

ADS CCEE Mock Test2

Total points 19/40 ?

0 of 0 points

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MCQ

19 of 40 points



✗ 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

✓ 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 $G = (V, E)$ be a weighted undirected graph and let T be a Minimum Spanning Tree (MST) of G maintained using adjacency lists. Suppose a new weighted edge $(u, v) \in V \times V$ 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

☒ $\theta(|V|)$

✗

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

☒ $O(n)$

☐ $O(\log n)$

☐ $O(n^2)$

☐ $O(n \log n)$

✓



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

- ☐ 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



✗ We use a dynamic programming approach when *

0/1

- ☒ 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



Correct answer

- ☒ The solution has an optimal substructure



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

- ☒ $\theta(1)$
- ☐ $\theta(\log n)$
- ☐ $\theta(n)$
- ☐ $\theta(n \log n)$

✗

Correct answer

- ☒ $\theta(n)$

✓ Which of the following are not Associative Containers? *

1/1

- ☒ priority queue
- ☐ map
- ☐ multimap
- ☐ multiset

✓



✓ A hash function h defined $h(\text{key}) = \text{key} \bmod 7$, with linear probing, is used 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? *1/1

☐ 3

☐ 4

☒ 5

☐ 6



✗ 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.



✗ A tree node with no children is called a..... node. *

0/1

- ☐ Leaf node
- ☒ Root node
- ☐ Parent node
- ☐ Ancestor node

✗

Correct answer

- ☒ Leaf node



✗ 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 $n > 8$.

*0/1

☐ $O(1)$ and $O(n)$

☐ $O(1)$ and $O(1)$

☐ $O(n)$ and $O(1)$

☒ $O(n)$ and $O(n)$

✗

Correct answer

☒ $O(1)$ and $O(n)$



✓ Consider the following sequence of operations on an empty stack indicated by '**S**'.

*1/1

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

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

enqueueer(21);

enqueueer(24);

dequeueer();

enqueueer(28);

enqueueer(32);

q=dequeueer();

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

☐ 62

☐ 24

☒ 86

☐ 68



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

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



✗ 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



✗ The recurrence relation capturing the optimal time of the Tower of Hanoi 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

☒ $T(n) = 2T(n-1)+1$

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

☐ $n(n-1)/2$

☒ $n(n-1)/4$

☐ $n(n+1)/4$

☐ $2n\lceil \log n \rceil$

✓



✗ 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

☒ $O(n \log n)$

✗

☐ $O(m \log m)$

☐ $O(n^2)$

☐ $O(m^2)$

Correct answer

☒ $O(m \log m)$

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

☐ $O(\log^2 n)$

☐ $O(n/2)$

☐ $O(\log^2 n - 1)$

☒ $O(n)$

✓



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

- ☐ $2^h - 1$
- ☐ $2^{(h-1)} - 1$
- ☒ $2^{(h+1)} - 1$
- ☐ $2^{*(h+1)}$



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

- ☐ $O(\log n)$
- ☒ $O(n)$
- ☐ $O(1)$
- ☐ $O(n^2)$



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

[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



✗ Depth First Search graph traversal method makes use of data structure.

*0/1

- ☒ Tree
- ☐ Stack
- ☐ Queue
- ☐ Linked list

✗

Correct answer

- ☒ Stack

✓ 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?

*1/1

- ☒ AVL Tree
- ☐ Expression Tree
- ☐ Threaded Binary Tree
- ☐ Binary Search Tree

✓



✓ 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



✗ 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



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

0/1

- ☒ Optimal Search
- ☐ Random Search
- ☐ Heuristic Search
- ☐ Stratified Search

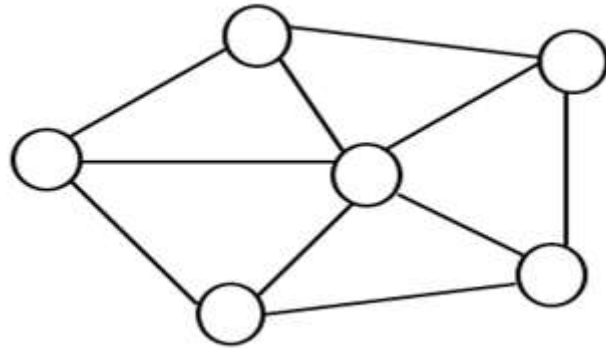
✗

Correct answer

- ☒ Heuristic Search



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



- ☐ 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



✓ 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



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

- ☐ $O(1)$
- ☐ $O(\log n)$
- ☒ $O(n)$
- ☐ $O(n \log n)$



✗ **Statement 1:** When applying the Backtracking algorithm, all choices made can be undone when needed. *0/1

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

✗

Correct answer

- ☒ Both, Statements 1 and 2, are true



✗ 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)

✗ The value returned by Hash Function is called as..... *

0/1

- ☐ Digest
- ☐ Hash value
- ☒ Hash code
- ☐ All of these

✗

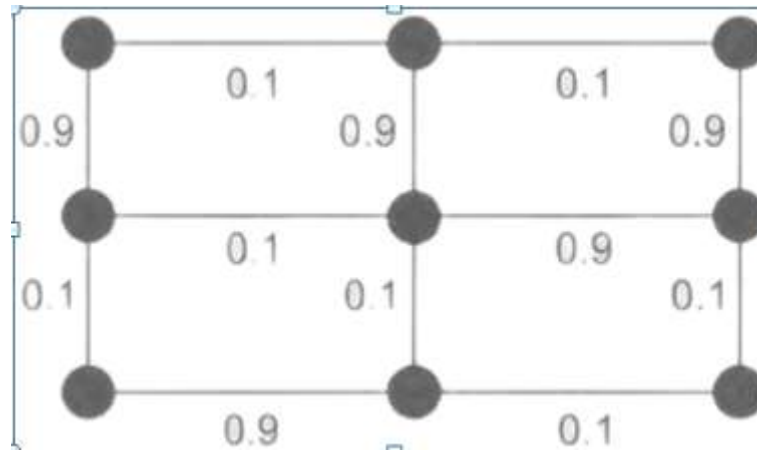
Correct answer

- ☒ All of these



✗ 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

✗



✗ 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---

- ☐ $\log_2 n$
- ☐ $n/2$
- ☒ $\log_2 (n-1)$
- ☐ n

✗

Correct answer

- ☒ n



✗ The postfix equivalent of prefix expression $* + a b - c d$ is *

0/1

☐ $a b + c d - *$

☐ $a b c d + - *$

☒ $a b + c d * -$

☐ $a b + - c d *$

✗

Correct answer

☒ $a b + c d - *$



✓ Consider the following array.

*1/1

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



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

☒ Dynamic programming ✓

☐ Back Tracking

☐ Greedy

☐ Divide & Conquer

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

☐ $N*N$

☐ $N-1$

☒ $N*(N-1)$ ✓

☐ $N*(N-1)/2$



✗ 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? *0/1

☐ 6

☐ 3

☒ 4

☐ 5

✗

Correct answer

☒ 5

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