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Question Paper Code: 93802

B.E./B.Tech. DEGREE EXAMINATION, NOV 2022

Third Semester

Information technology

19UIT302 - Data Structures and Algorithms

(Regulations 2019)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 2 = 20 Marks)

1. Consider 10 x 10 two dimensional array marks having its base address as 2000 and the number of words per memory location of the array is 2. Now compute the address of the element, marks [8][5]. Assuming that the elements are row major order. CO3- Ana
2. What is linked list? Illustrate with a diagram. CO1- U
3. Consider the queue given below five Persons Already in Queue which has FRONT = 1 and REAR = 5. CO2- App

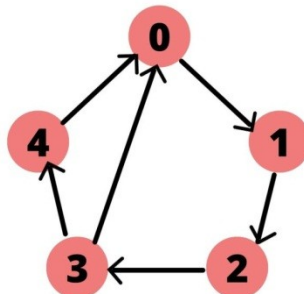


Show the queue after each operation of the following sequence

- i. Enqueue(F) ii. Dequeue iii. Dequeue
 - iv. Enqueue(G) v. Enqueue(H) vi. Dequeue
4. How stacks are used in a non-recursive program? CO3- Ana
 5. Which is the best data structure to implement AVL Tree? Array or Linked List. Justify. CO3- Ana
 6. How AVL is performing better than binary search tree? CO3- Ana
 7. Write some applications of graph. CO1- U
 8. Define in-degree and out-degree of a graph. CO1- U
 9. What are the types of sorting and which sorting technique has the least worst case? CO1- U
 10. Write a recursive function to perform selection sort. CO1- U

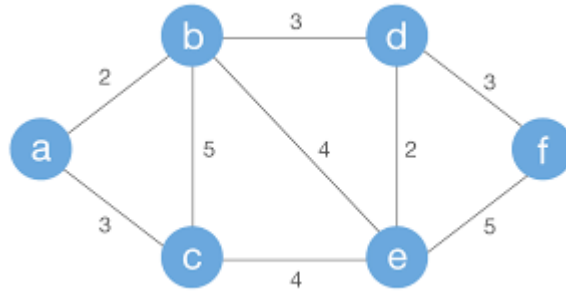
PART – B (5 x 16= 80 Marks)

11. (a) Why doubly linked list more useful than singly linked list? And write a program to input an n digit number. Now break this number into its individual digits and then store each individual digit in a separate node thereby forming a doubly linked list.
Example:
654321 is change to 6, 5, 4, 3, 2, 1
Or
(b) Which linked list method do you prefer for all polynomial operations and why? And write a program to multiply polynomial with a given number using your preferred linked list type. CO2- App (16)
12. (a) Write a program to perform Push and Pop operations on a stack array. CO2- App (16)
Or
(b) A circular queue has a size of 5 and has 3 elements 10,20 and 40 where F=2 andR=4. After inserting 50 and 60, what is the value of F and R. Trying to insert 30 atthis stage what happens? Delete 2 elements from the queue and insert 70, 80 &90. Show the sequence of steps with necessary diagrams with the value of F & R. CO2- App (16)
13. (a) Write an algorithm to create, insert and delete nodes in binary tree. CO2- App (16)
Or
(b) For the given data, draw a binary search tree and show the array and linked representation of the same: 100,85,45,55,110,20,70,65. CO2- App (16)
14. (a) Define graph. For the given graph, show the adjacency matrix and adjacency list representation of the graph. CO2-App (16)



Or

- (b) Explain how Prim's algorithm is used for finding the minimum spanning tree of a graph. Find a minimum cost spanning tree of the following graph using Prim's algorithm CO2-App (16)



15. (a) Is divide and conquer algorithm allows to split the array using one technique and group the sorted array in another technique? If Yes, Write an algorithm to sort and then show the iterations of the sorting process following numbers. 54, 26, 93, 17, 77, 31, 44, 55, 20. CO2-App (16)

Or

- (b) Write an algorithm to implement selection sort with suitable example CO2-App (16)

