B.E. Fourth Semester (Computer Science & Engineering., Computer Engineering) (CGS)

10311 : Data Structures : 4 KS 01 / 4 KE 01

P. Pages : 2 | AU - 2599

Time : Three Hours | Max. Marks : 80

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Notes :
1. Due credit will be given to neatness and adequate dimensions.
2. Assume suitable data wherever necessary.
3. Illustrate your answer necessary with the help of neat sketches.
4. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) What are various operation associated with word processing? How they implemented using basic string operation? **7**

b) Give the comment on 'Algorithm and Complexity' along with example. **7**

OR

2. a) Consider the pattern P = abc using slow pattern matching algorithm, calculate the number of comparisons to find the index P in the following text T. **8**

i) $(bca)^8$ ii) $(ab)^{10}$

iii) $(abc)^5$ iv) $(ab)^{20}$

b) Explain various string operation. **6**

3. a) Give the representation of a two dimensional array. **6**

b) Consider string S = 'Mumbai' using the bubble sort algorithm, arrange the character in S in alphabetical order. Show all passes. **7**

OR

4. a) Let A be an $n \times n$ square matrix sorted in the form of a two dimensional array. Write an algorithm to find sum of elements above the diagonal. **7**

b) Write an algorithm for primary search and obtain an expression for its complexity. **6**

5. a) Let LIST be a linked list in memory containing integer numbers. Write an algorithm to find. Sum of Even numbers on the list. **7**

b) Write a procedure which removes the first element of the list and add it to the end of list without changing any values in INFO. **6**

OR

6. a) Describe the algorithm for searching a linked list. **6**

b) Write algorithm for deleting a given node from list with example. **7**

7. a) Write an algorithm to PUSH and POP element from stack assuming array representation of a stack. **7**

b) What is priority queue? Explain in brief. **7**

OR

8. a) Write an algorithm for evaluation of postfix expression. **7**

b) Consider the infix expression $(A+B)*C-D/F$. Convert the expression to reverse polish notation. **7**

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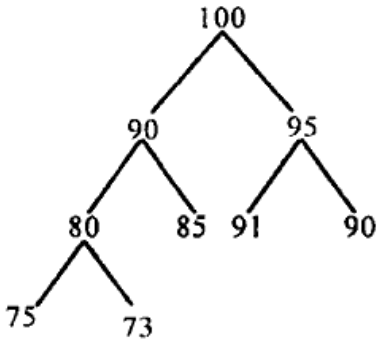
9. a) Draw a binary tree for following expression. 7
$A*B-(C+D)*(P/Q)$.

b) Consider the following Heap. 6



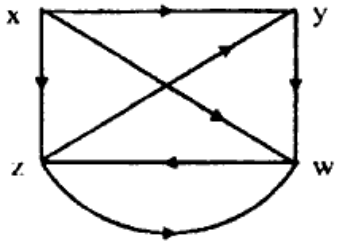
Suppose a new node 100 is to be inserted show all the steps required for insertion.

OR

10. a) Write an algorithm for post order traversal of a binary tree. 6

b) What is one way and two way in order threaded binary tree? Explain with example. 7

11. a) Consider the graph G where nodes are sorted in an array DATA as follows 6
DATA : X, Y, Z, W
the graph is as follows.



i) Find the adjacency matrix A of the Graph G.
ii) Find the path matrix P of G using power of the adjacency matrix A.
iii) Is the Graph strongly connected?

b) Explain with an example the LinkedList representation of a graph. 7

OR

12. a) Write an algorithm for Dept First search of Graph. 6

b) Assuming that an array A contain the following numbers A; 15, 20, 25, 8, 16, 52 Apply selection sort to sort A. 7

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