Part B

**Chapter 5**

**7. Consider the network of Fig. 5-12(a). Distance vector routing is used, and the following vectors have just come in to router C:**

* **from B: (5, 0, 8, 12, 6, 2)**
* **from D: (16, 12, 6, 0, 9, 10)**
* **from E: (7, 6, 3, 9, 0, 4)**

**The cost of the links from C to B, D, and E, are 6, 3, and 5, respectively. What is C’s new routing table? Give both the outgoing line to use and the cost.**

In the given network scenario, router C is receiving distance vectors from routers B, D, and E. To update C's routing table, the Distance Vector Routing algorithm is applied, taking into account the link costs from C to its neighbors (B, D, and E).

Utilizing the Bellman-Ford equation (C's cost to destination = min(C's cost to neighbor + neighbor's cost to destination)), the optimal routes and costs for each destination are determined. Here's the revised routing table for router C:

1. To A: Route through B (Cost: 11) [6 (C to B) + 5 (B to A)]
2. To B: Direct route (Cost: 6) [6 (C to B)]
3. To C: Local router (Cost: 0)
4. To D: Direct route (Cost: 3) [3 (C to D)]
5. To E: Direct route (Cost: 5) [5 (C to E)]
6. To F: Route through E (Cost: 9) [5 (C to E) + 4 (E to F)]

This updated routing table specifies the outgoing router and the associated cost for each destination.

**36. A router has just received the following new IP addresses: 57.6.96.0/21, 57.6.104.0/21, 57.6.112.0/21, and 57.6.120.0/21. If all of them use the same outgoing line, can they be aggregated? If so, to what? If not, why not?**

One route should consolidate all four subnets, while another route, featuring a lower metric, should encompass the 57.6.112.0/21 network. Despite the inclusion of the 57.6.112.0/21 network in the aggregate route, the specific route, possessing a lower metric, takes precedence over the aggregate route.

In a broader context, the default route directs traffic to 0.0.0.0/0, covering all addresses. However, more specific routes with lower metrics exist, influencing the routing decisions. Similarly, a route for a supernet like 57.6.96.0/19, which includes the subnet 57.6.112.0/21, can coexist with an even more specific route for the subnet 57.6.112.0/21, effectively superseding the less specific supernet route.

**Chapter 6**

**16. Why does UDP exist? Would it not have been enough to just let user processes send raw IP packets?**

It is better to use UDP, rather than just sending IP packets everywhere, because by using UDP, the data will be correctly to the desired destination. This is because UDP uses source and destination ports while raw IP packet does not include ports.

**48. What is the bandwidth-delay product for a 50-Mbps channel on a geostationary satellite? If the packets are all 1500 bytes (including overhead), how big should the window be in packets?**

The total delay for a round trip is approximately 500 milliseconds. Therefore, considering a channel with a capacity of 50 Mbps, the bandwidth product delay amounts to 3,125 kilobytes.

Bandwidth Product Delay = = 3,125,000 or 3,125 kilobytes

Required Packets =

Assuming packet size is 1500 bytes, it would require 2083.33 packets to saturate the connection, so the window size should be set to at least 2084 packets.

**Honor Statement**

In the realm of academia's vast expanse, the human mind unfolds, an intricate tapestry blending intellect and ethics in an ageless dance of discovery. As the seeker journeys through this intellectual landscape, an unspoken call for justice echoes, whispering that adherence to rules is not a shackle, but a beacon toward fair scholarship.

In the cosmic ballet of academic exploration, rules shape the scholarly cosmos like unseen forces molding the universe. They act as constellations, guiding the seeker through the vast expanse of knowledge, ensuring the pursuit of truth remains untarnished by shortcuts or ethical ambiguities. This adherence becomes a gravitational force, anchoring intellectual endeavors to a moral center, where justice, in the guise of ethical conduct, fosters an equilibrium for the river of knowledge to thrive.

The narrative unfolds, revealing rules as benevolent guides, much like a river's current steering the traveler downstream. Navigating within the channels of ethical conduct allows the river of knowledge to flow freely, untouched by the shadows of impropriety. Adherence to rules becomes a compass, directing the intellectual journey toward true north—the just, the honorable, and the undisputed pursuit of enlightenment.

In conclusion, the woven threads of this exploration reveal a profound understanding—the pursuit of justice in academia is not a distant ideal but a present force, shaped by the commitment to follow the rules. Through the river of knowledge, the silent architects, and the unwavering compass, the narrative echoes a resounding truth: adhering to the rules is not merely beneficial; it is the very essence that ensures a just and enduring legacy in the pursuit of knowledge.