

# CS356R (Spring 2026) – Quiz 3 Solutions

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## Problem 1 - Dijkstra's algorithm

For Dijkstra's algorithm, in the attached solution proceeding from step 2 to 3, you can also select C instead of E and the cost will be updated based on the cost from node C and previous cost of visiting nodes that have yet not been visited. This solution I prepared is attached at the the end of this document.

## Problem 2 - Link state vs Distance vector routing

Below are some differences between link state and distance vector routing:

Distance Vector	Link State
<ul style="list-style-type: none"><li>• Each router knows only distances to destinations via neighbors.</li></ul>	<ul style="list-style-type: none"><li>• Each router knows the full network topology.</li></ul>
<ul style="list-style-type: none"><li>• Exchanges entire routing table with directly connected neighbors.</li></ul>	<ul style="list-style-type: none"><li>• Floods link-state advertisements (LSAs) to all routers.</li></ul>
<ul style="list-style-type: none"><li>• Uses Bellman-Ford</li></ul>	<ul style="list-style-type: none"><li>• Uses Dijkstra</li></ul>
<ul style="list-style-type: none"><li>• Prone to routing loops and count-to-infinity problem.</li></ul>	<ul style="list-style-type: none"><li>• Less prone to loops due to global topology view.</li></ul>
<ul style="list-style-type: none"><li>• Slow convergence</li></ul>	<ul style="list-style-type: none"><li>• Fast convergence</li></ul>
<ul style="list-style-type: none"><li>• Suitable for small networks.</li></ul>	<ul style="list-style-type: none"><li>• Scales well for large networks.</li></ul>

## Problem 3 - Encapsulation

### What is Encapsulation?

Encapsulation is the process of wrapping an IP packet inside another IP packet by adding a new outer IP header. The original packet remains unchanged. A new header is added to forward the packet through a different path. It is often called IP-in-IP tunneling.

## Use in Mobile IP

In Mobile IP:

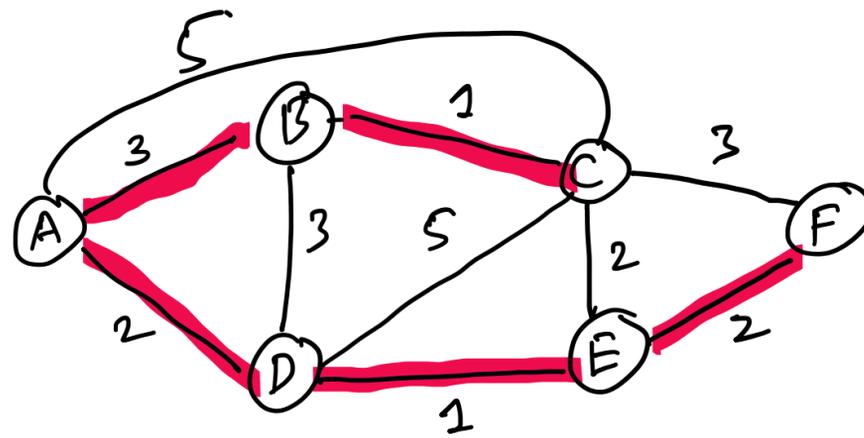
- When a Mobile Node (MN) moves away from its home network, packets are still sent to its home address.
- The Home Agent (HA) intercepts these packets.
- The HA encapsulates the original packet inside a new IP packet.
- The new outer header contains the Care-of Address (CoA) of the Mobile Node.
- The packet is tunneled to the foreign network.
- At the destination, the outer header is removed (decapsulation), and the original packet is delivered to the MN.

Quiz 3

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Q.01



$\infty$  = infinite cost

Step #	start $\mathcal{N}$	$D(B), p(B)$	$D(C), p(C)$	$D(D), p(D)$	$D(E), p(E)$	$D(F), p(F)$
0	A	3, A	5, A	2, A	$\infty$	$\infty$
1	AD	3, A	5, A		3, D	$\infty$
2	ADE	3, A	5, A			5, E
3	ADEB		4, B			5, E
4	ADEBC					5, E
5	ADEBCF					5, E