The recurrence relation capturing the optimal time of the Tower of Hanoi problem with n discs is.---  
\*

1/1

T(n) = 2T(n-2)+2

T(n) = 2T(n-1)+n

T(n) = 2T(n/2)+1

T(n) = 2T(n-1)+1

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?  
\*

1/1

O(n log n)

O(m log m)

O(n2)

O(m2)

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

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 integrity of transmitted data can be verified by using ……

\*

1/1

Hash Message Authentication Code (HMAC)

Timestamp comparison

Data length comparison

None of these

Identify the correct sequence of the below actions for implementing decisions?

I. Create an action plan

II. Prioritize actions and assign roles

III. Break solution into action steps

IV. Follow‐up at milestones

\*

0/1

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…….

\*

0/1

Digest

Hash value

Hash code

All of these

Correct answer

All of these

A hash function h defined h(key)=key mod 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?  
\*

0/1

3

4

5

6

Correct answer

5

Consider the following sequence of operations on an empty stack indicated by **‘S’**.

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 ---------

\*

0/1

62

24

86

68

Correct answer

86

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

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

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

log2 n

n/2

log2 (n-1)

n

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

 If you want to store the name and marks of N students, which of the following is the correct choice?

\*

1/1

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

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)

 Consider the following array.

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?

\*

0/1

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 pairs of shortest distances in a graph ( Warshall algorithms)?

\*

1/1

Dynamic programming

Back Tracking

Greedy

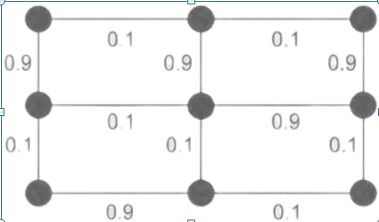
Divide & Conquer

Consider the following undirected graph with edge weights as shown:

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

\*

1/1



3

4

5

2

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

1/1

Optimal Search

Random Search

Heuristic Search

Stratified Search

A tree node with no children is called a…………. node.

\*

1/1

Leaf node

Root node

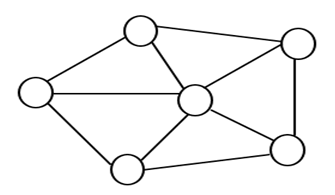
Parent node

Ancestor node

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 the tightest upper bound that represents the time complexity of inserting an object into a binary search tree of n nodes?

\*

0/1

O(1)

O(logn)

O(n)

O(nlogn)

Correct answer

O(n)

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 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?

\*

1/1

n(n-1)/2

n(n-1)/4

n(n+1)/4

2n[logn]

Which of the following are not Associative Containers?

\*

1/1

priority queue

map

multimap

multiset

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

\*

1/1

Tree

Stack

Queue

Linked list

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 linked list of length n for a given element is

\*

1/1

O(log2 n)

O(n/2)

O(log2 n – 1)

O(n)

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

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

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  
\*

1/1

Θ(∣E∣ + ∣V∣)

Θ(∣E∣.∣V∣)

Θ(E∣ log ∣V∣)

Θ(∣V∣)

The worst-case time complexity for the linear search algorithm is….

\*

1/1

O(n)

O(log n)

O(n²)

O(n log n)

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)

**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

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?

\*

1/1

Ө(1)

Ө(log n)

Ө(n)

Ө(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

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

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

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

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?

[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.]

\*

0/1

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());