CMSC 417: Computer Networks
Spring 2024

Midterm exam# 2
Date: April 16th, 2024
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/internet 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)
            3.8.5 TCP variants and Router assisted congestion control (Chapters 5 & 6)
            3.8.6 Vulnerabilities of TCP (Mentioned research paper and class slides)

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.