MCA-11/PGDCA-11-MSC(IT)-12

(Master of Computer Application/
P.G. Diploma in Computer Application)

Second Semester Examination-2015

MCA-06/PGDCA-06/MSCIT-06

Data Structure through 'C' Language

Time : 3 Hours   **Maximum Marks :** 60

Note : This paper is of sixty (60) marks divided into three (03) sections A, B, and C. Attempt the questions contained in these sections according to the detailed instructions given therein.

Section - A

(Long Answer Type Questions)

Note : Section 'A' contains four (04) long-answer-type questions of fifteen (15) marks each. Learners are required to answer any two (02) questions only.   (2×15=30)

1.   (a)   Write a complete programme in C to create a single linked list. Write functions to do the following operations: (10)

      (i) Insert a new node at the end

      (ii) Delete the first node

      (b)   Explain the bubble sort method.   (5)

2. (a) What do you understand by tree traversal ? Write a procedure for traversing a binary tree in pre-order and execute it on the following tree. (10)
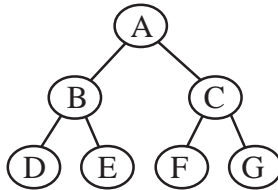
(b) Define the following terms using suitable examples. (5)
(i) Degree of Tree.
(ii) Height of Tree
(iii) Siblings
(iv) A Full binary Tree
(v) A Complete Binary Tree

3. (a) What is circular queue? Write down routines for inserting and deleting elements from a circular queue implemented using arrays. (10)

(b) What is a binary search tree? List its advantages. (5)

4. (a) Show the detailed contents of stack for a given postfix expression 623 +- 382 / +*2 & 3 + and evaluate the expression. (10)

(b) Explain the working of a Deques. (5)

Section - B

(Short Answer Type Questions)

Note : Section 'B' contains eight (08) short-answer-type questions of five (05) marks each. Learners are required to answer any four (04) questions only. (4×5=20)

1. State the need of Data Structures

2. Define the terms node, address, null pointer and next pointer for linked list.

3. Discuss the following terms :-
   (i) Connected graph
   (ii) Disconnected graph
4. Define data type and abstract data type. Comment upon the significance of abstract data type.
5. What are the applications of stack.
6. Suppose an array arr[15] stores numeric values only, write algorithms to
   (i) Calculate the average of the values in arr.
   (ii) Print the even numbers stored in arr.
7. Compare linear linked list and double linked list with diagrams.
8. Write a short note on dynamic memory allocation.

Section - C

(Objective Type Questions)

Note : Section 'C' contains ten (10) objective-type questions of one (01) mark each. All the questions of this section are compulsory.   (10×1=10)

1. A Iinear collection of data elements where the Iinker node is given by means of pointer is called
   (A) linked list   (B) node list
   (C) primitive list   (D) None of these
2. Representation of data structure in memory is known as :
   (A) recursive   (B) abstract data type
   (C) storage structure   (D) file structure
3. If the address of A[1][1] and A[2][1] are 1000 and 1010 respec tive ly and each element occupies 2 bytes then the array has been stored in .... order.
   (A) row major   (B) column major
   (C) matix major   (D) none of these

4. The largest element of an array index is called its

(A) lower bound. (B) range.

(C) upper bound. (D) All of these

5. In Breadth First Search of Graph, which of the following data structure is used ?

(A) Stack (B) Queue

(C) Linked List (D) None of the above

6. Consider that n elements are to be sorted. What is the worst case time complexity of Bubble sort ?

(A) O(1) (B) O(log2n)

(C) O(n) (D) O(n2)

7. A queue is a,

(A) FIFO (First In First Out) list

(B) LIFO (Last In First Out) list

(C) Ordered array

(D) Linear tree

8. What is the postfix form of the following prefix *+ab-cd

(A) ab+cd–* (B) abc+*–

(C) ab+*cd– (D) ab+*cd–

9. Quick sort is also known as

(A) merge sort (B) heap sort

(C) bubble sort (D) none of these

10. The data structure required to evaluate a postfix expression is

(A) queue (B) stack

(C) array (D) linked-list