Objective Type Questions with Solutions

Q 1 - A procedure that calls itself is called

A. illegal call

B. reverse polish

C. recursive

D. none of the above

Explanation : In recursion, a procedure calls itself, either directly or by calling a procedure which in turn calls it.

Q 2 - Maximum number of nodes in a binary tree with height k, where root is height 0, is

A. $2^k - 1$

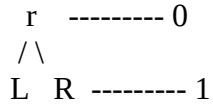
B. $2^{k+1} - 1$

C. $2k^{-1} + 1$

D. $2k - 1$

Explanation

If the root node is at height 0, then a binary tree can have at max $2^{k+1} - 1$ nodes. For example: a binary tree of height 1, can have maximum $2^{1+1} - 1 = 3$ nodes.



Q 3 - Minimum number of queues required for priority queue implementation?

A. 5

B. 4

C. 3

D. 2

Explanation: Minimum number of queues required for priority queue implementation is two. One for storing actual data and one for storing priorities.

Q 4 - Minimum number of spanning tree in a connected graph is

A. n

B. $n^{n - 1}$

C. 1

D. 0

Explanation: Every connected graph at least has one spanning tree.

Q 5 - After each iteration in bubble sort

A - at least one element is at its sorted position.

B - one less comparison is made in the next iteration.

C - Both A & B are true.

D - Neither A or B are true.

Explanation: In one iteration of Bubble sort, the maximum of the set in hand is moved at the end of the unsorted list. Hence one less comparison.

Q 6 - In binary heap, whenever the root is removed then the rightmost element of last level is replaced by the root. Why?

A - It is the easiest possible way.

B - To make sure that it is still complete binary tree.

C - Because left and right subtree might be missing.

D - None of the above!

Explanation: A binary heap (whether max or min) has to satisfy the property of complete binary tree at all times.

Q 7 - In doubly linked lists

A - a pointer is maintained to store both next and previous nodes.

B - two pointers are maintained to store next and previous nodes.

C - a pointer to self is maintained for each node.

D - none of the above.

Explanation: One pointer variable can not store more than one address values.

Q 8 - Heap is an example of

A - complete binary tree

B - spanning tree

C - sparse tree

D - binary search tree

Explanation: Heap maintains itself to meet all the requirements of complete binary tree.

Q 9 - Minimum number of moves required to solve a *Tower of Hanoi* puzzle is

A - 2^{n2}

B - 2^{n-1}

C - $2^n - 1$

D - 2n - 1

Explanation: Minimum number of moves required to solve a Tower of Hanoi puzzle is $2^n - 1$. Where n is the number of disks. If the number of disks is 3, then minimum number of moves required are $2^3 - 1 = 7$

Q 10 - Interpolation search is an improved variant of binary search. It is necessary for this search algorithm to work that −

A - data collection should be in sorted form and equally distributed.

B - data collection should be in sorted form and but not equally distributed.

C - data collection should be equally distributed but not sorted.

D - None of the above.

Explanation: For this algorithm to work properly the data collection should be in sorted form and equally distributed.

Q 11 - A circular linked list can be used for

A - Stack

B - Queue

C - Both Stack & Queue

D - Neither Stack or Queue

Explanation: Both stack and queue data structure can be represented by circular linked-list.

Q 12 - What data structure is used for depth first traversal of a graph?

A - queue

B - stack

C - list

D - none of the above

Explanation: Stack is used for depth first traversal whereas queue is used for breadth first traversal

Q 13 - Travelling salesman problem is an example of

A - Dynamic Algorithm

B - Greedy Algorithm

C - Recursive Approach

D - Divide & Conquer

Explanation: Travelling salesman is an example of greedy algorithm. Greedy algorithms tries to find localized optimum solution which may eventually land in globally optimized solutions.

Q 14 - Which of the following searching techniques do not require the data to be in sorted form

A - Binary Search

B - Interpolation Search

C - Linear Search

D - All of the above

Explanation: Both binary and interpolation search requires data set to be in sorted form. Linear search can work even if the data is not sorted.

Q 15 - Graph traversal is different from a tree traversal, because

A - trees are not connected.

B - graphs may have loops.

C - trees have root.

D - None is true as tree is a subset of graph.

Explanation: As trees do not have loops, they are easier to traverse.

Q16 - How many swaps are required to sort the given array using bubble sort - { 2, 5, 1, 3, 4}

A - 4

B - 5

C - 6

D - 7

Explanation: There will be 3 swaps in first iteration and 1 swap in second iteration**.**

Q 17 In a min-heap:

A - parent nodes have values greater than or equal to their childs

B - parent nodes have values less than or equal to their childs

C - both statements are true

D - both statements are wrong

Explanation: In a min heap, parents always have lesser or equal values than that of their childs.

Q 18 - Recursion uses more memory space than iteration because

A - it uses stack instead of queue.

B - every recursive call has to be stored.

C - both A & B are true.

D - None of the above are true.

Explanation: Recursion uses stack but the main reason is, every recursive call needs to be stored separately in the memory.

Q19 - From a complete graph, by removing maximum _____ edges, we can construct a spanning tree.

A - `e-n+1`

B - `n-e+1`

C - `n+e-1`

D - `e-n-1`

Explanation: We can remove maximum `e-n+1` edges to get a spanning tree from complete graph. Any more deletion of edges will lead the graph to be disconnected.

Q 20 - If the data collection is in sorted form and equally distributed then the run time complexity of interpolation search is −

A - O(n)

B - O(1)

C - O(log n)

D - O(log (log n))

Explanation: Runtime complexity of interpolation search algorithm is O(log (log n)) as compared to O(log n) of BST in favourable situations**.**

Q 21 - A complete graph can have

A - n^2 spanning trees

B - n^{n-2} spanning trees

C - n^{n+1} spanning trees

D - n^n spanning trees

Explanation: At maximum, a complete graph can have n^{n-1} spanning trees.

Q 22 - Postfix expression is just a reverse of prefix expression.

A - True

B - False

Explanation: Expression notations are not reverse (or so) of each other, rather operators used in the expression have different arrangements**.**

Q23 - Quick sort algorithm is an example of

A - Greedy approach

B - Improved binary search

C - Dynamic Programming

D - Divide and conquer

Explanation: Quick sort divides the list using pivot and then sorts in recursive manner. It uses divide and conquer approach.

Q 24 - If the array is already sorted, which of these algorithms will exhibit the best performance

A - Merge Sort

B - Insertion Sort

C - Quick Sort

D - Heap Sort

Explanation: Insertion sort, as it should then work in linear way**.**

Q 25 - An algorithm is

A - a piece of code to be executed.

B - a loosely written code to make final code.

C - a step by step procedure to solve problem.

D - all of the above.

Explanation: An algorithm is a step by step procedure to solve a computer problem.

Q 26 - Which of the below mentioned sorting algorithms are not stable?

A - Selection Sort

B - Bubble Sort

C - Merge Sort

D - Insertion Sort

Explanation: Except selection sort, all other sorting algorithms are stable**.**

Q 27 - `node.next -> node.next.next;` will make

A - node.next inaccessible

B - node.next.next inaccessible

C - this node inaccessible

D - none of the above

Explanation: After applying `node.next -> node.next.next;` we will not have node.next stored anywhere if not explicitly mentioned**.**

Q 28 - In C programming, when we remove an item from bottom of the stack, then −

A - The stack will fall down.

B - Stack will rearranged items.

C - It will convert to LIFO

D - This operation is not allowed.

Explanation: Stack can only be accessed from top of it.

Q 29 - The following sorting algorithms maintain two sub-lists, one sorted and one to be sorted −

A - Selection Sort

B - Insertion Sort

C - Merge Sort

D - both A & B

Explanation: Both selection sort and insertion sort maintains two sublists and then checks unsorted list for next sorted element.

Q 30 - What could be the worst case height of an AVL tree?

A - 0.97 log n

B - 2.13 log n

C - 1.44 log n

D - n^2 log n

Explanation: Worst case height of an AVL tree is 1.44 log n

Q 31 Which of the following has search effeciency of O(1) −

A - Tree

B - Heap

C - Hash Table

D - Linked-List

Explanation: A simple hash table has the Ω(1) efficiency.

Q 32 - Queue data structure works on

A - LIFO

B - FIFO

C - FILO

D - none of the above

Explanation: In queue, data item inserted first, will be available first and data item inserted last will be available in the last. FIFO stands for First In First Out and is a correct answer.

Q 33 - A linked-list is a dynamic structure

A - true

B - false

Explanation: A linked-list is dynamic structure; it can shrink and expand as required by the program.

Q 34 - Minimum number of spanning tree in a connected graph is

A - n

B - n^{n-1}

C - 1

D - 0

Explanation: Every connected graph at least has one spanning tree.

Q 35 - Which of the below given series is Non-Increasing Order −

A - 1, 3, 4, 6, 8, 9

B - 9, 8, 6, 4, 3, 1

C - 9, 8, 6, 3, 3, 1

D - 1, 3, 3, 6, 8, 9

Explanation: A sequence of values is said to be in non-increasing order, if the successive element is less than or equal to its previous element in the sequence.

Q 36 - Time required to merge two sorted lists of size m and n, is

A - O(m | n)

B - O(m + n)

C - O(m log n)

D - O(n log m)

Explanation: The time required to merge two sorted list is O(m + n).

Q 37 - Which of the following uses memoization?

A - Greedy approach

B - Divide and conquer approach

C - Dynamic programming approach

D - None of the above!

Explanation: Remembering the results of previously calculated solutions is called memoization.

Q 38 - Program with highest run-time complexity is

A - Tower of Hanoi

B - Fibonacci Series

C - Prime Number Series

D - None of the above

Explanation: Tower of hanoi has the highest run time complexity

Q 39 - If locality is a concern, you can use _____ to traverse the graph.

A - Breadth First Search

B - Depth First Search

C - Either BFS or DFS

D - None of the above!

Explanation: DFS is a better choice when locality-wise items are concerned.

Q 40 - A procedure that calls itself is called

A - illegal call

B - reverse polish

C - recursive

D - none of the above

Explanation: In recursion, a procedure calls itself, either directly or by calling a procedure which in turn calls it.

Q 41 - Which of the following is an example of dynamic programming approach?

A - Fibonacci Series

B - Tower of Hanoi

C - Dijkstra Shortest Path

D - All of the above

Explanation: All mentioned use dynamic programming approach. Before solving the in-hand sub-problem, dynamic algorithm will try to examine the results of previously solved sub-problems. The solutions of sub-problems are combined in order to achieve the best solution.

Q 42 - Which of the following algorithm is not stable?

A - Bubble Sort

B - Quick Sort

C - Merge Sort

D - Insertion Sort

Explanation: Among the given, only quick sort is not stable that is it may re-arrange the already sorted items**.**

Q 43 – A priory algorithm analysis does not include −

A - Time Complexity

B - Space Complexity

C - Program Complexity

D - None of the above!

Explanation: Algorithms are independent of programming languages, hence, program complexity is not a part of algorithm analysis.

Q 44 - What will be the running-time of Dijkstra's single source shortest path algorithm, if the graph G(V,E) is stored in form of adjacency list and binary heap is used −

A - $O(|V|^2)$

B - O(|V| log |V|)

C - O(|E|+|V| log |V|)

D - None of these

Explanation: The running time will be O(|E|+|V| log |V|) when we use adjacency list and binary heap.

Q 45 - Which of the following uses memoization?

A - Greedy approach

B - Divide and conquer approach

C - Dynamic programming approach

D - None of the above!

Explanation: Remembering the results of previously calculated solutions is called memoization.

Q 46 - Heap is an example of

A - complete binary tree

B - spanning tree

C - sparse tree

D - binary search tree

Explanation: Heap maintains itself to meet all the requirements of complete binary tree.

Q 47 - A balance factor in AVL tree is used to check

A - what rotation to make.

B - if all child nodes are at same level.

C - when the last rotation occured.

D - if the tree is unbalanced.

Explanation: The balance factor (BalanceFactor = height(left-sutree) − height(right-sutree)) is used to check if the tree is balanced or unbalanced.

Q 48 - Which of the following algorithm does not divide the list −

A - linear search

B - binary search

C - merge sort

D - quick sort

Explanation: Linear search, searches the desired element in the target list in a sequential manner, without breaking it in any way.

Q 49 - Which one of the below is not divide and conquer approach?

A - Insertion Sort

B - Merge Sort

C - Shell Sort

D - Heap Sort

Explanation: Among the options, only Merge sort divides the list in sub-list, sorts and then merges them together

Q 50 - What data structure is used for breadth first traversal of a graph?

A - queue

B - stack

C - list

D - none of the above

Explanation: Queue is used for breadth first traversal whereas stack is used for depth first traversal.