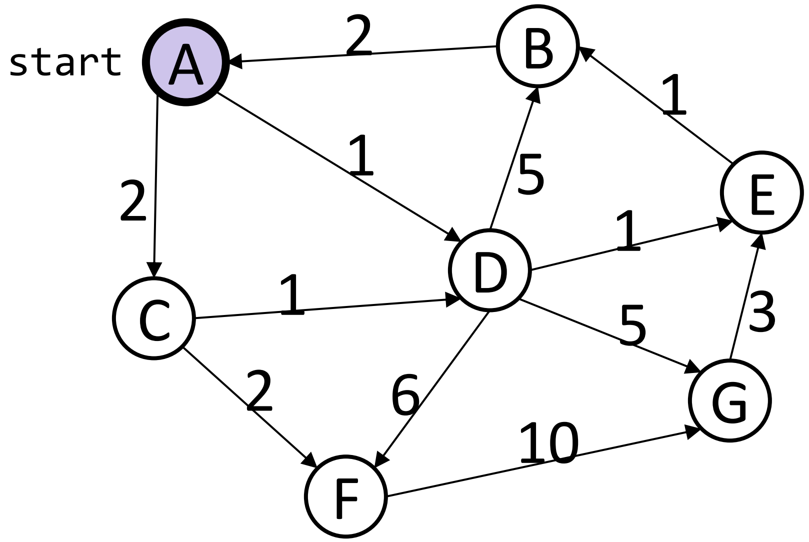
Shortest Paths Algorithms Exercises

Lecture 5.1, Spring 2026

BFS
Dijkstra's Algorithm
Bellman-Ford Algorithm

Q. Dijkstra's Algorithm

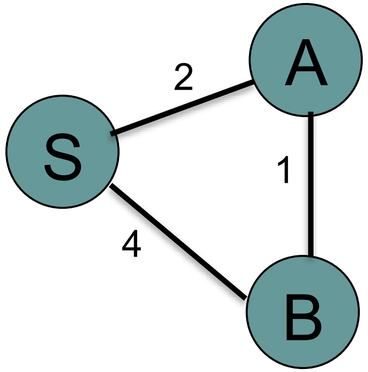
Exam question: Given this directed graph, run Dijkstra's Algo to find shortest paths starting from source node A. Give the node visit order, and fill in this table of SN (Shortest Distance) and PN (Previous Node), crossing out old SD and PN as you find a shortcut path with smaller SD



Visit Order

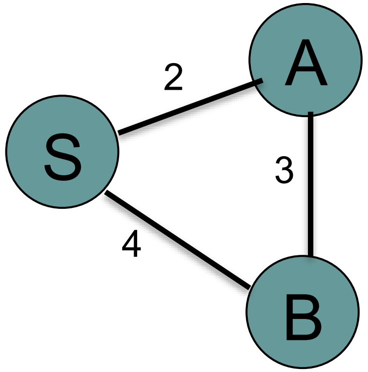
Node	SD	PN
A		
B		
C		
D		
E		
F		
G		

Q. Dijkstra's Algorithm (Source Node S)



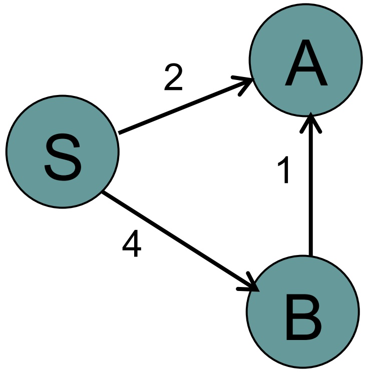
ANS

Node	SD	PN
S	0	/
A		
B		



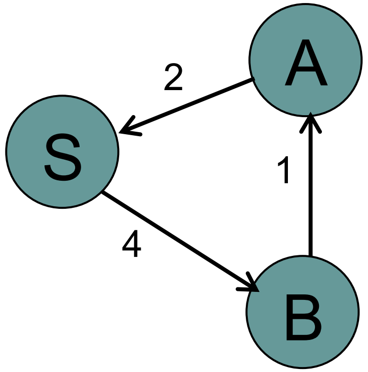
ANS

Node	SD	PN
S	0	/
A		
B		



ANS

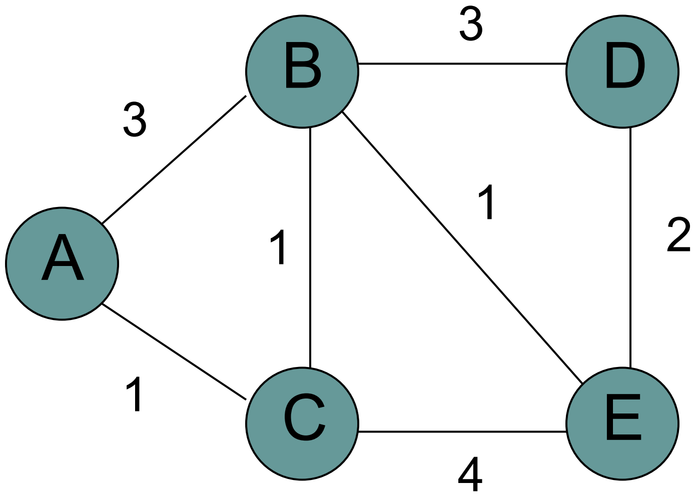
Node	SD	PN
S	0	/
A		
B		



ANS

Node	SD	PN
S	0	/
A		
B		

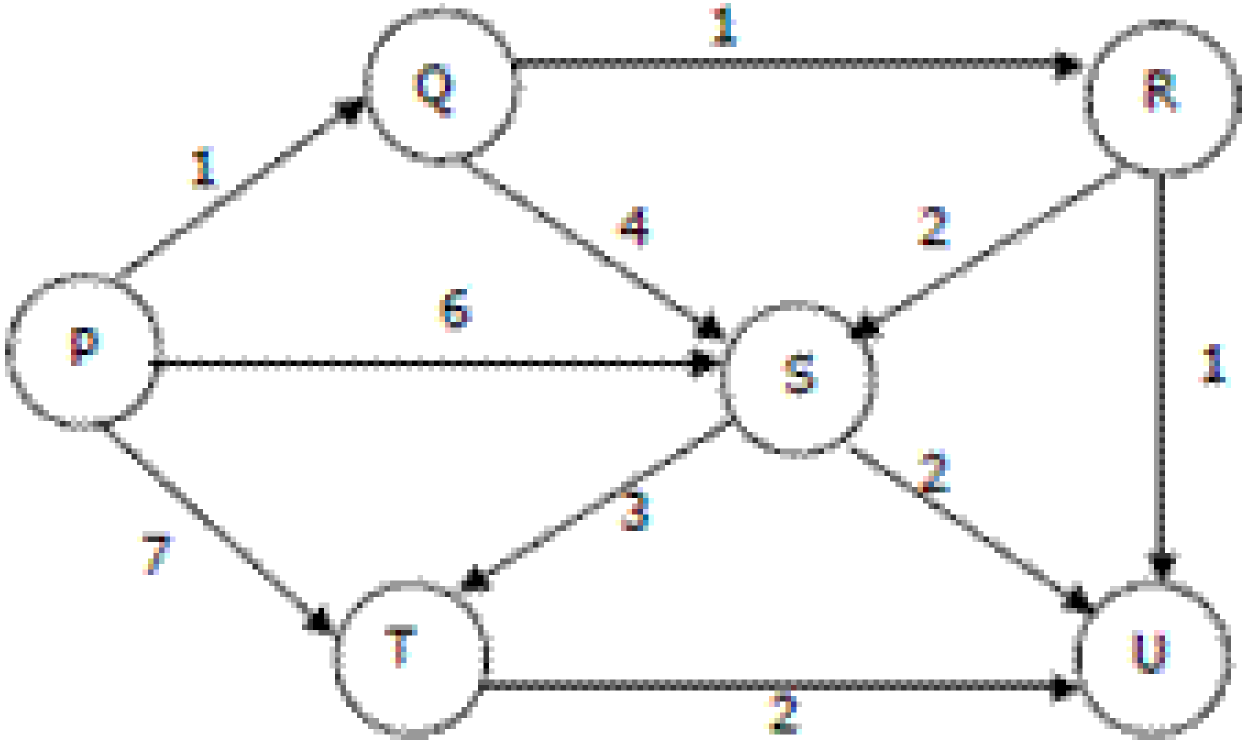
Q. Dijkstra's Algorithm (Source Node A, Undirected Graph)



Visit Order

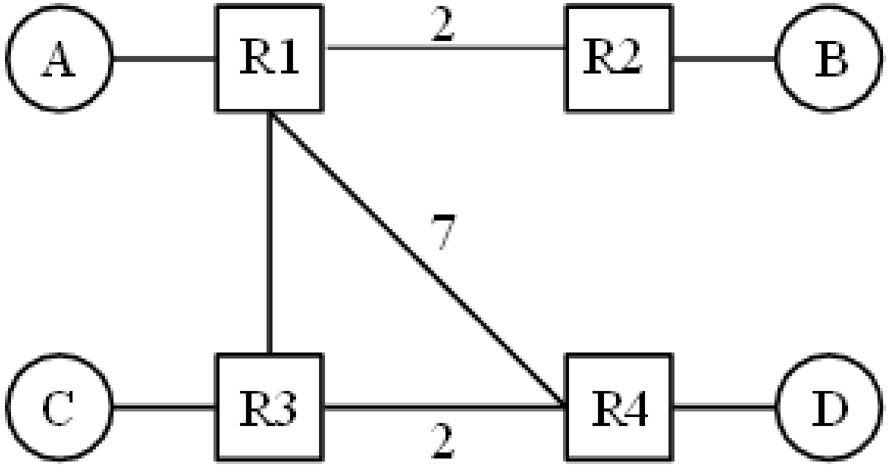
Node	SD	PN
A		
B		
C		
D		
E		

Q. Dijkstra's Algorithm (Source Node P, Directed Graph)



Q. Distance-Vector

Consider running the distance-vector protocol on the topology below. Unlabeled links have cost 1. Fill in the routing tables based on Distance-Vector algorithm. (refer to the handout for details.)



R1's table

Dest.	Hop, Dist.
A	Direct, 1

R2's table

Dest.	Hop, Dist.
B	Direct, 1

R3's table

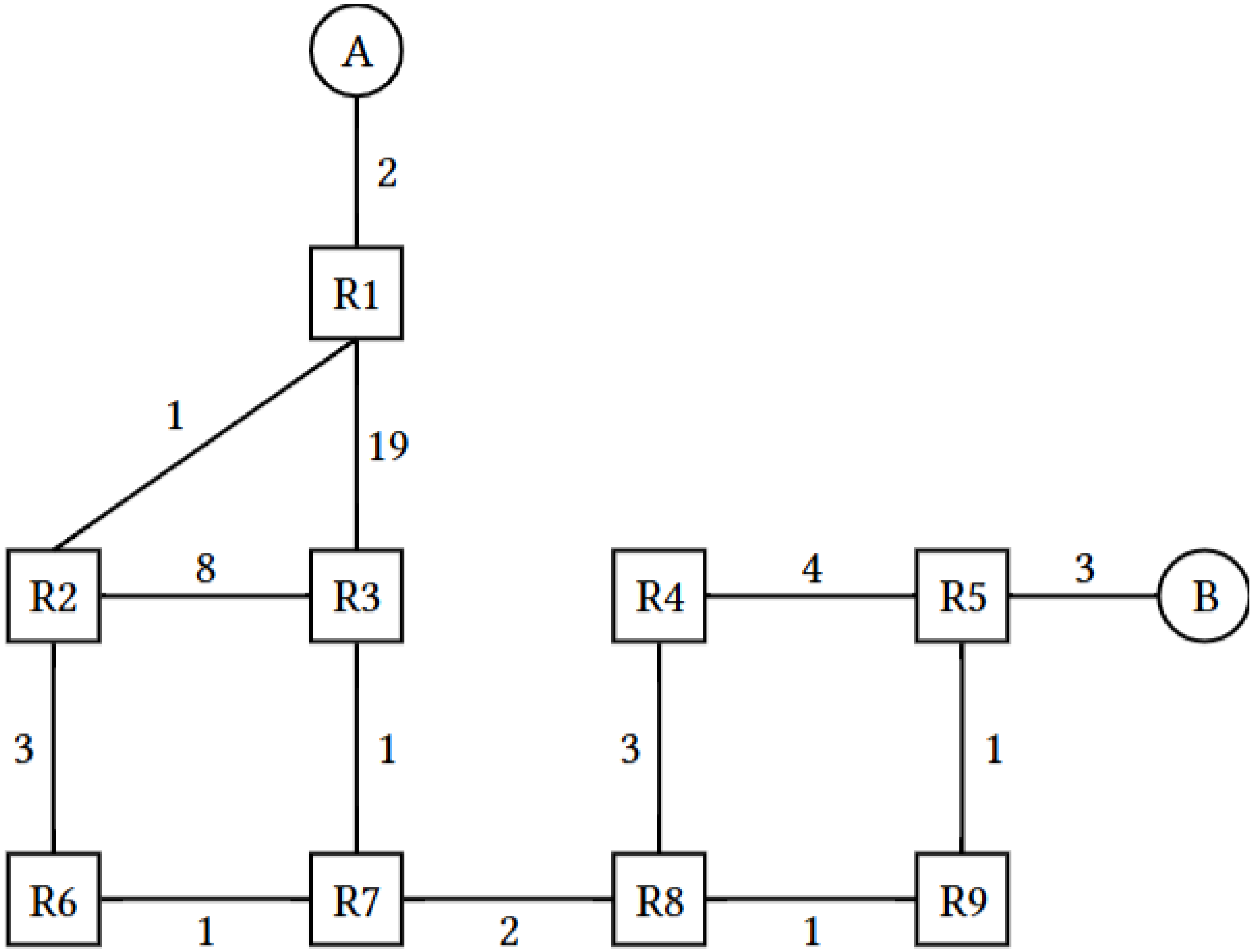
Dest.	Hop, Dist.
C	Direct, 1

R4's table

Dest.	Hop, Dist.
D	Direct, 1

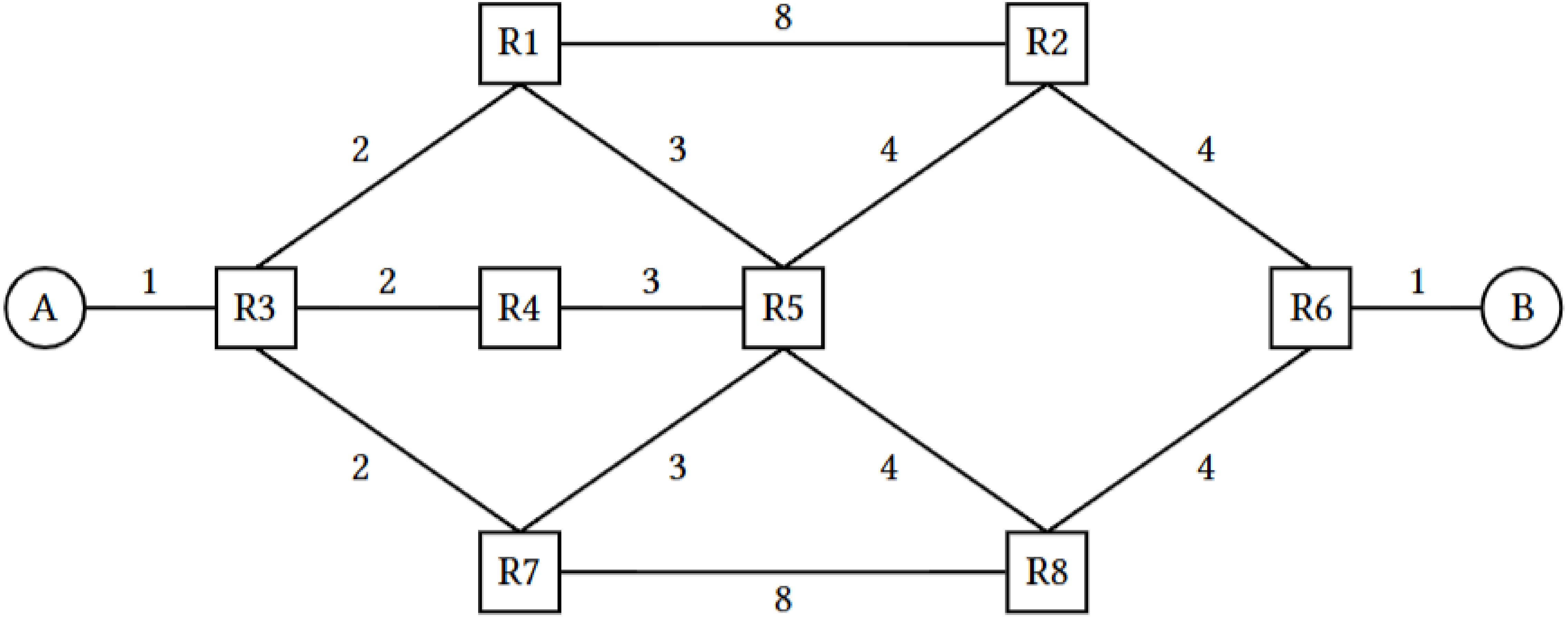
Q. Link-State Routing

Refer to the handout for details.



Q. More L3 Link State

Refer to the handout for details.


R1
8
R2
2
3
4
4
A
1
R3
2
R4
3
R5
R6
1
B
2
3
4
4
R7
8
R8