Midterm Review

I. Seven Layer ISO OSI Reference Model
II. Network Layer and Distance Vector Routing
   A. Routing
      1. Non-Adaptive
         a. flooding
         b. static
            i. Dijkstra's Shortest Path routing algorithm (N)
      2. Adaptive
         a. centralized   RCC (Y)
         b. distributed
            i. intradomain routing (Y)
            ii. interdomain routing (N)
         c. isolated
      3. Distance Vector Routing Y) **
         a. RIP (N)
      4. Link State Routing (N)
         a. OSPF (N)
III. Introduction
   A. Definitions
      1. network vs distributed system
      2. classify networks
         a. transmission technology - broadcast, multicast, point-to-point
         b. size - LAN, MAN, WAN
         c. topology - star, ring, tree
      3. performance measures
         a. throughput
         b. utilization
         c. response time
         d. end-to-end delay
            i.   processing delay
            ii. queueing delay
            iii. transmission delay
            iv. propagation delay
         e. latency
         f. goodput
         g. fairness

II. Miscellaneous topics before physical layer
   A. Multiplexing   *{Note – multiplexing was covered just before*
      1. TDM   *PCM in the Physical Layer section}*
      2. FDM

        3. statistical multiplexing {concentrator}
        4. WDM
  B. Switching
        1. circuit switching
        2. message switching
        3. packet switching
  C. Store-and-Forward Networks
        1. cut-through routing
        2. virtual circuit networks
        3. datagram networks
        4. connectionless versus connection-oriented networks

III. Physical Layer
  A. Definitions
        1. baud {modulation rate}
        2. data rate {capacity}
        3. bandwidth
        4. voice-grade line
  B. Nyquist Theorem
        1. signal constellations
  C. Shannon's Result
        1. signal-to-noise ratio
        2. decibel definition
  D. Analog vs Digital
        1. data
        2. signals
        3. transmissions
        4. attenuation
        5. amplifiers vs repeaters
        6. modem
        7. codec
        8. advantages vs disadvantages
  E. Data Encoding Techniques
        1. digital data, analog signals
            a. Amplitude modulation
            b. Frequency modulation
            c. Phase modulation
        2. digital data, digital signals
            a. NRZL
            b. NRZI
               i. differential codes
            c. Bi-phase codes
                i. Manchester
                ii. differential Manchester
        3. analog data, digital signals
            a. PCM

  b. T1 carrier
  c. delta modulation
F. Transmission Media
  1. twisted pair
    a. UTP Cat 3,4, 5,5e,6
    b. Dial up
    c. ADSL
    d. Hub topology
  2. Coaxial cable
    a. baseband
        i. 10BASE2
        ii. 10BASE5
    b. broadband   {CATV}
        i. HFC
  3. Optical Fiber
    a. three types of fiber
    b. three different wavelengths

IV. Data Link Layer
  A. Tanenbaum's DL protocols
    1. Utopia
    2. Stop-and-Wait   {introduce ACKs}
    3. PAR   {noisy channel}
        a. old version
           1. ACK, timer, duplicate frames
        b. "new version"   {ACKs, timers, premature timeouts}
  B. Synchronous vs asynchronous transmissions
    1. bit, character, block level
  C. Framing
    1. bit stuffing
    2. byte stuffing
  D. Transmission Errors
    1. error detection and error correction (Y)

V. Local Area Networks
  A.   "The Channel Allocation Problem" (N)
    1.   assumptions (N)
  B.   LAN Performance Notation
    1.   relative propagation time - **a**   (Y)
  C.   CSMA/CD (Y)
  D.   Ethernet (Y)
    1. binary exponential backoff   (Y)
    2. Ethernet evolution (10Base5, 10Base2, 1Base5, 10BaseT)
  E. Switched Ethernet (N)
    1. backward learning
  F. Token Ring
    1. token insertion choices   (N)

   2. 802.5 token ring (N)
   3. performance compared to Ethernet   (Y)
     a. token maintenance problems (N)
VI.   High Speed LANs
 A.   FDDI   (Y)
   1.   differences from 802.5 token ring   (N)
   2.   4B/5B encoding (Y)
   3.   dual ring   (Y)
VII. Wireless
 A.   Classification
   1.   Infrastructure
   2.   Ad Hoc
   3.   MANET

---------------------only up to here for Mid Term!! --------------------------