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Intro To Algorithms

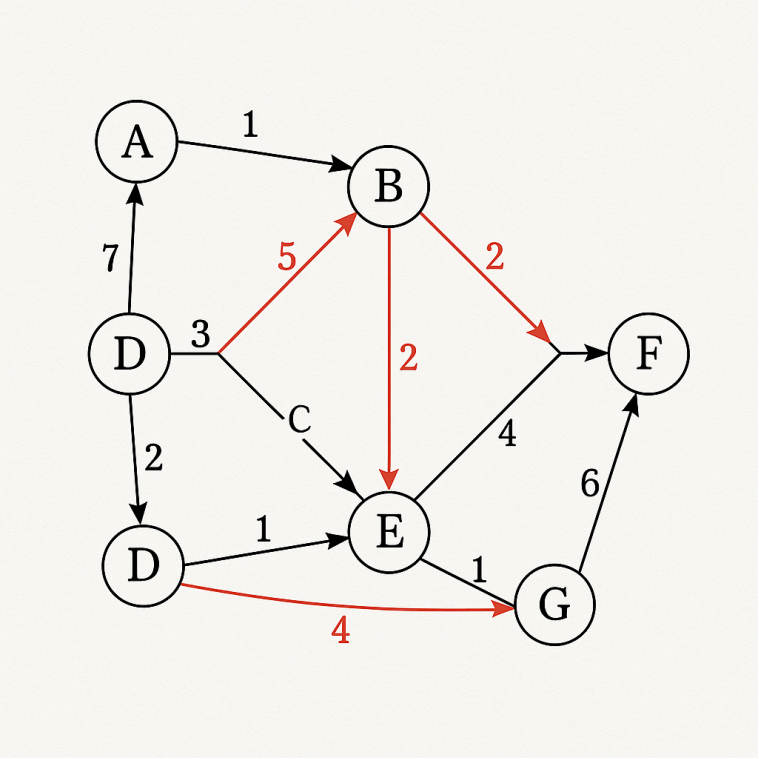
Apr 23, 2025

Assignment 7

1)

Vertex	Distance	E	Intermediate	F
E	0	A → D		1
A	2	A → 4		1
B	4	B		1
C	1	C		1
D	1	D → 1		F
F	1	F → A		F
G	3	G → B		G
H	7	H → 7		H

2)



3) A* was the shortest path to H in fewer iterations than Dijkstra because it uses a heuristic to guide the search, allowing it to prioritize more promising paths. Dijkstra explores uniformly, while A* is more focused.

7) Problem 4:

- **Time**: O(n^2), since we need to scan all elements in the adjacency matrix.
- **Space**: O(1) if input is pre-loaded; otherwise, O(n^2) if matrix is stored.

Problem 5:

- **Time**: Potentially exponential in the number of nodes, due to recursive backtracking for simple paths.
- **Space**: O(p), where p is the number of paths stored in memory (can be large).

Problem 6:

- **Time**: O(n), where n is the number of vertices, as we iterate over the input array once.

- **Space**: O(n^2) for storing the adjacency matrix and potentially more for the image data (if rendered graphically).