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13MCA21

Second Semester MCA Degree Examination, Dec.2015/Jan.2016
Data Structures using C

Time: 3 hrs. Max. Marks:100

Note: ***Answer any FIVE full questions.***

1 a. What is an ADT? Write an ADT for varying length character strings. **(08 Marks)**
b. Mention the two complementary goals of Data structures. **(02 Marks)**
c. Write a C program to concatenate two strings accepted from user and display the length of the resultant string and string as well, without using C library functions. **(10 Marks)**

2 a. Define Stack. Explain motion picture of a stack, with an example. **(06 Marks)**
b. Write an algorithm to check the validity of string consisting of operators, operands and different types of scope delimiters using stack. Show the state of the stack after reading in parts of the string : {x + (y – [a+b])}. **(10 Marks)**
c. Evaluate the given postfix expression : 623 + - 382 / + * 3 & 2 +. **(04 Marks)**

3 a. What is Recursive Definition? Write recursive definition for Fibonacci sequence. Using this, compute fib (6). **(06 Marks)**
b. State Towers of Hanoi problem. Give a recursive solution to move n disks. Simulate the actions of this recursive solution on the No. of disks n = 3. **(10 Marks)**
c. Write a Recursive C module for Binary search. **(04 Marks)**

4 a. What is Linked list? Write C modules for :
i) Inserting a node at end ii) Deleting a node at beginning. **(10 Marks)**
b. Write an Algorithm for insert and remove operations for linked Implementations of queues. **(10 Marks)**

5 a. What is Priority queue? Write a note on list Implementation of priority queue. **(04 Marks)**
b. Explain linked list as a Data structure. **(06 Marks)**
c. Write an Algorithm to insert a new node in the ordered list (smaller items precede larger) containing n nodes. Derive an expression for finding no. of nodes accesses on the average in inserting a new element into an ordered list. **(10 Marks)**

6 a. Write a C program for Bubble sort. **(10 Marks)**
b. Perform Shell Sort on the following : 25 57 48 37 12 92 86 33. **(05 Marks)**
c. Write a C module to traverse the doubly linked list in both directions and display the items during Traversals. **(05 Marks)**

7 a. Write about the following :
i) Interpolation search ii) Indexed Sequential search. **(08 Marks)**
b. What is Binary Search Tree? Write an Algorithm to delete a node from Binary Search Tree. **(12 Marks)**

8 a. Define Binary tree. Write C routines for inorder, postorder and preorder Traversals of Binary Tree. **(08 Marks)**
b. Write about the following : i) Red black Trees ii) AVL Trees. **(10 Marks)**
c. Construct a Binary Search Tree from the Input :
14 15 4 9 7 18 3 5 16 17. **(02 Marks)**