BRAINWARE UNIVERSITY

Term End Examination 2021 - 22
Programme – Bachelor of Computer Applications
Course Name – Data Structures
Course Code - BCAC201
(Semester II)

Time allotted : 1 Hrs.15 Min.   **Full Marks : 60**

[The figure in the margin indicates full marks.]

Group-A

(Multiple Choice Type Question)   1 x 60=60

Choose the correct alternative from the following :

(1) Finding the location of a given item in a collection of items is called

 a) Discovering   b) Finding
 c) Searching   d) Mining

(2) _____ is very useful in situations when data have to stored and then retrieved in reverse order.

 a) Stack   b) Queue
 c) List   d) Link list

(3) A _____ is a data structure that organizes data similar to a line in the supermarket, where the first one in line is the first one out.

 a) Stacks linked list   b) Queue linked list
 c) Both of them   d) Neither of them

(4) How is Data in a queue accessed?

 a) First in First out   b) First in Last out
 c) Last in First out   d) Last in Last out

(5) The retrieval of items in a stack is _____ operation.

 a) Push   b) Pop
 c) Retrieval   d) Access

(6) Deletion operation is done using _____in a queue.

 a) Front   b) Rear
 c) Top   d) List

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

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

(8) 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

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

a) Trees   b) Graphs

c) Arrays   d) None

(10) Which data structure is needed to convert infix notation to postfix notation?

a) Branch   b) Tree

c) Queue   d) Stack

(11) A linear list of elements in which deletion can be done from one end (front) and insertion can take place only at the other end (rear) is known as a ?

a) Queue   b) Stack

c) Tree   d) Linked list

(12) Which Data Structure is used to perform Recursion?

a) Queue   b) Stack

c) Tree   d) Linked list

(13) What is the space complexity of a linear queue having n elements?

a) O(n)   b) O(nlogn)

c) O(logn)   d) O(1)

(14) Which of the following is a correct way to declare a multidimensional array in Java?

a) int[] arr;   b) int arr[[]];

c) int[][]arr;   d) int[[]] arr;

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

a) Stacks   b) List

c) Strings   d) Trees

(16) Which of the following operations is not O(1) for an array of sorted data. You may assume that array elements are distinct.

a) Find the ith largest element   b) Delete an element

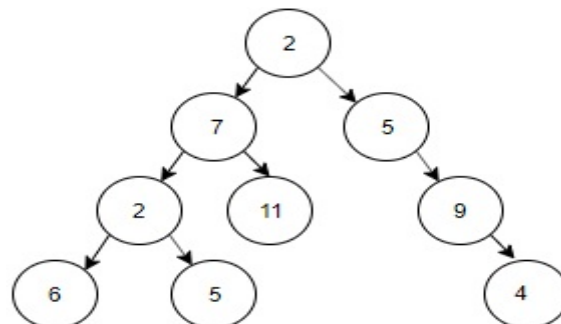c) Find the ith smallest element   d) all of these

(17) What is an external sorting algorithm?

a) Algorithm that uses tape or disk during the sort   b) Algorithm that uses main memory during the sort

c) Algorithm that involves swapping   d) Algorithm that are considered 'in place'

(18) Which search technique is better?

a) Linear   b) Binary

c) all of these   d) none of these

(19)

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

(20) To obtain a prefix expression, which of the tree traversals is used?

    a) Level-order traversal   b) Pre-order traversal

    c) Post-order traversal   d) In-order traversal

(21) Which of the following ways is a post-order traversal?

    a) Root->left sub tree-> right sub tree   b) Root->right sub tree-> left sub tree

    c) right sub tree-> left sub tree->   d) left sub tree-> right sub tree->Root

(22) What is a complete binary tree?

    a) Each node has exactly zero or two children   b) A binary tree, which is completely filled, with the possible exception of the bottom level, which is filled from right to left

    c) A binary tree, which is completely filled, with the possible exception of the bottom level, which is filled from left to right   d) A tree In which all nodes have degree 2

(23) 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) $N = 2*L– 1$

(24) In a full binary tree, every internal node has exactly two children. A full binary tree with 2n+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) _____ is not the component of data structure.

    a) Operations   b) Storage Structures

    c) Algorithms   d) None of these

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

    a) Dequeue   b) Priority queue

    c) Tree   d) Graph

(30) 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 contain information part and next pointer   d) Pointers store the next data element of a list

(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) Time taken for addition of element in queue is

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

    c) $O(n^2)$
    d) O(n)

(33) What is the worst case complexity of binary search using recursion?

    a) O(n log n)
    b) O(log n)

    c) O(n)
    d) $O(n^2)$

(34) What is the time complexity of uniform binary search?

    a) O(n log n)
    b) O(log n)

    c) O(n)
    d) $O(n^2)$

(35) What is the advantage of recursive approach than an iterative approach?

    a) Consumes more memory
    b) Consumes less memory

    c) Less code and easy to implement
    d) More code has to be written

(36) Degree of a leaf node is

    a) 0
    b) 1

    c) 2
    d) 3

(37) Which of the following traversal techniques lists the elements of a binary search tree in ascending order ?

    a) Pre-order
    b) Post-order

    c) In order
    d) None of these

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

    a) Merge sort
    b) Bubble sort

    c) Selection sort
    d) Insertion sort.

(39) Which of the following algorithm pays the least attention to the ordering of the elements in the input list?

    a) Insertion sort
    b) Selection sort

    c) Quick sort
    d) Merge sort

(40) What is the space complexity of an array having n elements?

    a) O(n)
    b) O (n log n)

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

(41) If a key is found in a list that is called _____ type of search.

    a) unsuccessful
    b) successful

    c) partial success
    d) partial unsuccessful

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

    a) 0
    b) 1

    c) n
    d) (n+1)/2

(43) In _____type of search, the list is divided into two parts.

    a) Linear search
    b) Random search

    c) Binary search
    d) None of these

(44) Which of the following is not a limitation of binary search algorithm?

    a) Must use a sorted array
    b) Requirement of sorted array is expensive when a lot of insertion and deletions are needed

    c) There must be a mechanism to access the middle element directly
    d) Binary search algorithm is not efficient when the data elements are more than 1500

(45) The time factor when determining the efficiency of algorithm is measured by__.

a) Counting the number of key operations

b) Counting the microseconds

c) Counting the number of statements

d) Counting the kilobytes of algorithm

(46) Which of the following is a disadvantage of linear search?

a) Requires more space

b) Greater time complexities compared to other searching algorithms

c) Not easy to understand

d) Not easy to implement

(47) Which of the following is correct recurrence for worst case of Binary Search?

a) $T(n) = 2T(n/2) + O(1)$ and $T(1) = T(0) = O(1)$

b) $T(n) = T(n-1) + O(1)$ and $T(1) = T(0) = O(1)$

c) $T(n) = T(n/2) + O(1)$ and $T(1) = T(0) = O(1)$

d) $T(n) = T(n-2) + O(1)$ and $T(1) = T(0) = O(1)$

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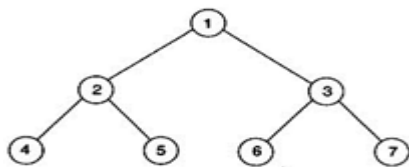
a) +, -, *, a, b, c, d

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

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

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

(49) Stack can be implemented using _____ and _____ .

a) Array and binary tree

b) Array and linked list

c) Array and stack

d) Graph and linked list

(50) The maximum number of binary trees that can be formed with three unlabeled nodes is:

a) 1

b) 6

c) 5

d) 4

(51) If n elements are sorted in a binary search tree. What would be the asymptotic complexity to search a key in the tree?

a) O(1)

b) O(log n)

c) O(n)

d) O(n log n)

(52) A binary search tree whose left subtree and right subtree differ in height by at most 1 unit is called

a) Lemma tree

b) Redblack tre

c) AVL tree

d) None of these.

(53) _____is a pile in which items are added at one end and removed from the other.

a) List

b) Queue

c) Stack

d) Array

(54) Any node is the path from the root to the node is called

a) Successor node

b) Ancestor node

c) Internal node

d) None of these

(55) What is the worst case time complexity for search, insert and delete operations in a general Binary Search Tree?

a) O(n) for all

b) O(log n) for all

c) O(log n) for search and insert, and O(n) for delete

d) O(log n) for search, and O(n) for insert and delete

(56) The depth of a complete binary tree with 'n nodes is (log is to be base two)

a) log (n+1)-1   b) log(n)

c) log (n-1) + 1   d) log(n) + 1

(57) A binary tree in which if all its levels except possibly the last, have the maximum number of nodes and all the nodes at the last level appear as far left as possible, is called

a) Full binary tree.   b) Binary Search Tree

c) Threaded tree   d) Complete binary tree

(58) The use of pointers to refer elements of a data structure in which elements are logically adjacent is

a) pointer   b) linked allocation

c) stack   d) queue.

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

a) n leaf node   b) n internal nodes

c) n-1 leaf nodes   d) n-1 internal nodes

(60) 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) $2^{h+1}+1$