

[ INFO 341 Mid-term Review ]

Not comprehensive

---

---

---

---

---

---

---

[ Exam ]

- Two parts (maybe)
  - Part 1 closed book, closed notes
  - Part 2 open book, open notes
- Questions
  - Acronym & Definition
  - Explanation/short answer
  - True/False explanation
  - Problems

---

---

---

---

---

---

---

[ Transmission Media ]

- Wires
  - UTP, Coaxial Cable
- Fiber Optic (glass)
- Radio
- Satellite
  - Geosynchronous, Geostationary
  - Low Earth Orbit (LEO), Low Earth Orbit Arrays
- Microwave
- Infrared

---

---

---

---

---

---

---

## [ Signaling ]

- Signal Encoding
  - analog wave forms, amplitude, frequency, phase
  - digital
- Signal Multiplexing
  - simplex, half-duplex, duplex
  - time division, frequency division multiplexing, wave division (optical)
- Signal Loss
  - Attenuation, cross talk, reflection, ambient noise

---

---

---

---

---

---

---

---

## [ Packets, Frames, Error ]

- Packet philosophy
  - Share resource
  - Packet switching networks
- Frame
  - Header + Data
- Error detection
  - Parity, CRC, Checksum

---

---

---

---

---

---

---

---

## [ LANs, Network Topology ]

- Point to point connections
- Topological Solution
  - Star, Ring, Bus, Tree
  - Logical topology vs physical topology
- Ethernet, example of bus
- IBM Token Ring & FDDI, example rings

---

---

---

---

---

---

---

---

**Ethernet**

- Origin, history
  - Aloha net, DIX
- Manchester encoding (not a British band)
- Ethernet frame format, addressing, types, payload
- CSMA/CD vs CSMA/CA
  - binary exponential backoff
- Broadcast/Multi-cast
  - Special Ethernet addresses

---

---

---

---

---

---

---

---

**LAN Wiring & Hardware**

- NIC, DMA
- Wiring
  - Thicknet, 10Base5, AUI, BNC connector, Thinnet, 10Base2, UTP, 10BaseT, Cat1, Cat2, Cat3, Cat4, Cat5
- Devices
  - Hubs, Repeaters, Bridges, Switches
- Distance, Segment limits
- Redundancy, bridging cycles & switch cycles

---

---

---

---

---

---

---

---

**Distance Connectivity, WANS**

- Connectivity Options & Speeds
  - T1, T3, OC1, OC3, SONET, ISDN, DSL, Cable, Frame Relay, ATM, X.25
- Switched Networks
  - Routers & routing
  - Hierarchical addressing
  - Store & forward

---

---

---

---

---

---

---

---

## [ Routing, Route Determination ]

- Gateways & Border protocols
  - IGP, EGP
- Route protocols
  - RIP, OSPF, BGP
- Steps to route determination

---

---

---

---

---

---

---

---

## [ Network Ownership ]

- Public networks
- Private networks
- Virtual Private Networks (VPN)
- Service Paradigms
  - Connection Oriented, Connectionless
- Performance Characteristics
  - Throughput, Delay

---

---

---

---

---

---

---

---

## [ Protocols ]

- Protocols
  - An end to end agreement
- Protocol suites
  - A collection of protocols, organized
- Stacks, Layers
- Sequencing, retransmission, flow control, acknowledgement, congestion control
- Sliding window protocol

---

---

---

---

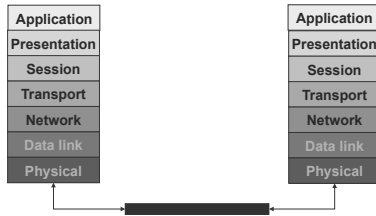
---

---

---

---

## ISO 7 Layer Model




---

---

---

---

---

---

---

---

## ISO Layers, more detail

- **Physical Layer** - responsible for activating, maintaining, and deactivating a physical/electrical connection between the Data Terminal Equipment (DTE) and Data Circuit Terminating Equipment (DCE), and providing clocking signals
- **Data Link Layer** -responsible for transfer of data, delimits the flow of bits, provides for the identity of bits in relation to their place in the data unit, manages DTE level flow control, supports detection of transmission errors and recovery of lost, duplicate or erroneous data
- **Network Layer** - defines network switching/routing and the communications between networks (internetworking)
- **Transport Layer** - provides interface between the data communications network and the upper three layers, provides the user options in obtaining certain levels of quality (and cost) from the network, provides end-to-end accountability of data transfer across more than one link.
- **Session Layer** - provides mechanisms for an organized means to exchange data between users, such as simultaneous transmission, alternate transmission, checkpoint procedures and resynchronization of user data flow.
- **Presentation Layer** - layer is concerned with the preservation of the syntax of the data, provide a means of describing data structures in a machine independent way, code data from an internal format of the sending machine, to the common transfer format and then decode this format to an appropriate format for the receiving machine.
- **Application Layer** - layer is concerned with the semantics of the data, service elements support job management, file transfer, electronic mail, financial data exchange, also supports the virtual terminal and virtual file concepts, manages directory services.

---

---

---

---

---

---

---

---

## Internetworking & TCP/IP

- Universal Service
  - Connect different, heterogeneous networks
  - Create a virtual/abstract network that works the same everywhere
- TCP/IP
  - History, origins, layer model
  - Performance

---

---

---

---

---

---

---

---

## [ IP - Internet Protocol ]

- IP Addresses
  - Address classes, bit relationships
  - Dotted decimal notation, dotted quad
  - Classful and classless addressing
  - Subnet masks, CIDR
  - Special Addresses
  - DHCP for setting addresses

---

---

---

---

---

---

---

---

## [ Subnetting & Masks ]

- Assume your organization is given a 'class B' address 64.100.x.x
  - What is the subnet mask for this address?
  
  - Suppose you want to break this up into 8 networks of approximately equal size, what subnet mask would you give to the local administrators?

---

---

---

---

---

---

---

---

## [ IP - ARP & Datagrams ]

- ARP
- Connection Oriented & Connectionless
- Datagram (packet) delivery
  - Next-hop delivery via routing table
  - Best effort delivery (so may lose packets)
- IP Encapsulation
  - Enveloping
- Segmentation & Reassembly

---

---

---

---

---

---

---

---

## TCP

- Reliable transport, connection oriented
  - Features of TCP service
  - Flow control, sliding windows
  - Three way handshake
  - Congestion control

---

---

---

---

---

---

---

---

## Network OS

- Brief History of NOS
  - History, Netware, WinNT, Win2K, Linux
- Client-Server vs Peer-to-Peer
- Essential NOS services
  - Printer Sharing
  - File Sharing
  - User & Group permissions/access control
  - Accounting, management

---

---

---

---

---

---

---

---

## Wireless Networking

- General understanding of propagation
- Shannon's Law
- IEEE802.11 a,b,g,n standards
- Channel 1, 6, and 11 don't overlap
- Honeycomb cells for large WLANs
- Encryption WEP, WPA, WPA2
- Range extenders

---

---

---

---

---

---

---

---