M.C.A. Second Semester (First Year) (CGS)

15510 : Data Structures & Algorithms

2 MCA 1 / 2 CS 1

P. Pages : 2

Time : Three Hours

AV - 3268

Max. Marks : 80

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.
3. Use of pen Blue/Black ink/refill only for writing the answer book.

1. a) What is pattern matching ? Write and explain Ist (First) pattern matching algorithm to check pattern P in a text T. **8**

b) What is string ? Explain the following string operations with example : **6**
i) Length ii) Substring
iii) Indexing

OR

2. a) What is word processing ? Explain the operations associated with word processing with examples. **7**

b) What is complexity of algorithm ? State and explain various parameters needs to measure the complexity of algorithm. **7**

3. a) State and explain with example the following algorithm **8**
i) Insert an element into array
ii) Delete an element from array.

b) Consider the following numbers are stored in an array A : 32, 51, 27, 85, 66, 23, 13, 57. Apply the bubble sort to arrange the elements in ascending order. Show the inter changes made in each pass separately. **6**

OR

4. a) Write and explain binary search algorithm with example. Give advantages and disadvantages of binary search. **8**

b) What is array ? Explain the representation of two dimensional array in memory. **6**

5. a) Write an algorithm to search a node with given item of information from unsorted linked list and write worst case and average case complexity of algorithm. **7**

b) Write and explain an algorithm to delete a node following a given node from linked list. **6**

OR

6. a) Write and explain an algorithm to insert a node after a given node into linked list. **6**

b) Explain : **7**
i) Header linked list ii) Two way linked list

7. a) What is stack ? Write an algorithm for push and pop operations on stack. 6

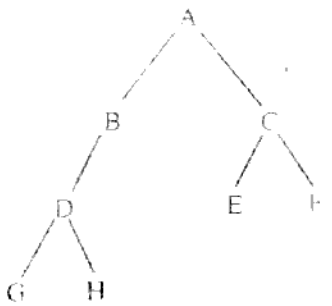
b) What is priority queue ? Explain one way list representation and array representation of a priority queue. 7

OR

8. a) Explain the concept of recursion ? Write recursive algorithm to find factorial of a number. 6

b) Write algorithm for evaluation of a postfix expression consider postfix expression 7
P : 5, 6, 2, +, *, 12, 4 /, –
Evaluate P using algorithm.

9. a) Find out preorder traversal of the following tree with the help of algorithm preorder traversal using stack. Also show the content of stack at each step ? 5



b) Explain the sequential representation of binary tree. 4

c) What is heap ? Explain with example the process of inserting element into heap. 4

OR

10. a) Explain : 6
i) Binary Tree ii) Complete Binary Tree
iii) Extended Binary Trees

b) Write down Huffman's algorithm. Build a Huffman tree for the following 8 data items and their assigned weights. 7

Data item	A	B	C	D	E	F	G	H
Weight	22	5	11	19	2	11	25	5

Also find the Huffman code for the 8 data items.

11. a) What is graph ? Explain linked representation of a graph. 6

b) What is Hashing ? Explain various hashing methods with example. 7

OR

12. a) Write an algorithm for 'Insertion Sort' with example. 6

b) State and explain "Breadth First Search" algorithm in detail. 7

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