algorithm   ✗
- ◯ Dijkstra's algorithm
- ◯ Bellman-Ford algorithm
- ◯ Floyd-Warshall's algorithm

Correct answer

- ⦿ Floyd-Warshall's algorithm

✕   Suppose prevnode, p, nextnode are three consecutive nodes in a Doubly   *0/1
Linked List. Deletion of node p in this Doubly Linked List can be
represented by which code snippet?

[getPrev() method returns the prev node and getNext() method returns
the next node in DLL.]

[SetPrev() method sets the prev node value and setNext() method sets
the next node value in DLL.]

⦿   p.getPrev().setPrev(p.getNext()); p.getNext().setNext(p.getPrev());   ✕

◯   p.getPrev().setNext(p.getPrev()); p.getNext().setPrev(p.getNext());

◯   p.getNext().setPrev(p.getPrev()); p.getPrev().setNext(p.getNext());

◯   None of the above

Correct answer

⦿   p.getNext().setPrev(p.getPrev()); p.getPrev().setNext(p.getNext());

✕   In the worst case, the number of comparisons needed to search a singly   *0/1
linked list of length n for a given element is

◯   O(log2 n)

⦿   O(n/2)   ✕

◯   O(log2 n − 1)

◯   O(n)

Correct answer

⦿   O(n)

✗   Which one of the following is the tightest upper bound that represents the *0/1
    time complexity of inserting an object into a binary search tree of n
    nodes?

○   O(1)

◉   O(logn)   ✗

○   O(n)

○   O(nlogn)

Correct answer

◉   O(n)

✗   Let G = (V, G) be a weighted undirected graph and let T be a Minimum   *0/1
    Spanning Tree (MST) of G maintained using adjacency lists. Suppose a
    new weighed edge (u, v) ∈ V×V is added to G. The worst-case time
    complexity of determining if T is still an MST of the resultant graph is

◉   Θ(|E| + |V|)   ✗

○   Θ(|E|.|V|)

○   Θ(E| log |V|)

○   Θ(|V|)

Correct answer

◉   Θ(|V|)

✕   Consider the following array.   *0/1

23,32,45,69,72,73,89,97

Which algorithm out of the following options uses the least number of
comparisons (among the array elements) to sort the above array in
ascending order?

○ Selection sort

◉ Merge sort   ✕

○ Insertion sort

○ Quicksort using the last element as a pivot

Correct answer

◉ Insertion sort

✕   Which of the following algorithm design techniques is used in finding all   *0/1
pairs of shortest distances in a graph (Warshall algorithms)?

○ Dynamic programming

◉ Back Tracking   ✕

○ Greedy

○ Divide & Conquer

Correct answer

◉ Dynamic programming

✓ The postfix equivalent of prefix expression * + a b − c d is *   1/1

    ◉ a b + c d - *   ✓

    ○ a b c d + - *

    ○ a b + c d * -

    ○ a b + - c d *

✓ Consider a binary max-heap implemented using an array. Which one of   *1/1
the following arrays represents a binary max-heap?

    ○ 25,12,16,13,10,8,14

    ◉ 25,14,16,13,10,8,12   ✓

    ○ 25,16,12,13,10,8,14

    ○ 25,14,12,13,10,8,16

✓ Depth First Search graph traversal method makes use of ………. data   *1/1
structure.

    ○ Tree

    ◉ Stack   ✓

    ○ Queue

    ○ Linked list

✓ We use a dynamic programming approach when *   1/1

○ We need an optimal solution

◉ The solution has an optimal substructure   ✓

○ The given problem can be reduced to the 3-SAT problem

○ It's faster than Greedy

✓ Which of the following is True about the Spanning Tree? *   1/1

◉ A spanning is a minimal set of edges in a graph that contains no cycle, connects all the vertices   ✓

○ A spanning is a maximal set of edges in a graph that connects all vertices.

○ A Graph will have only one possible spanning tree

○ None of the above

✗ A tree node with no children is called a…………. node. *   0/1

○ Leaf node

◉ Root node   ✗

○ Parent node

○ Ancestor node

Correct answer

◉ Leaf node

✕   The integrity of transmitted data can be verified by using ...... *   0/1

○   Hash Message Authentication Code (HMAC)

◉   Timestamp comparison   ✕

○   Data length comparison

○   None of these

Correct answer

◉   Hash Message Authentication Code (HMAC)

✗ Consider the following sequence of operations on an empty stack indicated by 'S'.   *0/1

Push(54);push(52);pop();push(55);push(62);s=pop();

Consider the following sequence of operations on an empty queue indicated by 'Q'

enqueuer(21);

enqueuer(24);

dequeuer();

enqueuer(28);

enqueuer(32);

q=dequeuer();

The value of (S+Q) is ---------

○ 62

◉ 24   ✗

○ 86

○ 68

Correct answer

◉ 86

✗ What is the best method to go for the game-playing problem? *   0/1

○ Optimal Search   ✗

○ Random Search

○ Heuristic Search

○ Stratified Search

Correct answer

◉ Heuristic Search

✗ A hash function h defined h(key)=key mod 7, with linear probing, is used   *0/1
   to insert the keys 44, 45, 79, 55, 91, 18, and 63 into a table indexed from 0
   to 6. What will be the location of key 18?

◉ 3   ✗

○ 4

○ 5

○ 6

Correct answer

◉ 5

✕   In the worst case, the number of comparisons needed to search a singly   *0/1
    linked list of length n for a given element is---

◉   log2 n   ✕

○   n/2

○   log2 (n-1)

○   n

Correct answer

◉   n

✓   The worst-case time complexity for the linear search algorithm is…. *   1/1

◉   O(n)   ✓

○   O(log n)

○   O(n²)

○   O(n log n)

✕   The height of a binary tree is the maximum number of edges in any root-   *0/1
to-leaf path. The maximum number of nodes in a binary tree of height h
is:

○ 2^h -1

◉ 2^(h-1) − 1   ✕

○ 2^(h+1) -1

○ 2*(h+1)

Correct answer

◉ 2^(h+1) -1

✕   Let 'm' and 'n' be the number of edges and vertices in a graph G,   *0/1
respectively. Which of the following is the time complexity of Kruskal's
algorithm to find the minimum spanning tree of G?

◉ O(n log n)   ✕

○ O(m log m)

○ O(n2)

○ O(m2)

Correct answer

◉ O(m log m)

✕   Which one of the following is an application of Stack Data Structure? *   0/1

◉ Managing function calls   ✕

◯ The stock span problem

◯ Arithmetic expression evaluation

◯ All of the above

Correct answer

◉ All of the above

✕   If you want to store the name and marks of N students, which of the   *0/1
following is the correct choice?

◯ An array of structures that contains names and marks as a field.

◯ A structure containing arrays of Names and arrays of Marks

◉ An array of names and an Array of marks   ✕

◯ All of the above

Correct answer

◉ An array of structures that contains names and marks as a field.

✗   Which of the following are not Associative Containers? *   0/1

○   priority queue

◉   map   ✗

○   multimap

○   multiset

Correct answer

◉   priority queue

✗   Identify the correct sequence of the below actions for implementing   *0/1
    decisions?

    I. Create an action plan

    II. Prioritize actions and assign roles

    III. Break solution into action steps

    IV. Follow-up at milestones

○   I, III, II, IV

○   I, II, III, IV

◉   I, IV, II, III   ✗

○   IV, III, II, I

Correct answer

◉   I, III, II, IV

✓ **The value returned by Hash Function is called as....... ***   1/1

○ Digest

○ Hash value

○ Hash code

◉ All of these   ✓

✗ **What are the time complexities of finding the 8th element from the**   *0/1
   beginning and the 8th element from the end in a singly linked list? Let n
   be the number of nodes in a linked list, you may assume that n > 8.

○ O(1) and O(n)

○ O(1) and O(1)

◉ O(n) and O(1)   ✗

○ O(n) and O(n)

Correct answer

◉ O(1) and O(n)

✕ Which of the following types of Linked List support forward and   *0/1
   backward traversal?

○ Singly Linked List

○ Doubly Linked List

⦿ Circular Singly Linked List   ✕

○ All of these

Correct answer

⦿ Doubly Linked List

✕ A digraph is said to be COMPLETE, if it has N vertices and ………edges. *   0/1

○ N*N

○ N-1

○ N*(N-1)

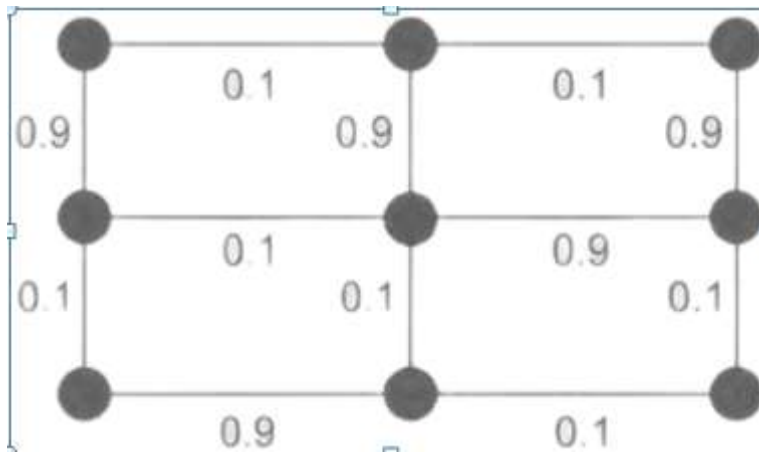⦿ N*(N-1)/2   ✕

Correct answer

⦿ N*(N-1)

✕   Consider the following undirected graph with edge weights as shown: *   0/1

The number of minimum-weight spanning trees of the graph is ----

○ 3

○ 4

○ 5

◉ 2   ✕

Correct answer

◉ 3

✓   Let A[1...n] be an array of n distinct numbers. If i < j and A[i] > A[j], then the *1/1
    pair (i, j) is called an inversion of A. What is the expected number of
    inversions in any permutation on n elements?

○ n(n-1)/2

◉ n(n-1)/4   ✓

○ n(n+1)/4

○ 2n[logn]

✓ What is a memory-efficient double-linked list? *   1/1

○ Each node has only one pointer to traverse the list back and forth   ✓

○ The list has breakpoints for faster traversal

○ An auxiliary singly linked list acts as a helper list to traverse through the doubly linked list

○ None of the mentioned

✓ The time required to search an element in a linked list of length n is *   1/1

○ O(log n)

◉ O(n)   ✓

○ O(1)

○ O(n2)

✗ Let H be a binary min-heap consisting of n elements implemented as an *0/1
array. What is the worst-case time complexity of an optimal algorithm to
find the maximum element in H?

○ Θ(1)

○ Θ(log n)

○ Θ(n)

◉ Θ(n log n) ✗

Correct answer

◉ Θ(n)

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