INST 346 Exam 2 Topic List
April 4, 2018

The Internet

- Layered architecture
- Packet switching
- How the specific pieces work together See, for example, Kurose and Ross, Computer Networking, A Top-Down Approach, 6th edition, pages 495-500 (section 5.7)
- Wireshark

Point-to-Point Circuits (physical layer)

- Fiber optic cables
- Terrestrial Microwave
- Satellite (synchronous, low earth orbit)

Ethernet (physical and link layer) [e3q1e]

- CSMA/CD
- MAC addresses
- Address Resolution Protocol (ARP)
- Frame (packet) structure
- Cyclic Redundancy Check (CRC)
- Switched Ethernet

WiFi (link layer) [e2q2, e3q4]

- CSMA/CA
- Adaptive rate selection
- Channels
- Frame (packet) structure
- Power management

IP (network layer)

- IPv4 addresses (subnets, prefixes)
- Datagram (packet) structure
- DHCP
- IPv6 (addresses, tunneling)
- Network address Toranslation (NAT)

Routing (network layer) [e1q2, e1q5, e2q1, e3q1a, e3q1d]

- Router components (switch, output buffer)
- Sources of delay (transmission, propagation, processing, queueing)
- Routing tables
- Shortest path routing
- Border Gateway Protocol

UDP (transport layer) [e3q5]

- Best-effort delivery

- Port numbers
- Segment (packet) structure

TCP (transport layer) [e3q1c]
- Guaranteed delivery
- Reliable data transfer (sequence numbers, acknowledgement, timeout)
- Connection setup and teardown (SYN and FIN)
- Segment (packet) structure
- Flow control

SSL (application layer) [e2q1b]
- Everything about encryption from exam 1 (symmetric key, public key)
- Certification authorities
- Strategy (public key, session key, Message Integrity Code)
- Record (packet) structure
- Setup (authentication, negation, key derivation)

DNS (application layer) [e1q3]
- Relationship between domain names and IP addresses
- Server hierarchy
- Resource records
- Cacheing
- Nslookup

Streaming (application layer)
- Everything about audio and video from exam 1 (compression, file size)
- Application scenarios (stored content, live content, conversational)
- Buffering (why?, how big?, what happens if empty?)
- Adaptive data rate (e.g., DASH)

Internet of Things (application layer)
- Cyber-Physical Systems (sensors, computers, actuators)
- Examples
- Issues (security, privacy, robustness, safety, …)

Internet Governance
- Jurisdiction
- Internet Engineering Task Force (RFC's)
- ICANN (universal resolvability)
- CERT

Networked System Architectures (application layer)
- Client server
- Peer to peer
- Replication
- (socket programming is not on exam 2)

Key for question references:

- To see the prior exams for Fall 2017 section 0101, go to the fall 2017 semester schedule (from the Spring 2018 section 0101 home page, select prior semester, then schedule)
- Exam code: e1 for exam 1, e2 for exam 2, e3 for the final exam
- Question code: q1 for question 1, etc.
- Example: e3q1b refers to part b of question 1 on the Fall 2017 final Exam