BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Bachelor of Computer Applications
Course Name – Data Structure and Algorithm
Course Code - BCA202
(Semester II)

Time allotted : 1 Hrs.25 Min. **Full Marks : 70**

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question) 1 x 70=70

Choose the correct alternative from the following :

(1) Which of the following is the level of implementation of data structure?
a) Application level
b) Abstract level
c) Implementation level
d) All of these

(2) Finding the location of the element with a given value is:
a) Traversal
b) Search
c) Sort
d) None of these

(3) Which data structure allows deleting data elements from front and inserting at the rear?
a) Stack
b) Queue
c) List
d) None of these

(4) Queues serve major role in _____
a) Simulation of recursion
b) Simulation of arbitrary linked list
c) Simulation of limited resource allocation
d) Simulation of heap sort

(5) If the array is already sorted, which of these algorithms will exhibit the best performance
a) Merge sort
b) Quick Sort
c) Insertion sort
d) None of these

(6) Which is the pointer associated with the stack?
a) FIRST
b) FRONT
c) TOP
d) REAR

(7) Before inserting into the stack one must check the condition _____

a) Overflow
b) Underflow
c) Maximum elements
d) Existing elements

(8) The condition _____ indicate the queue is empty.

a) Front=Null
b) Null=Front
c) Front=Rear
d) Rear=Null

(9) If the elements "A", "B", "C" and "D" are placed in a queue and are deleted one at a time, in what order will they be removed?

a) ABCD
b) DCBA
c) DCAB
d) ABDC

(10) Which of the following data structures is linear data structure?

a) Trees
b) Graphs
c) Arrays
d) None

(11) Consider the following operation performed on a stack of size 5. Push(1); Pop(); Push(2); Push(3); Pop(); Push(4); Pop(); Pop(); Push(5); After the completion of all operation, the no of element present on stack are

a) 1
b) 2
c) 3
d) 4

(12) Which of the following linked list below have the last node of the list pointing to the first node?

a) circular doubly linked list
b) circular linked list
c) circular singly linked list
d) doubly linked list

(13) If an array is declared as int arr[30] , how many elements can it hold?

a) 30
b) 31
c) 0
d) 1

(14) You are given pointers to first and last nodes of a singly linked list, which of the following operations are dependent on the length of the linked list?

a) Delete the first element
b) Insert a new element as a first element
c) Delete the last element of the list
d) Add a new element at the end of the list

(15) Which of the following is non-linear data Structure?

a) Stacks
b) List
c) Strings
d) Trees

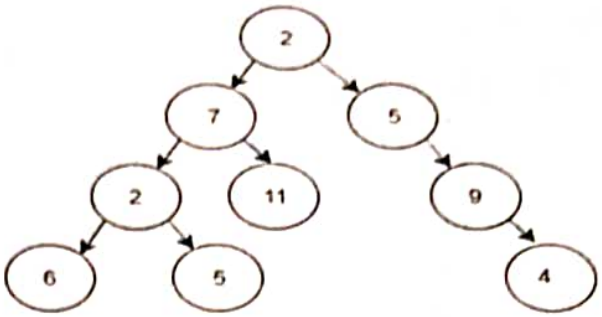
(16) The complexity of Bubble sort algorithm is

a) O(n)
b) O(log n)
c) O(n^2)
d) O(n log n)

(17) Which of the following is not an advantage of optimised bubble sort over other sorting tec hniques in case of sorted elements?

a) It is faster
b) Consumes less memory
c) Detects whether the input is already sorted
d) Consumes less time

(18)



For the tree, write the pre-order traversal.

a) 2, 7, 2, 6, 5, 11, 5, 9, 4
b) 2, 7, 5, 2, 6, 9, 5, 11, 4
c) 2, 5, 11, 6, 7, 4, 9, 5, 2
d) 2, 7, 5, 6, 11, 2, 5, 4, 9

(19) Which type of traversal of binary search tree outputs the value in sorted order?

a) Pre-order
b) In-order
c) Post-order
d) None

(20) The number of edges from the node to the deepest leaf is called _____ of the tree.

a) Height
b) Depth
c) Length
d) Width

(21) In a full binary tree if number of internal nodes is I, then number of leaves L is?

a) L = 2*I
b) L = I + 1
c) L = I – 1
d) L = 2*I – 1

(22) In a full binary tree if there are L leaves, then total numbers of nodes N are?

a) N = 2*L
b) N = L + 1
c) N = L – 1
d) N = 2*L– 1

(23) The no of external nodes in a full binary tree with n internal nodes is?

a) 1
b) n
c) n+1
d) 2n

(24) In a full binary tree, every internal node has exactly two children. A full binary tree with 2 n+1 nodes contains

a) n leaf node
b) n internal nodes
c) n-1 leaf nodes
d) n-1 internal nodes

(25) A complete binary tree of level 5 has how many nodes?

a) 15
b) 25
c) 63
d) 30

(26) Which of the following case does not exist in complexity theory?

a) Best case
b) Average case
c) Null case
d) Worst case

(27) The worst case occur in quick sort when

a) Pivot is the smallest element
b) Pivot is the median of the array
c) Pivot is the middle element
d) None of these

(28) To represent hierarchical relationship between elements, Which data structure is suitable?

a) Dequeue
b) Priority queue
c) Tree
d) Graph

(29) Which of the following statement is false?

a) Arrays are dense lists and static data structure
b) Data elements in linked list need not be stored in adjacent space in memory
c) Linked lists are collection of the nodes that co ntain information part and next pointer
d) Pointers store the next data element of a list

(30) Stack is also called as

a) Last In First Out
b) First In Last Out.
c) Last in Last Out
d) None of these

(31) Inserting an item into the stack when the stack is not full is called _____ operation and deletion of item form the stack, when stack is not empty is called _____operation.

a) push, pop
b) Pop, push
c) insert, delete
d) delete, insert,

(32) What is the value of the postfix expression 6 3 2 4 + – * ?

a) 22
b) 18
c) -18
d) None of these

(33) The complexity of fibonacci series is___

a) $O(2^n)$
b) O(n)
c) $O(n^2)$
d) None of these

(34) Binary Search can be categorized into which of the following?

a) Brute Force technique
b) Divide and conquer
c) Greedy algorithm
d) Dynamic programming

(35) Choose the recursive formula for the Fibonacci series.(n>=1)

a) F(n) = F(n+1) + F(n+2)
b) F(n) = F(n) + F(n+1)
c) F(n) = F(n-1) + F(n-2)
d) F(n) = F(n-1) – F(n-2)

(36) When a binary tree is converted in to an extended binary tree, all the nodes of a binary tre e in the external node becomes

a) Root node
b) External node
c) Internal nodes
d) None of these

(37) Degree of a leaf node is

a) 0
b) 1
c) 2
d) 3

(38) Which of the following traversal techniques lists the elements of a binary search tree in as cending order ?

a) Pre-order
b) Post-order
c) In order
d) None of these

(39) Which of the following require additional space to sort?

a) Merge sort
b) Bubble sort

c) Selection sort
d) Insertion sort.

(40) Which of the following algorithms has lowest worst case time complexity?

a) Insertion sort
b) Selection sort
c) Bubble sort
d) Heap sort

(41) Which of the following algorithm pays the least attention to the ordering of the elements i n the input list?

a) Insertion sort
b) Selection sort
c) Quick sort
d) Merge sort

(42) In _____ search start at the beginning of the list and check every element in the list.

a) Linear search
b) Binary search
c) Hash Search
d) Binary Tree search

(43) The element that is going to be searched in a list is called _____.

a) Key
b) Item
c) Table
d) File

(44) In linear search with array, how many comparisons are needed in best case?

a) 0
b) 1
c) n
d) n/2

(45) In linear search with array, how many comparisons are needed in worst case?

a) 0
b) 1
c) n
d) n/2

(46) Binary search algorithm cannot be applied to_____

a) Sorted Linked list
b) Sorted binary trees
c) Sorted linear array
d) Pointer array

(47) The complexity of Binary search algorithm is

a) O (n)
b) O(log n)
c) $O(n^2)$
d) $O (\log n^2)$

(48) Binary search can be applied on the sorted _____.

a) array or list.
b) arguments
c) queues
d) pointers

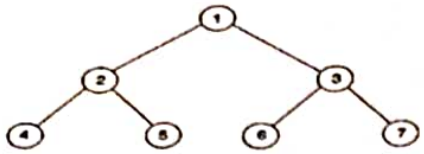
(49) When is the uniform binary search an optimization over the usual binary search?

a) A table lookup is generally faster than an addit ion and a shift
b) Many searches will be performed on the same array
c) Many searches will be performed on several ar rays of the same length
d) All of these

(50) The average number of key comparisons done in a successful sequential search in a list of length it is

a) log n
b) (n-1)/2
c) n/2
d) (n+1)/2

(51) If the post order traversal gives a b - c d * + then the label of the nodes 1, 2, 3 ... will be



a) +, -, *, a, b, c, d
b) a, -, b, +, c, *, d
c) a, b, c, d, -, *, +
d) -, a, b, +, *, c, d

(52) Let T be a tree with 10 vertices. The sum of the degrees of all the vertices in T is _____.

a) 18
b) 19
c) 20
d) 21

(53) One can convert a binary tree into its mirror image by traversing it in

a) in-order
b) pre-order
c) post-order
d) any order

(54) If n numbers are to be sorted in ascending order in O(nlogn) time, which of the following tree can be used

a) Binary tree
b) Binary search tree
c) Max -heap
d) Min -heap

(55) If n elements are sorted in a balanced binary search tree. What would be the asymptotic co mplexity to search a key in the tree?

a) O(1)
b) O(n)
c) O(log n)
d) O(n log n)

(56) The property of binary tree is

a) The first subset is called left subtree
b) The second subtree is called right subtree
c) The root cannot contain NULL
d) The right subtree can be empty

(57) Which is / are application(s) of stack?

a) Function call
b) Large number arithmetic
c) Evaluation of arithmetic expression
d) All of these

(58) For finding a node in a_____, at each stage we ideally reduce the number of nodes we have to check by half.

a) binary tree
b) binary search tree
c) AVL tree
d) binary heap tree

(59) A binary tree is generated by inserting in order the following integers: 50, 15, 62, 5, 20,5 8, 91, 3,8,37, 60, 24 The number of nodes in the left and right of the root respectively is:

a) (4,7)
b) (7,4)
c) (6,3)
d) (3,6)

(60) Which of the following statements is false?

a) Every tree is a bipartite graph
b) A tree contains a cycle
c) A tree with n nodes contains n-1 edges
d) A tree is a connected graph

(61) The use of pointers to refer elements of a data structure in which elements are logically ad jacent is

a) pointer
b) linked allocation
c) stack
d) queue.

(62) In which of the following tree, parent node has a key value greater than or equal to the key value of both of its children?

a) Binary search tree
b) Threaded binary tree
c) Complete binary tree
d) Max-heap

(63) In a full binary tree, every internal node has exactly two children. A full binary tree with 2 n+1 nodes contains_____.

a) n leaf node
b) n internal nodes
c) n-1 leaf nodes
d) n-1 internal nodes

(64) The height of a BST is given as h. Consider the height of the tree as the no. of edges in the longest path from root to the leaf. The maximum no. of nodes possible in the tree is____

a) $2^{h-1}-1$
b) $2^{h+1}-1$
c) $2^{h}+1$
d) $2^{h+1}+1$

(65) The post order traversal of a binary tree is DEBFCA. Find out the pre order traversal

a) ABDCEF
b) ABFCDE
c) ADBFEC
d) ABDECF

(66) In a full binary tree if number of internal nodes is I, then numbers of nodes N are____.

a) L = 2*I
b) L = I + 1
c) L = I – 1
d) L = 2*I + 1

(67) _____ is neither an algorithm nor a program.

a) Computing
b) Pseudo code
c) Computer science
d) None of these

(68) Which of the following data structure is not linear data structure?

a) Array
b) Linked list
c) Both of above
d) None of these.

(69) Which of the following traversal techniques lists the elements of a binary search tree in as cending order ?

a) Pre-order
b) Post-order
c) In order
d) None of these.

(70) The recurrence relation that arises in relation with the complexity of binary search is:

a) T(n) = 2T(n/ 2) + k , where k is constant
b) T(n) = T(n / 2) + k , where k is constant
c) T(n) = T(n / 2) + log n
d) T(n) = T(n / 2) + n