

12-00-2-03

MASTER OF COMPUTER APPLICATIONS DEGREE EXAMINATION ---
APRIL/MAY, 2018.

SECOND SEMESTER

MCA 202 : DATA STRUCTURES USING JAVA

(Under C.B.C.S. Revised New Regulations w.e.f. 2016-2017)

(Common Paper to University and all Affiliated Colleges)

Time : 3 hours

Max. Marks : 80

PART - A

Answer any FIVE of the following questions. Each question carries 4 marks.

(Marks : $5 \times 4 = 20$)

1. (a) Explain different Asymptotic notations used in analysis of algorithm.
- (b) Define stack? Explain stack operations.
- (c) Explain the different methods of Binary Tree representation with diagram.
- (d) How to represent a set using a tree data structure? Explain with example.
- (e) Write a note on red black trees.
- (f) Define Heap. Explain the insertion of a element into the heap with diagram.
- (g) Write an algorithm for insertion sort.
- (h) Differentiate between internal and external sorting. List different external sorting methods.
- (i) What is an overflow in Hashing explain with diagram?
- (j) Write note on cylinder surface indexing.

PART - B

Answer ONE full question from each Unit. Each question carries 12 marks.

(Marks : $5 \times 12 = 60$)

UNIT - I

2. (a) Define Linked list. Write function in java to implement push and pop operations of stack using linked list.
- (b) Write an algorithm to evaluate the postfix expression. Trace the algorithm for the expression : $2\ 1\ 3\ * + 5 +$.

Or

[P.T.O.]

3. (a) Write a Java program to implement operations of ordinary queue.
(b) Convert the following into prefix and postfix expression
(i) $A + B * C - D$
(ii) $(A + B) * C - (D - E)$

UNIT - II

4. (a) Write an algorithm for inorder, preorder and postorder traversal with an example case study.
(b) Discuss Adjacency matrix and linked representation of Graph.

Or

5. (a) Draw the binary tree for the following input
40, 15, 20, 44, 62, 79
(b) Explain in detail about the graph traversal techniques with suitable example.

UNIT - III

6. (a) Write insertion algorithm for AVL trees.
(b) Discuss splay tree with diagram.

Or

7. (a) Write a program to implement operations on Leftist Heap.
(b) What are the different types of rotation in AVL? Explain any one with diagram.

UNIT - IV

8. (a) Derive the best case, average case and worst case of insertion sort algorithm.
(b) Write a java program to sort the elements using Quick sort.

Or

9. (a) Compare the advantages and disadvantages of Merge sort — Quick sort.
(b) Calculate the Time complexity for poly phase merge sort algorithm.

UNIT - V

10. (a) Write a note on B-Tree indexing.
- (b) What is a Hash Table? Explain Implementation of hash table with quadratic probing.

Or

11. (a) Write an algorithm to search an element using Binary search.
- (b) What is double Hashing? Explain with example.
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