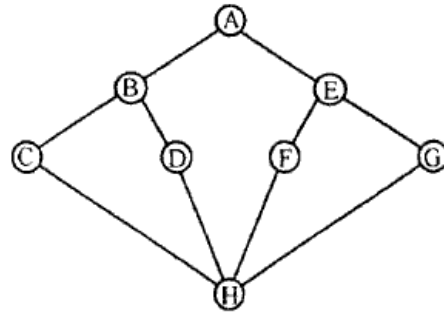


- c) Differentiate between DFS and BFS. Give DFS spanning tree of the given graph.

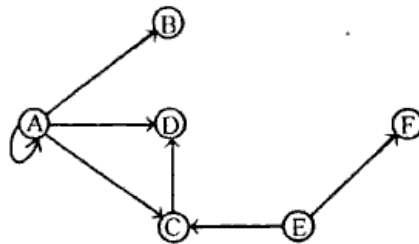


- d) Define graph. Explain three commonly used graph representation methods with example.

OR

For the graph given below, find it's

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



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Roll No

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:

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

- 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.

- 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

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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 $n(n-1)/2$.