Total No. of Questions – [08]

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MAY 2019/ENDSEM REEXAM

S. Y. B. TECH. (COMPUTER) (SEMESTER - II)

COURSE NAME: Data Structures and Files

COURSE CODE: CSUA22173

(PATTERN 2017)

Time: [**2 Hours**] [Max. Marks: **50**]

Instructions to candidates:

1) **Answer Q.1, Q.2, Q.3, Q.4, Q.5 OR Q.6, Q.7 OR Q.8**
2) **Figures to the right indicate full marks.**
3) **Use of scientific calculator is allowed**
4) **Use suitable data whereever required**

Q.1) a) i) If the Pre-order traversal sequence of a Binary search tree is as given below, draw the tree. [6]
Level 0: Node data: 50 , Level 1 Node data: 25, Level 2: Node data: 10, Level 1: Node data: 75, Level 2: Node data: 60, Level 2: Node data: 90, Level 3: Node data: 80

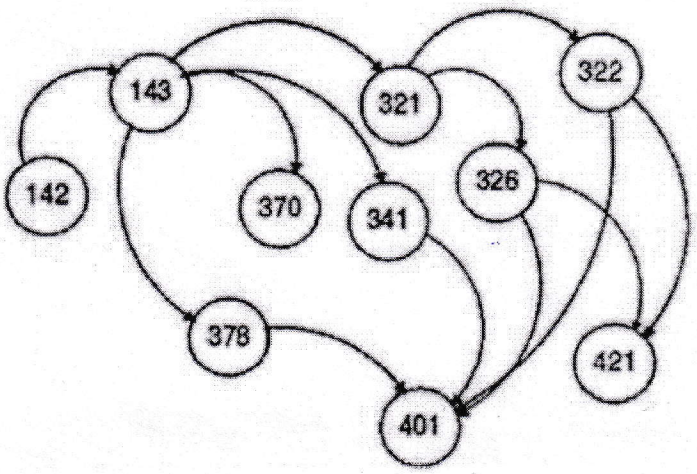
ii) If every node in a binary tree has either 0 or 2 children, then the height of the tree is NOT necessarily $\Theta(\lg n)$. Explain with example.

OR

b) i) If, in a Binary Search Tree without duplicate keys, deletion of a node requires choosing a replacement node from the left subtree. Which node do we select from left subtree? If deletion of a node requires choosing a replacement node from the right subtree, which node do we select from right subtree? [6]

ii) How much minimum number of nodes are there in a binary tree of height 3?

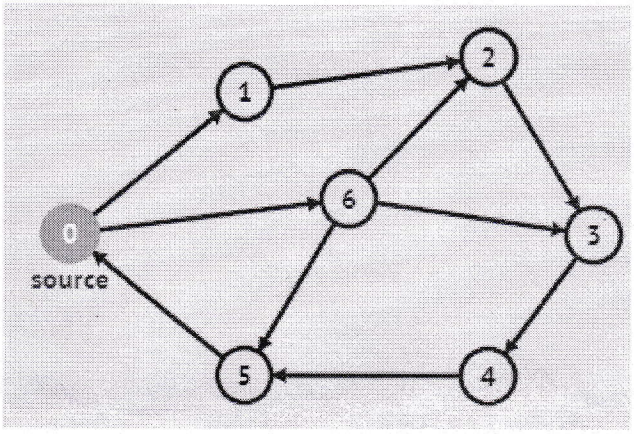
Q.2) a) Consider following graph, each node contains subject code number: [6]



To complete a course, students need to take all the course subjects. Students need to take into consideration which courses are prerequisites for other courses when making a schedule for the upcoming semester so that 370 cannot be taken before 143, but the former can be taken along with 341 and 370. Help the students by giving the order of subjects they need to take to complete the course [Hint: Use topological sort]

OR

b) For the graph given below, find BFS and DFS order. Illustrate stepwise [6]



Q.3) a) How many element comparisons would heap sort use to sort the integers 1 to 8 if they were (i) initially in sorted order, and (ii) initially in reverse sorted order? Explain how you obtained your answers. [6]

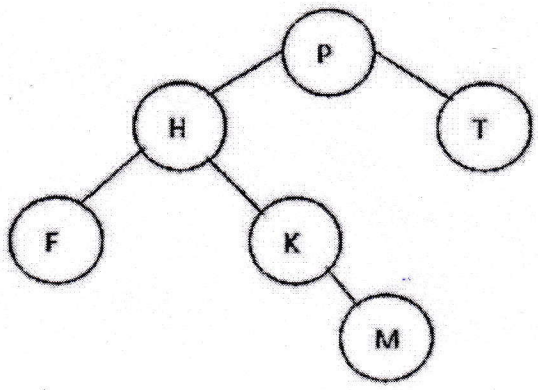
OR

b) What the time complexity is of Heapify, Build Heap and Heap sort algorithms? What is the height of a heap with n nodes? [6]

Q.4) a) What is symbol table? What are the operations on symbol table. Give symbol table ADT [4]

OR

b) Convert the following binary tree in AVL tree [4]



Q.5) a) Compare Sequential, Index sequential and Relative files [6]

b) Explain various file opening modes with respect to text and binary files [4]

c) Some N student records are stored in a sequentially organized file. Write C++ code to find the value of N without reading the records sequentially from the file. [4]

OR

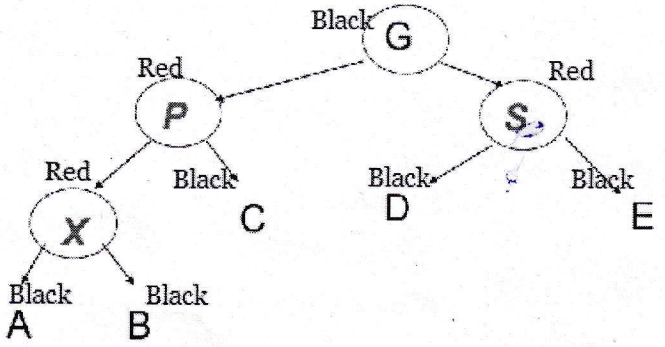
Q.6) a) Write pseudo code for all primitive operation on index sequential file [6]

b) With the prototype and example, explain following functions: [4]
i) seekp() ii)tellg()

c) Write note on Multi-indexed files [4]

Q.7) a) What is a B Tree? Create a B-Tree of order 5 by insertion of the following sequence of data : 50,85,12,10,6,60,70,80, 37,100,120, 65, 150, 62, 30, 17,15, 28, 75, 78. Draw all the necessary diagrams. [6]

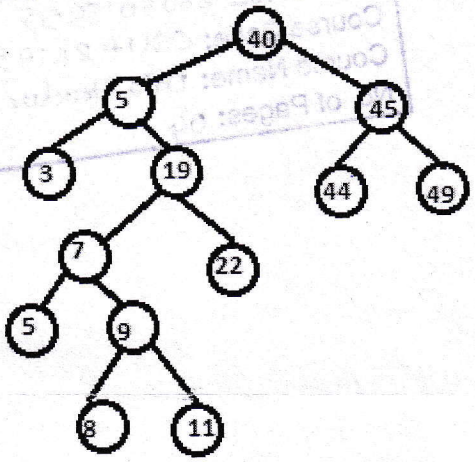
b) Give a brief comparison between Red Black and Splay trees. Identify and solve the problem in the red Black tree below. [4]



c) Name and define any two variants of B trees. [4]

OR

Q.8) a) Explain with diagram the splaying to root of node with value 11 in the Splay tree shown below. [6]



b) Explain the differences between B and B+ trees. [4]

c) What are the rotations used in Red Black tree? Show how they are performed with appropriate examples. [4]