Midterm Review

I. Introduction
   A. Definitions
      1. network vs distributed system
      2. network components
         a. core versus edge, end-to-end versus sub-network
      3. paradigms
         a. client-server
         b. peer-to-peer (P2P)
         c. wireless versus mobile
   B. Classify Networks
      1. transmission technology - broadcast, multicast, point-to-point
      2. size - LAN, MAN, WAN
      3. topology - star, ring, tree, hierarchical

II. Elementary TCP Sockets
   A. Client/server model
   B. structure of sockaddr_in
   C. socket functions
      1. socket
      2. connect
      3. bind
      4. listen
      5. accept
      6. close

III. Network Architecture
   A. Seven Layer ISO OSI Reference Model
      1. Protocol
   B. Introduction to TCP/IP Protocol Stack
      1. IPv4, IPv6
      2. encapsulation

IV. Switching
   A. circuit switching
   B. message switching
   C. packet switching
   D. cell switching
   E. Store-and-Forward Networks
      1. cut-through routing
      2. virtual circuit networks
      3. datagram networks
      4. connectionless versus connection-oriented networks

V. Network Performance
   A. Generic performance measures
      1. throughput
      2. utilization
3. response time
B. end-to-end delay
   1. processing delay at the node
   2. Queueing delay
   3. Propagation delay
   4. Transmission delay
C. latency, goodput, fairness
D. delivery ratio, packet loss rate, retransmission rate

VI. Physical Layer
A. Definitions
   1. baud {modulation rate}
   2. data rate {capacity}
   3. bandwidth
   4. voice-grade line
B. Analog vs Digital
   1. signals
   2. attenuation
   3. modem
C. Multiplexing
   1. TDM
      a. T1 line
   2. FDM
   3. statistical multiplexing {concentrator}
   4. WDM
D. Transmission Media
   1. twisted pair
      a. UTP Cat 3,5,5e
      b. Dial Up Modem
      c. ADSL
   2. Coaxial cable
      a. baseband
         i. 10BASE2 {did not cover}
         ii. 10BASE5 {will cover now!!}
      b. broadband {CATV}
      c. HFC (Hybrid Fiber-Coax)
   3. Optical Fiber
      a. FTTH
      b. PON
         i. FIOS
   4. Radio transmissions
      a. 802.11 (WiFi)
      b. Cellular EVDO

VII. Application Layer
A. TCP versus UDP
VIII. HTTP
   A. Web Terminology
      1. object, base-HTML page, URL
   B. HTTP Overview
      1. uses TCP, port 80
      2. stateless
   C. Connections
      1. non-persistent
      2. persistent
   D. HTTP Request Message
   E. HTTP Response Message
   F. Cookies
   G. Web Caching (Proxy Server)
IX. DNS
X. Introduction to Security