ADS CCEE Mock Test1

0 of 0 points

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MCQ   26 of 40 points

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

○ Tree

◉ Stack   ✓

○ Queue

○ Linked list

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

○ Singly Linked List

⦿ Doubly Linked List ✓

○ Circular Singly Linked List

○ All of these

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

○ Optimal Search

○ Random Search

⦿ Heuristic Search ✓

○ Stratified Search

✗ 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

✗ Let G = (V, G) be a weighted undirected graph and let T be a Minimum 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 *0/1

○ $\Theta(|E| + |V|)$

○ $\Theta(|E|.|V|)$

◉ $\Theta(E| \log |V|)$ ✗

○ $\Theta(|V|)$

Correct answer

◉ $\Theta(|V|)$

✓ A complete n-ary tree is a tree in which each node has n children or no 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?   *1/1

○ 6

○ 3

○ 4

◉ 5   ✓

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

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

✓ Let H be a binary min-heap consisting of n elements implemented as an   *1/1
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)

✓ 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

✓ A hash function h defined h(key)=key mod 7, with linear probing, is used   *1/1
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

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

● 3   ✓

○ 4

○ 5

○ 2

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

● priority queue   ✓

○ map

○ multimap

○ multiset

✓ The integrity of transmitted data can be verified by using …… *   1/1

◉ Hash Message Authentication Code (HMAC)   ✓

◯ Timestamp comparison

◯ Data length comparison

◯ None of these

✕ 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

✓ **Statement 1:** When applying the Backtracking algorithm, all choices 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

*1/1

- ⦿ Both, Statements 1 and 2, are true ✓
- ◯ Statement 1 is true, Statement 2 is false
- ◯ Statement 2 is true, Statement 1 is false
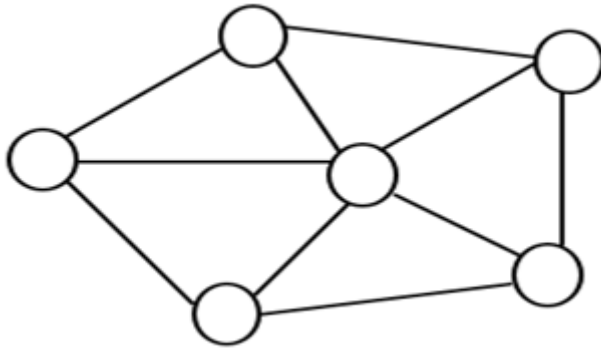- ◯ Both, Statements 1 and 2, are false

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

- ◯ Managing function calls
- ◯ The stock span problem
- ◯ Arithmetic expression evaluation
- ⦿ All of the above ✓

✓ What would be the order in which edges are added to form a minimum   *1/1
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

✓ 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

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

○ O(log2 n)

○ O(n/2)

○ O(log2 n − 1)

⦿ O(n)   ✓

✓ 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]

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

○ Digest

○ Hash value

○ Hash code

⦿ All of these   ✓

!

✓ 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)

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

- ⊙ Prim's algorithm
- ⊙ Dijkstra's algorithm
- ⊙ Bellman-Ford algorithm
- ⦿ Floyd-Warshall's algorithm   ✓

✓ What are the time complexities of finding the 8th element from the 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.   *1/1

- ⦿ O(1) and O(n)   ✓
- ⊙ O(1) and O(1)
- ⊙ O(n) and O(1)
- ⊙ O(n) and O(n)

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

○ N*N

○ N-1

◉ N*(N-1) ✓

○ N*(N-1)/2

✕ Which is the safest method to choose a pivot element? * 0/1

○ 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 ✕

Correct answer

◉ Choosing a random element as a pivot

✓ 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

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

◉ O(n log n) ✗

○ O(m log m)

○ O(n2)

○ O(m2)

Correct answer

◉ O(m log m)

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

○ 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

✕ 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)

✕ 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());

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

◉ Leaf node   ✓

◯ Root node

◯ Parent node

◯ Ancestor node

✗ In which of the following tree do the height of the left subtree and the height of the right subtree differ at most by one?   *0/1

◯ AVL Tree

◯ Expression Tree

◉ Threaded Binary Tree   ✗

◯ Binary Search Tree

Correct answer

◉ AVL Tree

✓ 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 *

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

○ log2 n

○ n/2

○ log2 (n-1)

◉ 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

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

◉ O(n)   ✓

○ O(log n)

○ O(n²)

○ O(n log n)

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

○ 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.

✕ **What is a memory-efficient double-linked list?** * 0/1

○ 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

Correct answer

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

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