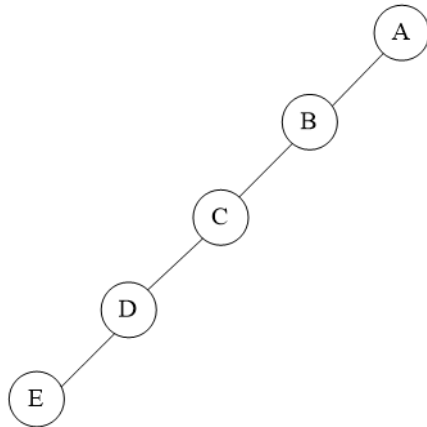


Assignment 3

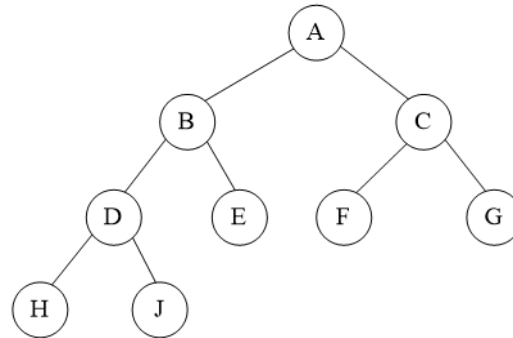
Due date: 18 December 2024

TA: 薛凱駿, 楊承霖, 吳奇軒 (ECG 706)

1. (20%) Write out the inorder, preorder, postorder, and level-order travels for the binary trees (a) and (b).



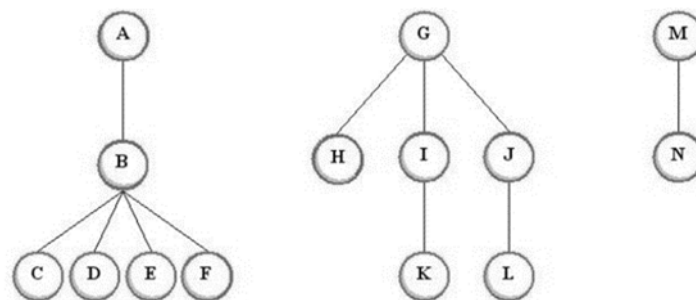
(a)



(b)

2. (20%) Transforming the forest into a binary tree using the rule:

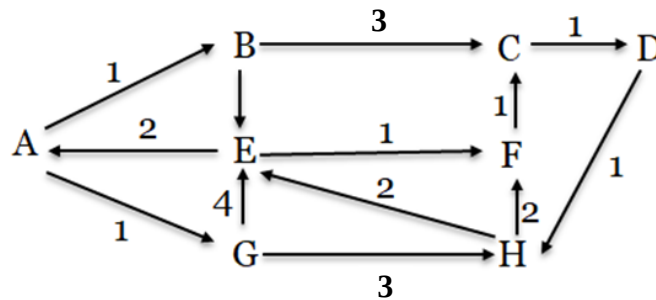
- If T_1, \dots, T_n is a forest of trees, then the binary tree corresponding to this forest, denoted by $B(T_1, \dots, T_n)$
- Root equal to $\text{root}(T_1)$
- Left subtree equal to $B(T_{11}, T_{12}, \dots, T_{1m})$, where $T_{11}, T_{12}, \dots, T_{1m}$ are subtrees of $\text{root}(T_1)$; and has right subtrees $B(T_2, \dots, B_{T_n})$.



3. (20%) Compute the generating function for the number of ways of computing multiplications of n square matrices of the same shape.

Note: You should only give the closed form of the function (e.g., $f(x) = 1/(x - 1)$).

4. (20%) A weighted directed graph G is given as follows. Filling in the given table using Dijkstra's algorithm to find shortest path from A to all nodes. If more than 1 vertices have the same minimum distance, choose the vertex with alphabet priority.



Iteration	Vertex Selected	Distance							
		A	B	C	D	E	F	G	H
Initial									
1									
2									
3									
4									
5									
6									
7									

5. (20%) Answer the questions with respect to the following graph.
- Show the result by the Kruskal's algorithm.
 - Starting from node A , show the result by the Prim's algorithm.
 - Starting from node D , give the sequence by depth-first-search. If you have multiple choices, just follow the alphabetical order.
 - Starting from node E , give the sequence by bread-first-search. If you have multiple choices, just follow the alphabetical order.

