

Final Exam Topics List

CS 640, Spring 2014

- Layering (section 1.3; quiz 1 question 2)
- Physical layer
 - Structure of a network (section 1.2.2)
 - Circuit switching vs. packet switching (section 1.2.3; quiz 1 question 3)
 - Multiplexing (section 1.2.3; quiz 1 question 4)
 - Performance (section 1.5; section 2.2.1; quiz 1 question 5)
 - Encoding (section 2.2; quiz 2 question 1)
- Link layer
 - Framing (section 2.3)
 - Access control (section 2.6; quiz 2 question 2)
 - Error detection (section 2.4; quiz 2 question 3)
 - Forwarding (section 3.1.4; quiz 3 question 2)
- Queueing
 - FIFO (section 6.2.1; quiz 2 question 4a)
 - Fair queueing (section 6.2.2; quiz 2 question 4b)
- Wireless
 - Infrastructure based vs. ad hoc (quiz 2 question 5)
 - Frequency allocation
 - Hidden node and exposed node problems (section 2.7.1; quiz 3 question 1)
 - Radio resource control (RRC) in cellular networks
- Internet protocol (IP)
 - Header (section 3.2.2 pages 207-210)
 - Fragmentation (section 3.2.2 pages 210-213)
 - Addressing (section 3.2.3; section 3.2.5; quiz 3 question 3)
 - Forwarding (section 3.2.4)
 - Address Resolution Protocol (ARP) (section 3.2.6; quiz 3 question 4)
 - Dynamic Host Configuration Protocol (DHCP) (section 3.2.7)
 - Internet Control Message Protocol (ICMP) (section 3.2.8)
- Intra-domain routing
 - Basics (section 3.3 opening; section 3.3.1)
 - Distance vector routing (section 3.3.2 up to page 248; quiz 4 question 1)
 - Link state routing (section 3.3.3 up to page 259; quiz 4 question 2)
- Inter-domain routing (section 4.1.2; quiz 4 questions 3 and 4)
- IPv6 (section 4.1.3)
- Network Address Translation (NAT) (pages 335-336; quiz 4 question 5)
- Mobile IP (section 4.4.2)
- Features of the transport layer (section 5 opening; quiz 5 question 1)
- User Datagram Protocol (UDP) (section 5.1)

- Transport Control Protocol (TCP) basics
 - Features (section 5.2 opening; section 5.2.1)
 - Header (section 5.2.2)
 - Connection establishment/termination (section 5.2.3)
 - Sequence numbers and ACKs (section 5.2.4; section 5.2.8; quiz 5 question 2)
- TCP flow control
 - Sliding window (section 5.2.4; quiz 5 question 3)
 - Nagle's algorithm (section 5.2.5; quiz 5 question 4)
 - Setting timeouts (section 5.2.6; quiz 5 question 5)
- TCP congestion control
 - Exponential backoff (section 6.3.1)
 - Slow start (section 6.3.2; quiz 6 question 1)
 - Fast retransmit and fast recovery (section 6.3.3; quiz 6 question 2)
 - Congestion avoidance (section 6.4.3)
- Application protocols
 - Email (section 9.1.1)
 - Web (section 9.1.2)
 - DNS (section 9.3.1; quiz 6 question 3)
- Software defined networking ("Software-Defined Networking: The New Norm for Networks")
 - Motivation
 - Comparison with traditional networks (quiz 6 question 4)
 - Flow table and forwarding rules
 - Motivating applications
 - Design considerations
 - Challenges and ongoing research
- Data center networks ("Cloud Computing - A Primer" parts 1 and 2)
- Cloud computing ("Cloud Computing - A Primer" parts 1 and 2)
- Content delivery
 - Approaches
 - Content distribution networks (section 9.4.3)
 - Peer-to-peer networks (section 9.4.2)
- Network security
 - Cryptographic building blocks (section 8.1)
 - Authentication protocols (section 8.3)
 - Middleboxes (section 8.5)