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10CS35

Third Semester B.E. Degree Examination, Dec.2016/Jan.2017
Data Structures with C

Time: 3 hrs. Max. Marks:100

Note: ***Answer FIVE full questions, selecting at least TWO questions from each part.***

PART – A

1 a. Define pointer. With examples, explain pointer declaration, pointer initialization and use of the pointer in allocating a block of memory dynamically. **(06 Marks)**

b. What is recursion? What are the various types of recursion? **(05 Marks)**

c. Explain the following: i) Big - Oh ii) Big - Ω iii) Big - θ. **(09 Marks)**

2 a. Define structure and union with suitable example. **(08 Marks)**

b. Write a C program using structures with following fields NAME, ROLLNO, marks in M_1, M_2, M_3 and find Total and average. Read any N records and print all the records and also print the record who is having second highest total with all the fields. **(12 Marks)**

3 a. Define queue. Write a function for both INSERT( ) and DELETE( ) functions. **(08 Marks)**

b. Write an algorithm to convert infix to postfix expression and apply the same to convert following expressions from infix to postfix:
i) a/b – c + d * e - a * c ii) (a – b) + c/d $n e. **(12 Marks)**

4 a. What is a linked list? Explain the different types of linked list with diagram. **(10 Marks)**

b. Write a C-program to implement the insertion and delete operation on queue using linked list. **(10 Marks)**

PART – B

5 a. Define binary tree. For the given tree find the following:
i) Siblings
ii) Leaf nodes
iii) Ancestors
iv) Depth of a tree
v) Level of trees. **(10 Marks)**

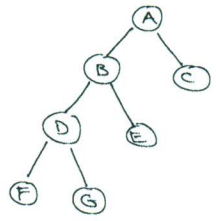

Fig.Q.5(a)

b. Explain the following with suitable example:
i) Strictly binary tree
ii) Complete binary tree
iii) Skewed tree. **(06 Marks)**

c. What is heap? Explain the different types of heaps. **(04 Marks)**

6 a. What is a binary search tree? Draw the binary search tree for the following list 14, 5, 6, 2, 18, 20, 15, 19, -3, 16. **(10 Marks)**

b. What is a forest? Explain the different methods of traversing a tree with following tree. **(10 Marks)**

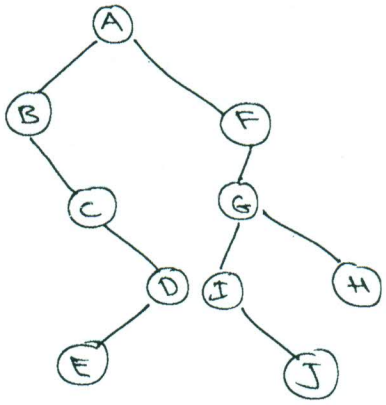

Fig.Q.6(b)

7 a. What is a priority queue? Explain the various types of priority queues. **(08 Marks)**

b. Write a short note on:
   i) Binomial heaps
   ii) Priority heaps
   iii) Fibonacci heaps. **(12 Marks)**

8 a. What is an AVL tree? Write the algorithm to insert an item into AVL tree. **(10 Marks)**

b. Explain the following:
   i) Red-black trees
   ii) Splay trees. **(10 Marks)**

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