CMSC 417: Computer Networks Spring 2023

In-term exam# 2

Date: April 13th, 2023 Time and Location: In-class Duration: 1 hour

Instructions:

1) You should be in the class at 2 pm.

2) You must bring your University ID card. The proctors may not allow you to sit for the exam without your University ID card.

3) This is a closed book exam.

4) You may not discuss with other students during the exam.

5) You must maintain academic integrity and code of conduct.

Exam syllabus:

(A) Internet Protocol (IP) (Chapter:3, Section: 3.2)

- 1. Classless addressing and CIDR (Section: 3.2.5)
- 2. ARP protocol (Section: 3.2.6)
- 3. DHCP protocol (Section: 3.2.7)
- 4. Private address spaces and NAT protocol (Refer to class slides and notes)
- 5. ICMP protocol (Section: 3.2.8, for Ping and Traceroute refer to class slides)
- 6. Virtual networks and tunnels (Section: 3.2.9)
- 7. Basics of IPv6 (Class slides)

(B) Transport layer protocols (Class slides and text book chapters 5 & 6)

- 1. Transport layer multiplexing and demultiplexing (Class slide, Section: 5.1)
- 2. UDP protocol (Section: 5.1)
- 3. TCP protocol (Chapter 5)
 - 3.1 Reliable byte stream (Section: 5.2)
 - 3.2 Packet format, flags, sequence number (Section: 5.2.2, 5.2.3)
 - 3.3 ARQ protocols: Stop-&-Wait, Sliding window (Class slides, Section: 5.2.4)
 - 3.4 Cumulative ACK (Class slide, Section: 6.3.2, 6.3.3)
 - 3.5 TCP flow control (Section: 5.2.4)
 - 3.6 Silly-window syndrome, Nagle's algo (Section: 5.2.5)
 - 3.7 Karn-Partridge algo (Section: 5.2.6)
 - 3.8 Congestion control (Chapter: 6)
 - 3.8.1 AIMD protocol (Section: 6.3.1)
 - 3.8.2 Drop-tail FIFO queue (Section: 6.2.1)
 - 3.8.3 Slow start (Section: 6.3.2)
 - 3.8.4 Fast retransmit, Fast recovery (Section: 6.3.3)

Expect "problem solving" type questions on:

- a) CIDR, ICMP, Traceroute protocol
- b) 3-Way handshake for TCP

- c) Calculating header fields for TCP segments/packets and ACKs.
 d) Throughput calculation for ARQ protocols
 e) Calculating Advertised_window
 f) Observing Congestion-window behavior

Please note that exam questions will include topics discussed in response to various questions asked in the class.