

DiplETE – CS (Current & New Scheme)

Time: 3 Hours

JUNE 2015

Max. Marks: 100

PLEASE WRITE YOUR ROLL NO. AT THE SPACE PROVIDED ON EACH PAGE IMMEDIATELY AFTER RECEIVING THE QUESTION PAPER.

NOTE: There are 9 Questions in all.

- Question 1 is compulsory and carries 20 marks. Answer to Q.1 must be written in the space provided for it in the answer book supplied and nowhere else.
- The answer sheet for the Q.1 will be collected by the invigilator after 45 minutes of the commencement of the examination.
- Out of the remaining EIGHT Questions answer any FIVE Questions. Each question carries 16 marks.
- Any required data not explicitly given, may be suitably assumed and stated.

Q.1 Choose the correct or the best alternative in the following: (2×10)

- a. In a union, the different members share
- (A) Same variable (B) Same memory location
(C) Same data type (D) None of these
- b. Which of the following condition is required for binary search
- (A) List should be sorted
(B) List should be sorted in ascending order only
(C) List should be sorted in descending order only
(D) Any one of the above
- c. Structure is used
- (A) When multiple data types are to be processed
(B) When single data types is to be processed
(C) No data type is to be processed
(D) None of these
- d. A list is a structure in which insertion, deletions and retrieval may occur at
- (A) Beginning of the list (B) End of the list
(C) Any position of the list (D) None of these
- e. A queue can be
- (A) Circular (B) Non-circular
(C) Both (A) and (B) (D) None of these
- f. Which of the following data structures can store homogeneous data elements
- (A) Arrays (B) Pointers
(C) Structure (D) None of these

- g. The operation of rearranging of elements of a list in some particular order is called
- (A) Searching (B) Sorting
(C) Addressing (D) Referring
- h. The other name of a stack is
- (A) FIFO (B) LIFO
(C) LILO (D) PIPO
- i. In a binary tree a root node can have
- (A) At most 2 children (B) Not more than 3 children
(C) 3 children (D) More than 2 children
- j. In a binary search tree the left node value is _____ than the root value.
- (A) Less than (B) Greater than
(C) Equal (D) Not equal

**Answer any FIVE Questions out of EIGHT Questions.
Each question carries 16 marks.**

- Q.2** a. Explain the scope of variables with an example. (6)
- b. Briefly explain dynamic memory allocation. (6)
- c. Write a recursive program to find the sum of all even numbers from 1 to n. (4)
- Q.3** a. When do you use a structure? Define a structure data type called time_struct containing three members, integer hour, integer minute and integer second. Develop a programme that would assign values to the individual members and display the time in the following from: 16:40:51 (8)
- b. Give the details of memory allocation to the following structure: (3)
- ```
Struct address
{
 Street char [30];
 City char [30];
 State char [30];
}
Struct employee
{
 name char [30];
 salary float;
 struct address adr 1;
}
Struct Empolyee Employee 1;
```

- c. List out the different types of files and explain major operation that can be performed on them. (5)
- Q.4** a. Write a program in C to implement bubble sort n integer numbers. (8)
- b. Write a C program to implement binary search using single dimensional array. (8)
- Q.5** a. What is stack? Give array implementation of stack. (8)
- b. Briefly explain a circular queue and write the C implementation of a circular queue using arrays. (8)
- Q.6** a. Write a C program to delete a specific node from a singly linked list. (10)
- b. Explain how to merge two sorted singly linked lists. (6)
- Q.7** a. With an example explain circular linked list. (4)
- b. Briefly explain the following: (12)
- (i) Doubly linked list
- (ii) How to insert a node in to a doubly linked list?
- Q.8** a. Define the following: (4)
- (i) Tree
- (ii) Degree of a node
- (iii) Degree of a tree
- (iv) Level of a node
- b. Find the Preorder, Inorder and Postoder traversal sequences for the following trees: (6)

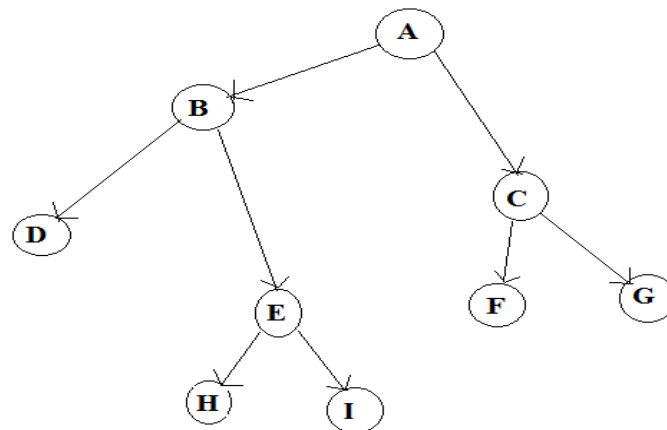


Fig.1

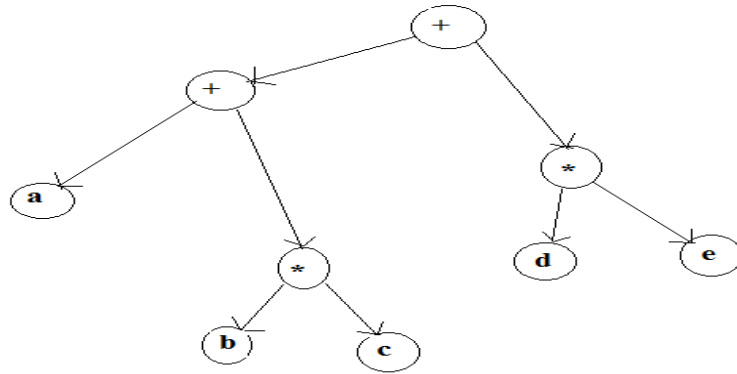


Fig.2

- c. Explain the following operations with respect to a Binary Search Tree. (6)
- Deletion of a node with 2 children.
  - Deletion of a node with 1 child.

- Q.9 a. For the following Fig.3 find the forward and backward path between every pair of vertices. Is the digraph strongly connected? (4)

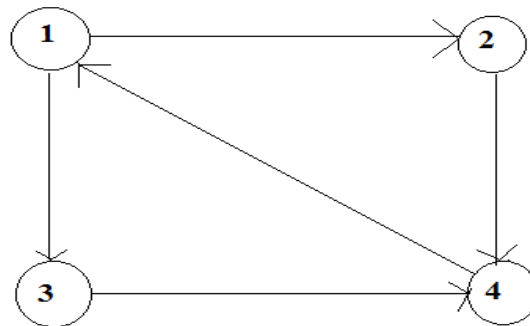


Fig.3

- b. What is minimum-cost spanning tree of a graph? Compute the minimum cost spanning tree of the following graph using prim's Algorithm. (8)

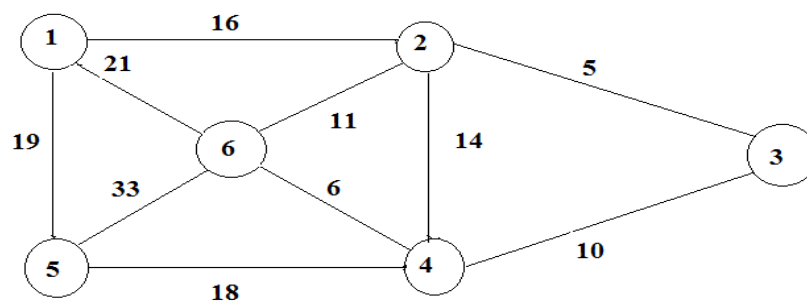


Fig.4

- c. Draw the DAG representation for the following expression. (4)
- $(a+b) * c + ((a+b)+c)$