

15. (a) Consider a hash table with 9 slots. The hash function is $h(k) = k \text{ mod } 9$. The following keys are inserted in the order 5, 28, 19, 15, 20, 33, 12, 17, 10. Draw the contents of the hash table when the collisions are resolved by
- Chaining
 - Linear probing
 - Double hashing. The second hash function $h_2(x) = 7 - (x \text{ mod } 7)$ (13)
- Or
- (b) (i) Write a function to perform merge sort. Give example (6)
- (ii) Write a routine for Insertion sort. Sort the following sequence using Insertion sort.
3, 10, 4, 2, 8, 6, 5, 1. (7)

PART C — (1 × 15 = 15 marks)

16. (a) (i) Indicate whether you use an Array, Linked List or Hash Table to store data in each of the following cases. Justify your answer. (6)
- A list of employee records needs to be stored in a manner that it is easy to find max or min in the list.
 - A library needs to maintain books by their ISBN number. Only thing important is finding them as soon as possible.
 - A data set needs to be maintained in order to find the median of the set quickly.
- (ii) Define data abstraction. Write the ADT for the data structure in which the same condition can be used appropriately, for checking overflow and underflow. Define all basic functions of this ADT. (9)
- Or
- (b) (i) When do you perform rehashing? Illustrate with example. (8)
- (ii) From the Figure 16. (b), in what order are the vertices visited using DFS and BFS starting from vertex A? Where a choice exists, use alphabetical order. (7)

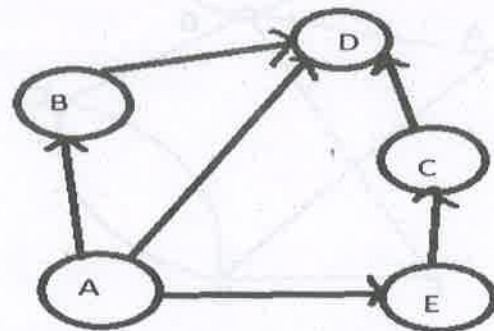


Figure 16. (b)

Reg. No. :



Question Paper Code : 80095

B.E./B.Tech. DEGREE EXAMINATIONS, APRIL/MAY, 2019.

Third Semester

Computer Science and Engineering

CS 8391 — DATA STRUCTURES

(Common to Computer and Communication Engineering/Information Technology)

(Regulation 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

- What are the advantages of Linked List over arrays?
- Illustrate the differences between linear linked list and Circular linked list.
- Convert the following infix expression to postfix expression using Stack
 $a + b * c + (d + e + f) / g$.
- A priority queue is implemented as a Max-Heap. Initially it has 5 elements. The level order traversal of the heap is : 10, 8, 5, 3, 2. Two new elements 11 and 7 are inserted into the heap in that order. Give the level order traversal of the heap after the insertion of elements.
- How to resolve null links in a binary tree?
- The depth of complete binary tree is 8 and compute the number of nodes in leaf.
- What is Bi-connectivity?
- Given a weighted, undirected graph with $|V|$ nodes, Assume all weights are non-negative. If each edge has weight $\leq w$, What can you say about the cost of Minimum spanning tree?
- Brief about Extendible hashing.
- Compare linear search and Binary search.

- (b) (i) Write a routine for AVL tree insertion. Insert the following elements in the empty tree and how do you balance the tree after each element insertion?

Elements : 2, 5, 4, 6, 7, 9, 8, 3, 1, 10. (8)

- (ii) Brief about B+ Tree. And discuss the applications of heap. (5)

14. (a) Apply an appropriate algorithm to find the shortest path from 'A' to every other node of A. For the given graph Fig. 14(a) (13)

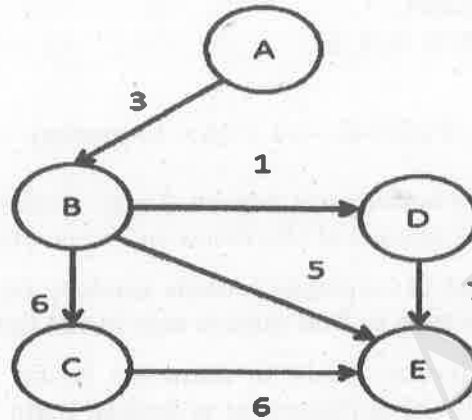


Fig. 14(a)

Or

- (b) (i) Explain in detail about strongly connected components and illustrate with an example. (7)

- (ii) Find an Euler path or an Euler circuit using DFS for the following graph Fig. 14(b). (6)

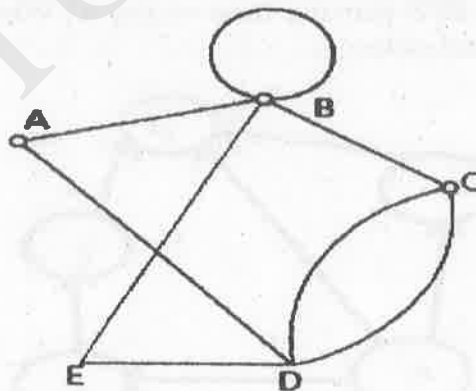


Fig. 14(b)

Reg. No. :

Question Paper Code : 25060

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2018.

Third Semester

Computer Science and Engineering

CS 8391 – DATA STRUCTURES

(Common to Information Technology / Computer and Communication Engineering)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. State the advantage of ADT.
2. What are the disadvantage of linked list over array?
3. What are the application of stacks?
4. What are priority queues? What are the ways to implement priority queue?
5. For the tree in Figure 1.
 - (a) List the siblings for node E.
 - (b) Compute the height.

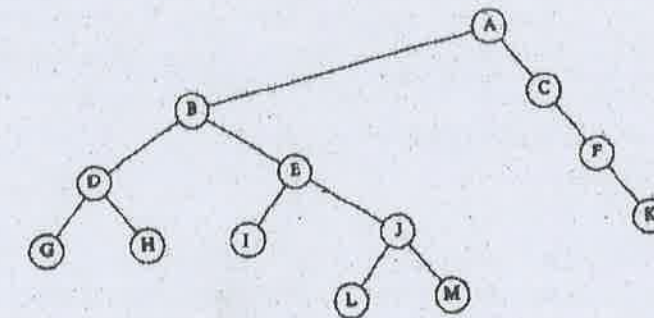


Figure 1

6. Show the result of in order traversal of the binary search tree given in Figure 2.

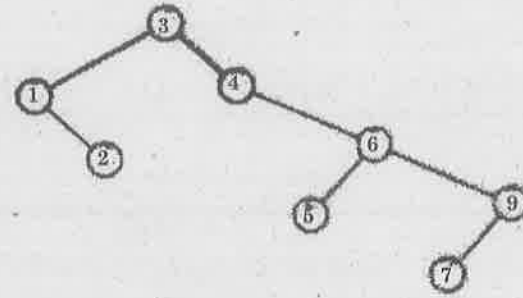


Figure 2

7. What are the representation of the graphs?
 8. Define Euler circuits.
 9. What are the advantage and disadvantage of separate chaining and linear probing?
 10. State the complexity of binary search.

PART B — (5 × 13 = 65 marks)

11. (a) (i) State the polynomial representation for $6x^3 + 9x^2 + 7x + 1$ using linked list. Write procedure to add and multiply two polynomial and explain with suitable example. (7)
 (ii) What are the ways to insert a node in linked list? Write an algorithm for inserting a node before a given node in a linked list. (6)

Or

- (b) (i) What are the various operations on array? Write a procedure to insert an element in the middle of the array. (7)
 (ii) Write a procedure to deleting the last node from a circular linked list. (6)
12. (a) Write the procedure to convert the infix expression to postfix expression and steps involved in evaluating the postfix expression. Convert the expression $A - (B/C + (D \% E * F) / G) * H$ to postfix form. Evaluate the given postfix expression $9\ 3\ 4\ * \ 8\ + \ 4\ / \ -$.

Or

- (b) What are circular queues. Write the procedure to insert an element to circular queue and delete an element from a circular queue using array implementation.

13. (a) Write the following routines to implement the basic binary search tree operations.
 (i) Perform search operation in binary Search Tree.
 (ii) Find_min and Find_max.

Or

- (b) Distinguish between B Tree and B+ tree. Create a B tree of order 5 by inserting the following elements: 3, 14, 7, 1, 8, 5, 11, 17, 13, 6, 23, 12, 20, 26, 4, 16, 18, 24, 25, and 19.

14. (a) Distinguish between breadth first search and depth first search with example.

Or

- (b) State and explain topological sort with suitable example.
15. (a) (i) State and explain the shell sort. State and explain the algorithm for shell sort. Sort the elements using shell sort. (7)
 (ii) Explain Open Addressing in detail. (6)

Or

- (b) (i) Distinguish between linear search and binary search. State and explain the algorithms for both the search with example. (7)
 (ii) Explain Rehashing and extendible hashing. (6)

PART C — (1 × 15 = 15 marks)

16. (a) What are expression Trees. Write the procedure for constructing an expression Tree.

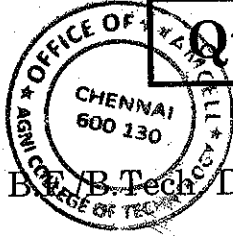
Or

- (b) Given input {4371, 1323, 6173, 4199, 4344, 9679, 1989} and a hash function $h(x) = x \pmod{10}$, show the resulting
 (i) open hash table
 (ii) closed hash table using linear probing
 (iii) closed hash table using quadratic probing
 (iv) closed.



Reg. No. :

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Question Paper Code : 90152

B.Tech DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2019

Third Semester

Computer Science and Engineering

CS8391 – DATA STRUCTURES

(Common to : Computer and Communication Engineering/Information Technology)

(Regulations 2017)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions

PART – A

(10×2=20 Marks)

1. Define Linked List.
2. Define an Abstract Data Type.
3. List the applications of stacks.
4. State the rules to be followed during infix to postfix conversions.
5. What do you mean by level of the tree ?
6. Define a binary search tree.
7. What is meant by strongly connected in a graph ?
8. Define adjacency list.
9. What do you mean by internal and external sorting ?
10. Define radix sort.

PART – B

(5×13=65 Marks)

11. a) Explain the insertion operation linked list. How nodes are inserted after a specified node ?

(OR)

- b) What are the applications of linked list in dynamic storage management ?



12. a) Write an algorithm for Push and Pop operations on Stack using Linked list.
(OR)
b) What is a DeQueue ? Explain its operation with example.
13. a) Explain the tree traversal techniques with an example.
(OR)
b) How to insert and delete an element into a binary search tree and write down the code for the insertion routine with an example.
14. a) Explain depth first and breadth first traversal.
(OR)
b) Explain the various applications of Graphs.
15. a) Write an algorithm to implement selection sort with suitable example.
(OR)
b) Write an algorithm for binary search with suitable example.

PART - C

(1×15=15 Marks)

16. a) There are 'N' numbers of balls in the box. The colours of the balls are red and blue. You are requested to stack the balls in the bottom sealed basket one by one. The order of placing the balls is two consecutive red balls followed by the two consecutive blue balls. Later, Create two empty queues Q1 and Q2. Remove the last inserted ball from the basket and place it in Q1. Similarly remove the next ball from the basket and insert in Q2. Develop a program to repeat this process until the basket is empty and also print the colour of the balls in both queues.
(OR)
b) Implement a priority queue using linked list.
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