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Question Paper Code : 65068

5 Year M.Sc. DEGREE EXAMINATION, MAY/JUNE 2013.

Third Semester

Software Engineering

XCS 233/10677 SW 303 — DATA STRUCTURES

(Common to : 5 Year M.Sc. — Computer Technology and 5 Year M.Sc. Information Technology)

(Regulation 2003/2010)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. What is data structure?

2. How do you push and pop elements in a linked stack?

3. If you are using C language to implement the heterogeneous linked list, what pointer type will you use?

4. Differentiate singly linked list and circularly linked list.

5. Define single rotation on AVl tree.

6. What is the difference between binary tree and binary search tree?

7. Define a graph. How it differs from tree?

8. What is minimum spanning tree? Name any two algorithms used to find MST.

9. What is meant by garbage collection?

10. Define the term external fragmentation.

PART B — (5 × 16 = 80 marks)

11. (a) (i)   Implement typical stack operation when stacks are represented using arrays. (8)

         (ii) Explain with an example the concept of recursion using stack. (8)

Or

     (b) Describe how conditional and unconditional statements might be implemented in reverse polish frame work. (16)

12. (a) Assume we have a priority queue split into several queues. To access these queues we have vectors of pointers to the front and rear of each queue and one to indicate the length of each. Thus to access the front of the queue representing priority 2, one merely starts at PRIORITY_F[2]. This representation allows each queue to be of different length. Given this representation, devise algorithms to insert and delete from a priority queue. (16)

Or

     (b) (i)   Give an algorithm to reverse the elements of a single linked lists without using a temporary list. (6)

         (ii) Write algorithms to insert into and delete elements from a doubly linked list. (6)

         (iii) Write an algorithm to count the number of nodes in a given singly linked list. (4)

13. (a) (i)   Construct the binary tree given the following traversals.

                Pre-order : A B D G H C E I F In-order : G D H B A E I C F23. What is structure? How is it different from an array? (8)

         (ii) Write an algorithm to delete a node from a binary search tree. (8)

Or

     (b) (i)   Show that the result of inserting 2, 1, 4, 5, 9, 3, 6, 7 into an empty AVL tree. (8)

         (ii) Explain about the DFS spanning tree. (8)

14. (a) (i)   Write C function for minimum spanning tree of a weighted undirected graph. (10)

         (ii) Write a C program to implement depth first traversal of graph. (6)

Or

(b) Explain Dijkstra's algorithm in the given graph. Find the shortest path between V_1 to V_2, V_4, V_6, V_7. (16)
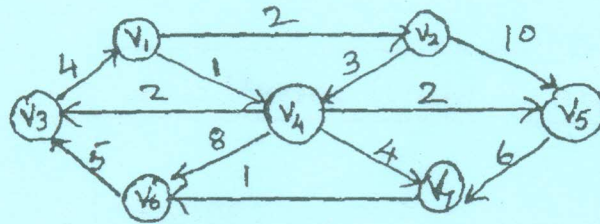
15. (a) (i) Give in detail the structure of a typical indexed sequential file. (8)

(ii) Describe the direct file organization and give the procedure to retrieve a record from a direct file given the key. (8)

Or

(b) Write notes on :

(i) Garbage compaction (6)

(ii) VASM files (5)

(iii) Virtual hashing. (5)

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