Data Structure & Algorithm (PCC CS301)

Multiple choice questions

SET 1

Introduction

1. Which if the following is/are the levels of implementation of data structure A) Abstract level B) Application level C) Implementation level D) All of the above
2. The memory address of the first element of an array is called: a. Floor address b. Foundation address c. First address d. Base address
3. The two key measures to find efficiency of an algorithm are: a. Time and space b. Capacity and Complexity c. Data and space d. Processor and memory
4. The space factor when determining the efficiency of algorithm is measured by: a. Counting the minimum memory needed by the algorithm b. Counting the maximum memory needed by the algorithm c. Counting the average memory needed by the algorithm d. Counting the maximum disk space needed by the algorithm
5. Which of the following cases does not exist in the complexity theory? a. Best case b. Worst case c. Average case d. Null case
6. Which of the following data structures is not linear data structure? a. Linked lists b. Array c. Both (a) and (b) d. None of the above
7. The operation of processing each element in the list is known as: a. Sorting b. Traversal c. Merging d. Inserting
8. ..... is a condition when there is no space to insert an element a. underflow b. houseful c. memory-full d. overflow
9. Which of the following data structure is linear data structure? a. Trees b. Graphs c. Arrays d. None of above

Stack

1. A parentheses checker program would be best implemented using (A) List (B) Queue (C) Stack (D) Any of the above
2. Which of the following data structure is required to convert arithmetic expression in infix to its equivalent postfix notation? (A) Queue (B) Linked list (C) Binary search tree (D) None of above
3. Which of the following is an application of stack? A. finding factorial B. tower of Hanoi C. infix to postfix D. all of the above
4. Stack is also called as A) Last in first out B) First in last out C) Last in last out D) First in first out

5. Inserting an item into the stack when 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
6. …… is very useful in situation when data have to stored and then retrieved in reverse order. A) Stack B) Queue C) List D) Link list
7. Which is/are the application(s) of stack A) Function calls B) Large number Arithmetic C) Evaluation of arithmetic expressions D) All of the above
8. Before inserting into stack one must check the condition..... A. Overflow B. Underflow C. Maximum elements D. Existing elements
9. The Postfix equivalent of the Prefix Notation * + ab - cd is
   A. ab + cd - *
   B. abcd +-*
   C. ab+cd*-
   D. ab+-cd*
10. The data structure required to evaluate a postfix expression a. Queue b. Stack c. Array d. Linked list
11. The data structure required to check whether expression contains balanced parenthesis is a. Queue b. Array c. Tree d. stack
12. If a sequence of operations- push(1), push(2), pop, push(1),push(2),pop, pop , pop, push(2),pop are performed on a stack , the sequence of popped out values are a. 2,2,1,1,2 b. 2,2,1,2,2 c. 2,1,2,2,1 d. 2,1,2,2,2
13. If the elements A, B, C and D are placed in a stack and are deleted one at a time, what is the order of removal?

    A. ABCD

    B. DCBA

    C. DCAB

    D. ABDC

14. Which of the following is the prefix form of A+B*C?
    A. A+(BC*)
    B. +AB*C
    C. ABC+*
    D. +A*BC

15. What is the outcome of the prefix expression +, -, *, 3, 2, /, 8, 4, 1?
    A. 12
    B. 11
    C. 5

D. 4

Queue

1. . …… form of access is used to add and remove nodes from a queue. A. LIFO, Last In First Out B. FIFO, First In First Out C. Both a and b D. None of these
2. Identify the data structure which allows deletions at both ends of the list but insertion at only one end. A) Input restricted dequeue B) Output restricted qequeue C) Priority queues D) Stack
3. ……. Is a pile in which items are added at one end and removed from the other. A) Stack B) Queue C) List D) None of the above
4. The condition..... Indicate the queue is empty. A. Front=Null B. Null=Front C. Front=Rear D. Rear=Null
5. The value of REAR is increased by 1 when..... A. An element is deleted in a queue B. An element is traversed in a queue C. An element is added in a queue D. An element is merged in a queue
6. ..... is a collection of elements such that each element has been assigned a processing priority. A. Priority queue B. Procedure queue C. Main queue D. Interrupt queue
7. The term dequeue is the contraction of the name..... A. Double ended queue B. Double side queue C. Double headed queue D. Double address queue
8. If (rear = maxsize -1) rear =0; else rear = rear +1; is required in a. Circular queue b. Stack c. Linear queue d. Link list

Linked List

1. Minimum number of fields in each node of a doubly linked list is ____
   (A) 2 (B) 3 (C) 4 (D) None of the above
2. The situation when in a linked list START=NULL is …. A. Underflow B. Overflow C. Houseful D. Saturated Ans. A Underflow
3. A doubly linked list has ..... pointers with each node. A. 0 B. 1 C. 2 D. 3
4. The disadvantage in using a circular linked list is ..... A. it is possible to get into infinite loop B. last node points to fist node. C. time consuming D. requires more memory space.
5. A linear list in which each node has point to the predecessor and successors nodes is called ..... A. singly linked list B. circular linked list C. doubly linked list D. linear linked list
6. In a circular linked list a. Components are linked in random manner b. There is no beginning and no end c. Components are arranged hierarchically d. Forward and backward traversal within the list is permitted

7. Which of the following require extra memory for storage: a. Linked list b. Array c. Both (a) & (b) d. None of the above
8. In which of the following link field of last node point to the first node a. singly linked list b. doubly linked list c. circular linked list d. both (a) and (c)
9. Consider the following definition in c programming language

```
struct node
{
int data;
struct node * next;
}
typedef struct node NODE;
NODE *ptr;
```

Which of the following c code is used to create new node?

a) ptr=(NODE*)malloc(sizeof(NODE));
b) ptr=(NODE*)malloc(NODE);
c) ptr=(NODE*)malloc(sizeof(NODE*));
d) ptr=(NODE)malloc(sizeof(NODE));

10. In doubly linked lists, traversal can be performed?

a) Only in forward direction
b) Only in reverse direction
c) In both directions
d) None

11. A variant of the linked list in which none of the node contains NULL pointer is?

a) Singly linked list
b) Doubly linked list
c) Circular linked list
d) None

12. In circular linked list, insertion of node requires modification of?

a) One pointer
b) Two pointer
c) Three pointer
d) None

Tree

1. A binary search tree whose left subtree and right subtree differ in height by at most 1 unit is called A) AVL tree B) Red-black tree C) Lemma tree D) None of the above
2. The in order traversal of tree will yield a sorted listing of elements of tree in.... A. Binary trees B. Binary search trees C. Merging D. AVL Trees
3. In order traversing a tree resulted E A C K F H D B G; the preorder traversal would return. A. FAEKCDBHG B. FAEKCDHGB C. EAFKHDCBG D. FEAKDCHBG
4. Which indicates pre-order traversal? A. Left sub-tree, Right sub-tree and root B. Right sub-tree, Left sub-tree and root C. Root, Left sub-tree, Right sub-tree D. Right sub-tree, root, Left sub-tree
5. Which indicates in-order traversal? A. Left sub-tree, root and Right sub-tree B. Right sub-tree, Left sub-tree and root C. Root, Left sub-tree, Right sub-tree D. Right sub-tree, root, Left sub-tree
6. The root R of the binary tree is assigned a level number of ..... A. 1 B. 0 C. -1 D. Null
7. Given a binary search tree, which traversal type would print the values in the nodes in sorted order? A. Preorder B. Postorder C. Inorder D. None of the above
8. Which of the following is false? a. Tree is a non-linear data structure b. A tree contains a cycle c. A tree with n modes contains (n-1) edges d. A tree is a connected graph
9. Preorder is also known as a. Depth first order b. Breadth first order c. Topological order d. Linear order
10. In which traversal root node in visited at the last a. Post-order traversal b. Pre-order traversal c. In-order traversal d. None
11. 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 binary tree D.Complete binary tree
12. A BST is traversed in the following order recursively: Right, root, left
    The output sequence will be in
    a.Ascending order
    b.Descending order
    c.Bitomic sequence
    d.No specific order

Graph

1.A graph in which all vertices have equal degree is known as ____ (A) Complete graph (B) Regular graph (C) Multi graph (D) Simple graph Ans: A Complete graph

2. A vertex of in-degree zero in a directed graph is called a/an (A) Root vertex (B) Isolated vertex (C) Sink (D) Articulation point

3. A …… is an acyclic digraph, which has only one node with indegree 0, and other nodes have indegree 1. A) Directed tree B) Undirected tree C) Dis-joint tree D) Direction oriented tree

4. The data structure required for breadth first traversal on a graph is: a. Queue b. Stack c. Array d. Tree

Sorting & Searching

1. Which of the following is an external sorting? A. Insertion Sort B. Bubble Sort C. Merge Sort D. Tree Sort
2. Selection sort first finds them ..... element in the list and put it in the first position. A. Middle element B. Largest element C. Last element D. Smallest element
3. Quick sort is also known as..... A. merge sort B. tree sort C. shell sort D. partition and exchange sort
4. The worst case occurs in linear search algorithm when..... A. Item is somewhere in the middle of the array B. Item is not in the array at all C. Item is the last element in the array D. Item is the last element in the array or item is not there at all
5. The complexity of merge sort algorithm is..... A. O(n) B. O(logn) C. O(n2) D. O(n logn)
6. You have to sort a list L consisting of a sorted list followed by a few ‘random’ elements. Which of the following sorting methods would be especially suitable for such a task? a. Bubble sort b. Selection sort c. Quick Sort d. Insertion Sort
7. The quick sort algorithm exploit ……design technique a. Greedy b. Dynamic programming c. Backtracking d. Divide and conquer
8. ..... is the process of arranging the elements of a particular data structure in some logical order. a. Merging b. Insertion c. traversing d. Sorting

9. Consider a hash table of size seven, with starting index zero, and a hash function (3x + 4)mod7. Assuming the hash table is initially empty, which of the following is the contents of the table when the sequence 1, 3, 8, 10 is inserted into the table using closed hashing? Note that '_' denotes an empty location in the table.
   a.8 - - - - - 10
   b.1 8 10 - - - 3
   c.1 - - - - - 3
   d.1 10 8 - - - 3
10. . The complexity of linear search algorithm is a. O(n) b. O(log n) c. O(n^2) d. O(n log n)
11. The complexity of Binary search algorithm is a. O(n) b. O(log n) c. O(n2) d. O(n log n)
12. Which of the following is not a stable sorting algorithm?
    a) Insertion sort
    b) Selection sort
    c) Bubble sort
    d) Merge sort