

B.Tech II Year II Semester (R15) Supplementary Examinations December 2018

**DATA STRUCTURES**

(Electronics &amp; Communication Engineering)

Time: 3 hours

Max. Marks: 70

**PART – A**

(Compulsory Question)

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1 Answer the following: (10 X 02 = 20 Marks)

- (a) Define asymptotic notations.
- (b) Differentiate between arrays and linked list.
- (c) What is linear data structure? Discuss difference between FIFO and LIFO concepts.
- (d) Minimum how many numbers of queues are needed to implement the priority queue?
- (e) Find the maximum height of any AVL tree with 9 nodes.
- (f) What is threaded binary tree? List its advantages.
- (g) What is the difference between internal sort and external sort?
- (h) List the advantages and disadvantages of merge sort.
- (i) Define hashing.
- (j) What do you mean by double hashing?

**PART – B**

(Answer all five units, 5 X 10 = 50 Marks)

**UNIT – I**

- 2 (a) Explain the pseudo code to insert a new node in the beginning and end of the singly linked list.
- (b) Consider a 2-D array A: [-200:200, -10:100]. Find the address of the element A [199, 50] by considering the base address 10 and assume each element takes 4 bytes for storage. Follow row major order.

**OR**

- 3 Write an algorithm to perform the following operation on a singly linked list:
  - (i) Insert node at the beginning of list.
  - (ii) Insert new node at middle.
  - (iii) Delete a node in the middle and last.
  - (iv) Count the number of nodes.

**UNIT – II**

- 4 (a) Write an algorithm to implement insert operation into a circular queue using linked list representation of a queue.
- (b) Draw the hash table with size 11, resulting from hashing the keys: 12, 44, 13, 88, 23, 94, 11, 39, 20, 16 and 5 using the hash function  $h(i) = (2i + 5) \bmod 11$ .

**OR**

- 5 (a) Write an algorithm to implement PUSH and POP operations on stack.
- (b) Convert the following infix expression into post-fix notation:  
$$A + (B * C - (D/E/F) * G) * H$$

Contd. in page 2

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**UNIT – III**

- 6 (a) What is the difference between heap and binary search tree? Construct the heap and binary search tree for the following data set: 55, 64, 82, 23, 10, 62, 98, 33, 66, 18, 76 and 55.
- (b) Explain Dijkstra's algorithm for finding the shortest path in a given graph.

**OR**

- 7 Construct an AVL tree with the following numbers: 25, 46, 13, 55, 15, 30, 58, 4. And insert 50, 10 and 40, delete 25, 13 and 30 and rebalance the tree if necessary in each case.

**UNIT – IV**

- 8 Write an algorithm for bubble sort and explain it with an example.

**OR**

- 9 Write an algorithm for quick sort and trace the algorithm with the following data set: 77, 12, 8, 39, 27, 21, 44, 18, 6, 427, 117 and 600.

**UNIT – V**

- 10 (a) Discuss sequential search procedure with example.
- (b) What is collision resolution? Discuss various open addressing methods to collision resolution with example and make a comparison among them.

**OR**

- 11 Given input (371, 323, 173, 199, 344, 679, 989) and has function  $h(x) = x \bmod 10$ , show the result using: (i) Separate chaining. (ii) Closed hashing using linear probing, quadratic probing, and double hashing  $h_2(x) = 7 - (x \bmod 7)$ .

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