EE4204 Review Session

In a txt or word document, please write your answers and then submit the file to the Review-Session-1 folder in LumiNUS Files.

Layering and Cross-Layering

- OSI Reference model
- Reasons for using a layered design
  - Ease of maintenance, prevent tight coupling, scalability
- Encapsulation – each layer add a header
- Cross-layer design
  - Introduce coupling between layers in a a structured manner

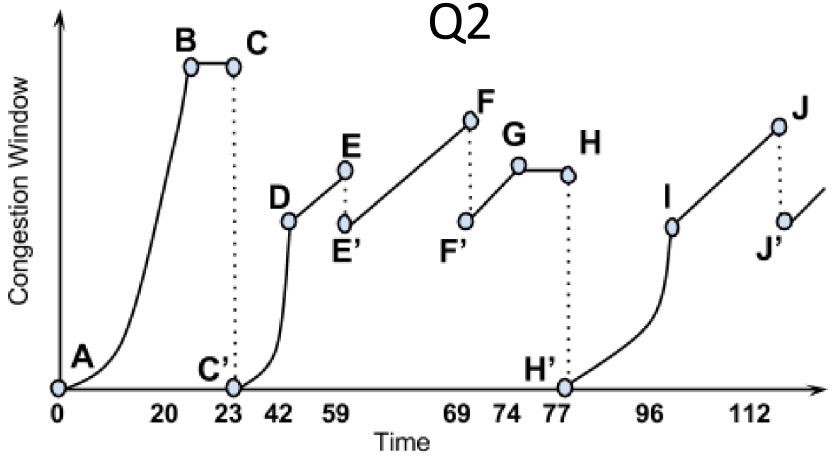
Q1

- What are the seven layers? What is the job of each layer (in your own words).
  - Physical: learn how to use the medium of communication, create a link
  - Link Layer: Create a reliable link (hop-by hop)
  - Network: Find a set of reliable links which form a path from source to destination, routing
  - Transport: Ensure end-to-end reliability
  - Application: User interface (source and sink)

Transport Layer

- The job of the transport layer is end-to-end reliability
- Functions at the transport layer
  - Multiplexing and Demultiplexing
  - Sequence numbers
  - Retransmissions
  - Acknowledgments
  - Sliding Window
  - Fast Retransmit and Recovery
  - Flow Control
  - Congestion Control

Q2



Slow-start: A-B, C'-D, H'-I

Timeout: C, H

Fast-retransmit and Recovery: E, F, J

CWND at A, B, C, C', D, E: 1, 2^20, 2^20, 1, 2^19, 2^19+17

SSThresh at A, B, C, C', D, E: inf, inf, inf, 2^19, 2^19, 2^19

Network Layer

- The job of the network layer is routing, which is finding a set of reliable links connecting source and destination.
- Functions at the network layer
  - Fragmentation and Reassembly
  - Routing
  - Forwarding
  - IPv4 and IPv6
  - ICMP
  - NAT
  - Routing – Link State and Distance Vector (Path Vector)
  - Broadcast and Multicast routing

Q3

Aggregate the following set of four /24 IP network addresses to the highest degree possible.

212.56.132.0/24

212.56.133.0/24

212.56.134.0/24

212.56.135.0/24

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212.56.132.0/24
11010100.00111000.10000100.00000000
212.56.133.0/24
11010100.00111000.10000101.00000000
212.56.134.0/24
11010100.00111000.10000110.00000000
212.56.135.0/24
11010100.00111000.10000111.00000000
Common Prefix:
11010100.00111000.10000100.00000000
The CIDR aggregation is:
212.56.132.0/22
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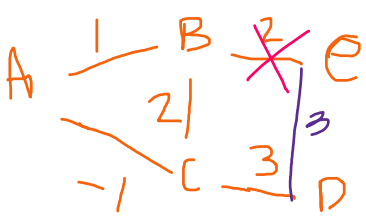
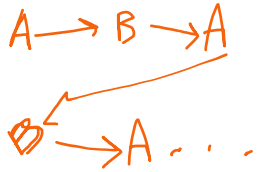
Q4





Shortest Paths from A	Link State	Distance Vector	If Link B-E breaks?
A-B A-C A-C-D A-B-E	In-order A-C A-C-B OR A-B (flip coin) A-C-D A-B-E	Same solution as link state.	Link-state There will be no link to E. In the network topology learning phase, every node will learn this. Distance Vector Count to infinity Look at B B will rely on its neighbor, say A, to get to E. But A relies on B to get to E. That is the routing loop.