University of Sargodha

BS 3rd Term Examination 2018

Subject: Computer Science **Paper: Data Structure Algorithms (CMP: 3113)**

Time Allowed: 2:30 Hours **Maximum Marks: 80**

Note: **Objective part is compulsory. Attempt any three questions from subjective part.**

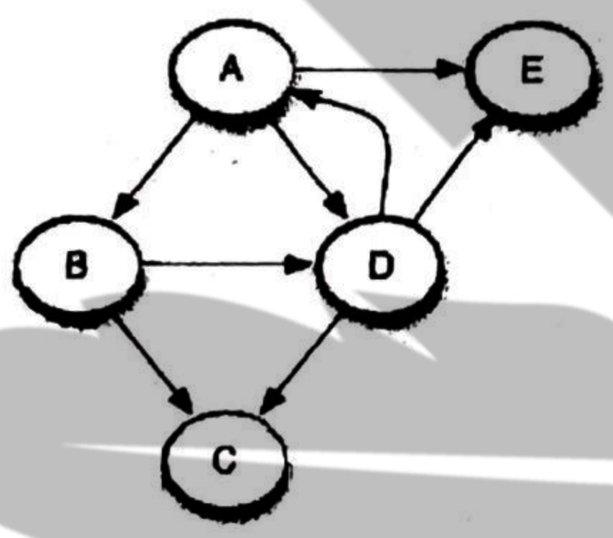
Objective Part (Compulsory)

Q.1. Write short answers of the following in 2-3 lines each. (2*16)

I. What is Big Oh notation?
II. What is the minimum number of queues needed when implementing a priority queue?
III. What is a dequeue?
IV. What are dynamic data structures?
V. Why to use PREFIX and POSTFIX notations when we have simple INFIX notation?
VI. What is an AVL tree?
VII. There are 8, 15, 13, and 14 nodes in 4 different trees. Which one of them can form a full binary tree? Why?
VIII. How do you insert a new item in a binary search tree?
IX. Differentiate linear from non linear data structure.
X. Differentiate file structure from storage structure.
XI. Are linked lists considered linear or non-linear data structures? give reason?
XII. Which data structures is applied when dealing with a recursive function?
XIII. What is an ordered list?
XIV. What is Data abstraction?
XV. In what areas do data structures applied?
XVI. What is the minimum number of nodes that a binary tree can have?

Subjective Part

Q.2 Traversal the following graph using DFS and BFS algorithms.



Q.3 (a) Write the pseudocode of Insertion sort. (8+8)

(b) Write the pseudocode of Selection sort. (8)

(8)

Q.4 Suppose that we implement a hash table using a character array of size 13 (indexed 0 to 12) to store the keys/characters themselves. Show the contents of the map/array when the keys "***S I L V E R M E D A L***"are inserted in that order into an empty hash table with linear probing to resolve conflicts. (Note: S = 19th letter of alphabet, I = 9th and so on) (16)

Q.5 (a))Suppose the numbers 7, 5, 1, 8, 3, 6, 0, 9, 4, 2 are inserted in that order into an initially empty binary search tree. The binary search tree uses the usual ordering on natural numbers. What is the in-order traversal sequence of the resultant tree? 0123456789 (8)

(b) The inorder and preorder traversal of a binary tree are *d b e a f c g* and *a b d e c f g*, respectively. What is the postorder traversal of the binary tree? debfgca