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020303

January 2023

B.Tech. (RAI) - III SEMESTER

Data Structure (PCC-RAI-303-21)

Time : 3 Hours] [Max. Marks : 75

Instructions :

1. *It is compulsory to answer all the questions (1.5 marks each) of Part-A in short.*
2. *Answer any four questions from Part-B in detail.*
3. *Different sub-parts of a question are to be attempted adjacent to each other.*

PART-A

1. (a) Distinguish between static memory allocation and dynamic memory allocation. (1.5)

   (b) What is recursion? (1.5)

   (c) How a two-dimensional array is represented in memory? (1.5)

   (d) Write a function to delete the last node of a linear linked list. (1.5)

   (e) List the applications of stack. (1.5)

(f) What is a deque? (1.5)

(g) What is a binary search tree? Mention the properties of a binary search trees. (1.5)

(h) What is a sparse matrix? (1.5)

(i) Define sets? (1.5)

(j) What is a pointer? (1.5)

PART-B

2. (a) What is a circular queue. How it is better than the linear queue? Write a program to implement the circular queue. (10)

(b) Write a program to implement a stack using linear linked list. (5)

3. (a) Write a function/program to perform each of the following operation : (9)

(i) Delete a given element from a doubly linked list.

(ii) Add an element at the proper place in an ordered linear linked list.

(iii) Combine two ordered linked list in to a single ordered list.

(b) Write a program to search an element from a given array using binary search. (6)

(a) Define Heap. Describe the heap sort algorithm with suitable example. What is the run time complexity of heap sort? (8)

(b) Write a program/function to sort a given list of N numbers using insertion sort. (7)

5. (a) What is a binary tree? Write an algorithm to create a binary tree. (8)

(b) What is hashing? What is collision? Describe the collision resolving techniques with examples. (7)

6. Define Graph. How it can be represented in memory? Describe different Graph traversal techniques with examples. (15)

7. Write short notes on the following :

(a) AVL Tree.

(b) Threaded binary tree.

(c) B Tree. (5×3=15)