

Data Structures (2025 Fall)

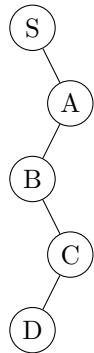
Assignment 04*

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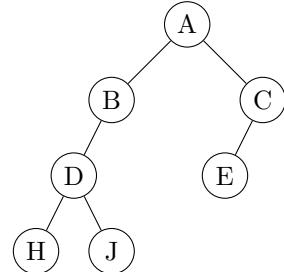
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Due date: 27 December 2025

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



(a)

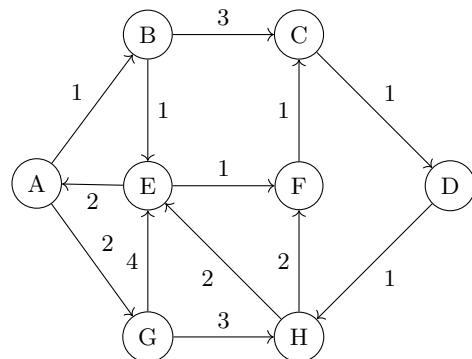


(b)

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.

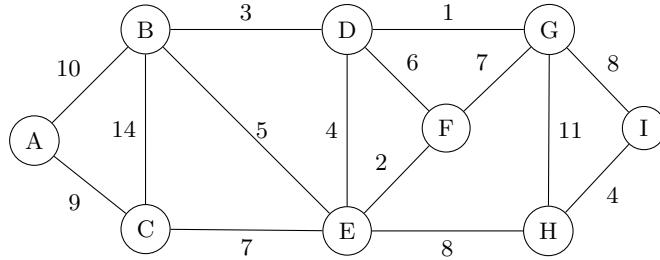
3. (20%) A weighted directed graph G is given as follows. Filling in the given table using Dijkstra's algorithm to find shortest path from A to all nodes. If more than 1 vertices have the same minimum distance, choose the vertex with alphabet priority.



* List the required intermediate steps next to each problem. Note that any answers generated directly by AI are invalid for this assignment.

Iteration	Vertex Selected	Distance							
		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.
- 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 breadth-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.

