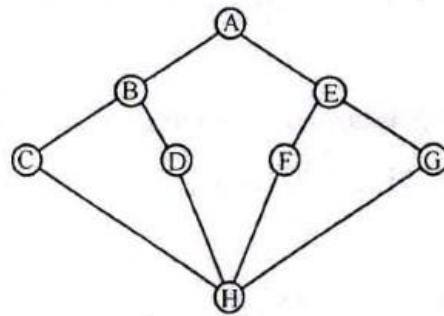


- c) Differentiate between DFS and BFS. Give DFS spanning tree of the given graph.



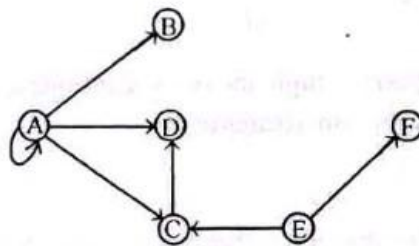
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- d) Define graph. Explain three commonly used graph representation methods with example.

OR

For the graph given below, find it's

- Adjacency matrix
- Path matrix
- Path matrix using Marshall's algorithms.



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CS/IT - 305**B.E. III Semester**

Examination, December 2014

Data Structures**Time : Three Hours****Maximum Marks : 7**

- Note:** i) Answer five questions. In each question part A, B, C i compulsory and D part has internal choice.
 ii) All parts of each questions are to be attempted at one place
 iii) All questions carry equal marks, out of which part A and I (Max.50 words) carry 2 marks, part C (Max.100 words) carry 3 marks, part D (Max.400 words) carry 7 marks.
 iv) Except numericals, Derivation, Design and Drawing etc

- Describe the difference between an abstract data type specification and implementation.
 - Give the solution for the following recurrences.

$$T(n) = 2T\left(\frac{n}{2}\right) + n \log n$$

- Enlist different operation which are normally performed on any linear array.

Write an algorithm for Insertion operation.

- Write in brief about following:

- Garbage collection
- Back tracking.

OR

What do you mean by direct and indirect recursion. Write a recursive C function for tower of Hanoi problem.

2. a) Convert the following infix expression to prefix expression and give various steps in evaluation using stacks

$$(5 * 3 \uparrow 2) / (3 + (7 + 3) / 10)$$

- b) Show how the following polynomial can be represented using linked list:

$$7x^2y - 4x^2y + 5xy^2 - 2$$

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- c) Write a program in C/C++ to create a linked list of ten element and to traverse the list.
d) Write an algorithm for insertion and deletion operation on circular queue.

OR

Write short note on doubly circular linked list.

Write a C program to insert a node into a doubly linked list at n^{th} position where 'ln' is asked from the user.

3. a) Define tree. Prove that a binary tree with n nodes has exactly $(n - 1)$ edge or branches.
b) What are the application of tree? Construct a binary tree for following expression.

$$(a + b * c) + ((d * c + f) * g)$$

- c) What are the properties of multiway search tree? Create a 5 way search tree of the following data.
50, 72, 96, 94, 107, 26, 12, 11, 92, 10, 25, 51, 16, 17, 95.

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- d) What is B^+ tree? Compare it with B tree? Insert following entries in to an initially empty B-tree order s.

a, g, f, b, k, c, h, n, j, d, r, i, s, x, e, l, m, t, u, v

OR

Following nodes are inserted into empty tree in order
5, 16, 22, 45, 2, 10, 18, 30, 50, 12, 1

Construct

- i) Binary search tree
ii) AVL tree

4. a) Write short note on searching?
b) What is quick sort? Why is it called partition exchange sort?
c) Write an algorithm for selection sort what is complexity of this algorithm.
d) What do you mean by hashing? What is hash function? Explain with example?

OR

What are the advantage and disadvantages of the various collision resolution strategies?

5. a) Differentiate between a tree and graph. Is it possible to connect a graph in to tree?
b) Prove that the maximum number of edges possible in a single graph of a n node is $n(n-1)/2$.