Assignment questions

First Semester M.Sc Computer Science

School of Distance education

University of Kerala

## DCS 11- Computer Architecture

1. Explain the basic structure of digital computer with a neat diagram?
2. Compare CISC and RISC?
3. Explain serial Communication?
4. Explain advanced architectures-Multicore processing, multiprocessor systems

DCS12 Data Structure and Algorithms

1. List the nodes of the below tree in preorder, post order and inorder
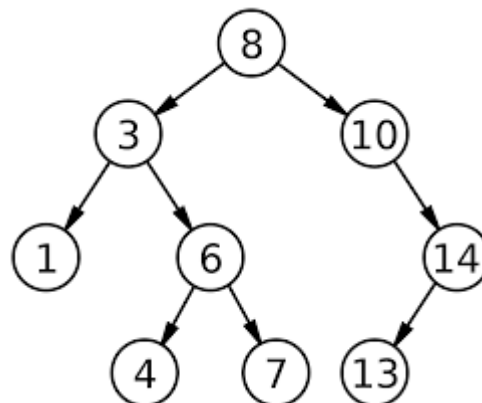
2. In the above binary search tree, carry out the following operations in sequence: Add 5, add 17, delete 10, and delete 8.
3. With example write short notes on B-Tree and B+ Trees
4.
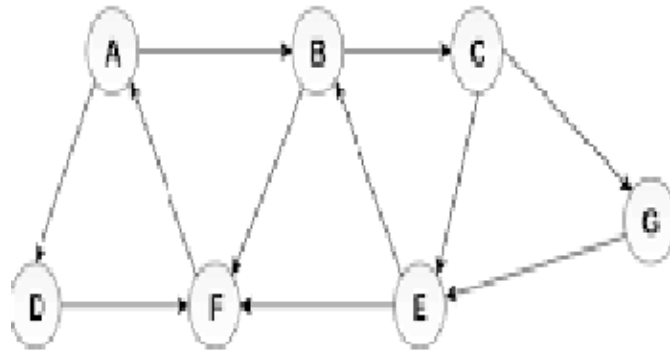
a. Represent the above graph in adjacency list and adjacency matrix representation
b. Perform DFS and BFS traversals on the above graph

5. Consider the following graph; perform minimum cost spanning tree algorithms on it.
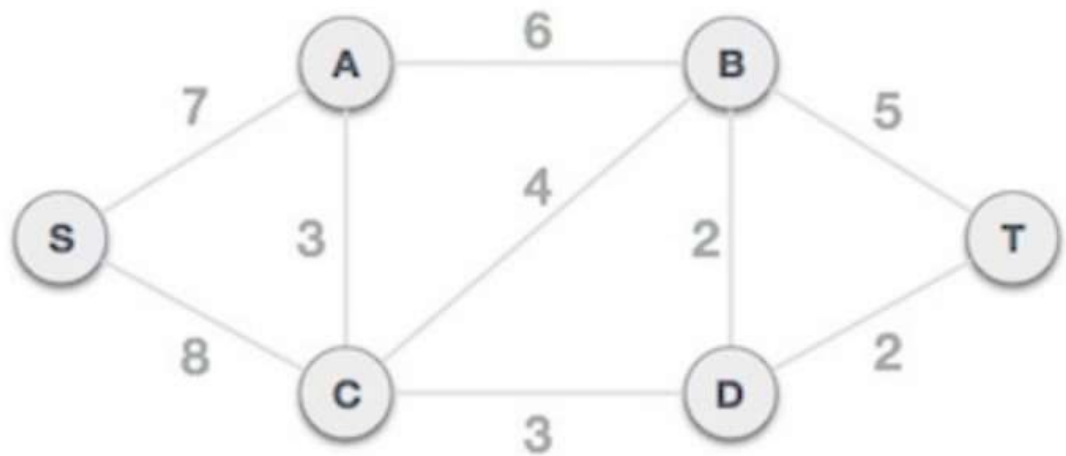
6. Apply Quick Sort Algorithm with the following example. Explain step by step procedure

45, 41, 56, 2, 87, 52, 12, 44, 21

7. Explain randomized version of quick sort
8. Write short notes on NP hard and NP Complete problems.
9. Write an example for matrix chain multiplication using dynamic programming.

DCS13 Mathematical Foundations of Computer Science

1. Let U={1,2,3,4,5,6,7,8,9}, A={1,2,4,6,8}, B={2,4,5,9} ,C={x|x is appositive integer and $x^2<16$} and D={7,8}. Compute:
   a) AUB b)AUC c)AUD d) BUC e) A∩C f)A∩D g)B∩C
   h)C∩D f)A-B g)B-A h) C-D i)C$^{'}$ j)A$^{'}$ k)A⊕ B l)C⊕ D
   m) B⊕ C n)AUBUC o)A∩B∩C p) A∩(BUC)   q)(AUB)∩D
   r)(AUB) s)A AUB ∩B

2. Let A={1,2,3,4,5} and R be the relation defined by aRb if and only if a<b
   Compute R3 and R3.
   Complete the following statement : aR2b if and only if
   _____
   Complete the following statement: aR3b if and only if
   _____

3. Show that the symmetric difference Δ defined by A Δ B =(AU B) – (A∩ B) is commutative and associative and has an identity element. Show that the inverse of A is A itself. Show that the operation of intersection, but not that of union, distributes over Δ.

4. Show that the operations of meet and join on a lattice are commutative, associative and idempotent.

5. Find the zeros of the semi group $\langle P(x), n \rangle$ and $\langle P(x), u \rangle$ where X is any given set and P(X) is its power set. Are these Monoids? If so what are the identities?

6. Let G be graph with exactly one spanning tree. Prove that G is a tree.

7. Prove that every tree with maximum degree $\Delta > 1$, has at least Δ vertices of degree 14.

8. Consider the figure
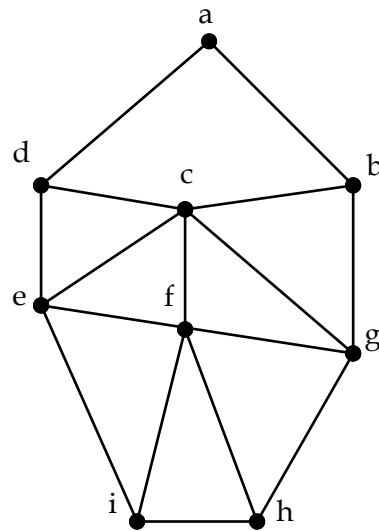
(i) Obtain DFS spanning tree

(ii) Obtain BFS spanning tree

(iii) Construct DFS spanning tree using stack

DCS 14-Programming Paradigms

1. Explain
   a) Characteristics of programming languages
   b) Looping
   c) Lifetime of variables
   d) Recursion
2. Comparative study of C++ and JAVA and iostreams and files.
3. Explain
   a) Asynchronous programming with event based languages
   b) Dynamic languages
   c) Content Management Systems
4. Comparison of Programming Languages

DCS 15- Computer Networks

1. Explain interconnecting devices-Repeater, Hub, Switch, Bridge, Router, Gateway
2. Explain telecommunication systems: GSM, DECT, TETRA, UMTS and IMT 2000
3. Expalin satellite systems and Broadcast systems
4. Explain wireless LAN: IEEE 802.11, Hiper LAN, Bluetooth
5. Give overview of wireless sensor networks, VPN, IOT and LiFi