MODEL ENGINEERING COLLEGE, ERNAKULAM

Computer Science & Engineering – A batch

Subject : CST 201 Data Structures

ASSIGNMENT QUESTIONS

Roll Nos	Questions
1	Write an algorithm and program that displays all the elements X in a binary search tree such that $k1 \leq x, \leq k2$ where k1 and k2 are two values supplied
2	Write a non recursive algorithm and program to find the preorder traversal of a binary tree.
3	Write an algorithm and program to enter an integer and to reverse the digits of the integer using suitable data structure
4	Write an algorithm and program to swap first and last nodes of a linked list (interchange only pointers)
5	Write an algorithm and program to create a priority queue using linked list. Store element and priority value. Assume square root of entered number as its priority value. Insert and delete the elements.
6	Write an algorithm and a program to remove all occurrences of element x from list L
7	Devise an algorithm for determining whether the two binary trees T1 and T2 are similar or not. Out of these two trees T1 is represented with linked storage representation and T2 is represented with sequential storage representation. Write also the program.
8	Suppose a binary tree is represented in memory(Using linked structure) Write a recursive procedure which finds the number of nodes, number of edges and height of the tree. Write also the program .
9	Write an algorithm and program to delete repeated elements from a singly linked list
10	A binary tree is given with the sequential storage representation. Write an algorithm and program to copy the binary tree into linked storage representation.
11	Suppose the array to be sorted (into alphabetical order) by Heapsort initially contains the following sequence of letters E,X,A,M,P,L,E. Show how they would be arranged in the array after the heap construction phase. Also show how the heap sort is done in this array. Explain in detail with the help of diagram. Write the algorithm & program for heapsort
12	Apply quick sort to sort the list P,O,L,Y,N,O,M,I,A,L in alphabetical order. Explain in detail every step. Write the algorithm & program for quicksort
13	Write an algorithm and program to find the minimum & maximum elements from a non empty binary search tree.
14	Write an algorithm and program to count the Number of nodes with degree 2 Number of nodes with degree 1 Number of nodes with degree 0 Assume that a binary tree is represented with linked storage representation.
15	Write an algorithm and program that checks whether a given binary tree is a binary search tree or not

16	Apply merge sort to sort the list P,O,L,Y,N,O,M,I,A,L in alphabetical order. Explain in detail every step. Write the algorithm & program for merge sort
17	Write an algorithm and a program to insert an element into a linked list in which elements are stored in ascending order
18	Write an algorithm and program to find the predecessor of a given node in a singly linked list.
19	Devise an algorithm for determining whether the two binary trees T1 and T2 are similar or not. Out of these two trees T1 is represented with linked storage representation and T2 is represented with sequential storage representation. Write the program
20	Write an algorithm and program to count the number of nodes in a given circular doubly linked list
21	Write an algorithm and program to find the number of even and odd numbers in a given linked list
22	Create a singly linked list with a set of data. Then for any input K, split the list into three lists LIST1, LIST2 and LIST3 such that the elements in LIST1 is less than the value K, the elements in LIST2 is equal to the value K and the elements in LIST3 is greater than the value K. Write an algorithm and program.
23	Write a non recursive algorithm and program to find the preorder traversal of a binary tree.
24	Write an algorithm and program to print all ancestors of a particular node in a binary tree
25	Write an algorithm and program to concatenate two linear linked lists
26	Write a non-recursive algorithm and program which will return and remove the maximum element from a binary search tree.
27	A binary tree is given with the sequential storage representation. Write an algorithm and program to copy the binary tree into linked storage representation.
28	Given a doubly linked list , write an algorithm and program that removes a node with a particular value from the list and inserts it in the front
29	Write an algorithm and program to print the middle node’s value in a singly linked list.
30	Write a program to find successor of the given element in a linked list
31	Write a non recursive algorithm and program to find the inorder traversal of a binary tree.
32	There are two linear lists L1 and L2. Find L1 ∩ L2 (means the common elements in L1 and L2) into a new list called L3. Write the algorithm and program.
33	Suppose the array to be sorted (into alphabetical order) by Heapsort initially contains the following sequence of letters T,R,A,V,E,R,S,A,L. Show how they would be arranged in the array after the heap construction phase. Also show how the heap sort is done in this array. Explain in detail with the help of diagram. Write the algorithm & program for heapsort
34	Suppose a binary search tree T is in memory. Write an algorithm and program which counts and deletes all the leafs in T
35	Apply quick sort to sort the list S, O, R, T, I, N, G. in alphabetical order. Explain in detail every step. Write the algorithm & program for quicksort

36	Write an algorithm and program to spilt a linked list into two lists, in such a manner that the first linked list contains the odd numbered nodes & second linked list contains the even numbered nodes.
37	A palindrome is some word/line that reads the same forwards or backwards. Given a linked list of words, write an algorithm and program to create a palindrome list from it by concatenating its reverse list to the given list
38	Write a non-recursive algorithm and program which will return and remove the minimum element from a binary search tree.
39	Write a non recursive algorithm and program to find the postorder traversal of a binary tree.
40	Let LIST be a linked list in memory. Write an algorithm and program which i) Finds the number of times a given item occurs in LIST ii)Finds the number of non zero elements in LIST iii) Adds a given value K to each element in LIST
41	Write an algorithm and program that test for balanced bracket pairs. The input strings all consisting of a single line less than 80 characters long will include four types of brackets. { }, [ ], < >, ( ).For an expression to be parenthesized properly each left bracket must be matched with a right bracket of the same type for eg. {A [B <C> <D> (E)]} is correct. { A [B }] is not correct.
42	Suppose the array to be sorted (into alphabetical order) by Heapsort initially contains the following sequence of letters C,O,M,P,L,E,X,I,T,Y. Show how they would be arranged in the array after the heap construction phase. Also show how the heap sort is done in this array. Explain in detail with the help of diagram. Write the algorithm & program for heapsort
43	Write an algorithm and program that reverses all the elements in a queue using stack
44	Write an algorithm and program which interchanges the K^{th} and $K+1^{th}$ elements in the list without interchanging any values, interchange only pointers
45	Given single circular linked list containing a set of data. Obtain the following from this data structure i)Reverse the direction of links For given two elements in the list, find the distance(that is, the number of nodes) between the two. Write an algorithm and program .
46	Write an algorithm and program to create a singly linked list and split it at the middle and make the second half as the first and vice-versa. Display the final list
47	Suppose FIRST and SECOND are sorted singly linked lists with distinct elements. Write an algorithm and program which combines the lists into a single sorted linked list by changing the pointers.
48	Apply quick sort to sort the list T,R,A,V,E,R,S,A,L in alphabetical order. Explain in detail every step. Write the algorithm & program for quicksort
49	Write an algorithm and a program to delete the first node from a singly linked list L
50	Apply merge sort to sort the list T,R,A,V,E,R,S,A,L in alphabetical order. Explain in detail every step. Write the algorithm & program for merge sort
51	Write an algorithm and a program to remove all occurrences of element x from list L

52	Suppose a binary tree is represented in memory(Using linked structure) Write a recursive procedure which finds the number of nodes, number of edges and height of the tree. Write also the program .
53	Write a non recursive algorithm and program to find the postorder traversal of a binary tree.
54	Write an algorithm and program to create a priority queue using linked list. Store element and priority value. Assume square root of entered number as its priority value. Insert and delete the elements.
55	Write an algorithm and program to print all ancestors of a particular node in a binary tree
56	Suppose a binary search tree T is in memory. Write an algorithm and program which counts and deletes all the leafs in T
57	Write an algorithm and program to count the number of nodes in a given circular doubly linked list
58	Write an algorithm and program to find the minimum and maximum value from a binary search tree
59	A binary tree is given with the sequential storage representation. Write an algorithm and program to copy the binary tree into linked storage representation.
60	There are two linear lists L1 and L2. Find L1 $\cup$ L2 (means all elements in L1 and L2) into a new list called L3. Then make L3 as a sorted list. Write the algorithm and program.
61	Write an algorithm and program to find the predecessor of a given node in a singly linked list.
62	Write an algorithm and a program to delete the last node from a doubly linked list L
63	Write an algorithm and a program to sort a singly linked list L
64	Write an algorithm and program to insert a node at a specific position in a doubly linked list
65	Write an algorithm and program to find the minimum and maximum value from the linked list
66	Write an algorithm and program to delete a particular value from a doubly linked list
67	Write an algorithm and program to count the number of nodes a linked list
68	Write an algorithm and program to add a value K to all nodes data in a linked list