Data Structures (2025 Fall)
## Assignment 04[*]
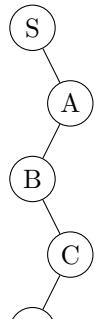
Chuang-Chieh Lin
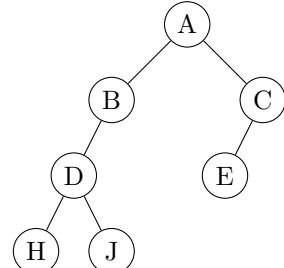
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Due date: 27 December 2025

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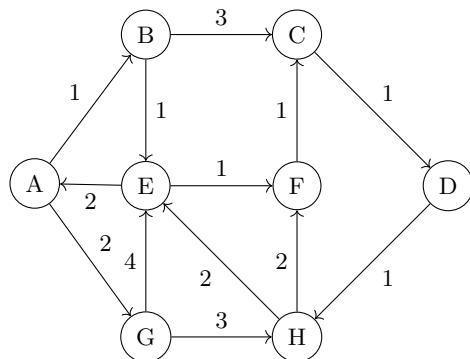
(a)   (b)

2. (25%) 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.
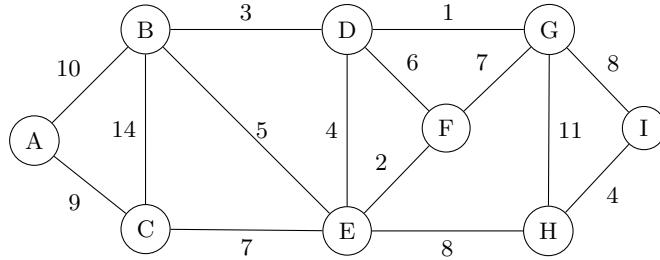
3. (20%) A weighted directed graph G is given as follows. Filling in the given table using Dijkstra's algorithm to find shortest path from A to all nodes. If more than 1 vertices have the same minimum distance, choose the vertex with alphabet priority.

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

4. (20%) Answer the questions with respect to the following graph.

   (a) Show the result by the Kruskal's algorithm.
   (b) Starting from node A, show the result by the Prim's algorithm.
   (c) Starting from node D, give the sequence by depth-first-search. If you have multiple choices, just follow the alphabetical order.
   (d) Starting from node E, give the sequence by bread-first-search. If you have multiple choices, just follow the alphabetical order.

5. (20%) Perform BFS on the following graph, starting from vertex a, and compute the distances to every vertex in the graph.