Notes in preparation for CPTR-456 Exam I - Chapter 1

Look back over the sections of the text that cover these things.

- What is a protocol
- Access network; what is meant by this
- Physical media- twisted pair cable, coax cable, fiber optic, radio
- Network core
  - packet switching vs circuit switching
  - frequency-division multiplexing vs time-domain multiplexing
  - store and forward transmission; delay calculation
  - Access ISP, Regional ISP, IXP, Content Provider
- Types of delay in packet-switched networks
  - processing; know what it is
  - queuing; know what it is
  - transmission; be able to calculate
  - propagation ($3x10^8$ meters/sec in air - speed of light, slower in a cable)
  - packet loss
  - end-to-end delay; what factors combine to create this
  - throughput; note the affect that multiple client-server pairs sharing a common "pipe" have
- Protocol layers
  - five layer - know the layers
    - Application; know the most common protocol names and what they are used for
    - Transport; two protocol names to know
    - Network; know this layer's protocol name
    - Link; what is the job of this layer? know typical protocol names
    - Physical;
- Encapsulation
  - the concept of a message to be sent (from an application) having a Transport layer header attached to create a segment to which the Network layer adds a header to create a Datagram to which the Link layer adds a header to create a Frame that then is transported by the physical layer to the next node in the network. Note which protocol layers are used in network switches; in network routers
- What is a denial-of-service attack?
- The history of networking is interesting, but I will <u>not</u> be asking questions from section 1.7

Chapter 2

- In the context of a communication session, the meaning of client and that of server.
- Know what a socket is and how it is used
- What is meant by reliable data transfer
- Know the principle characteristics of TCP and UDP and typical applications that use each
- There are several common application level protocols. What are four things that an application protocol typically defines?

- HTTP
  - Know what transport protocol HTTP uses
  - Persistent versus non-persistent connections
  - How is a persistent connection implemented?
  - What does it mean when HTTP is said to be a stateless protocol?
  - Know the basic interaction required to obtain a web page
  - What is in a typical HTTP request message?
  - How may a web server know the type of web browser that a request is coming from?
  - What are web site cookies? How may they be used? why?
- What is a proxy server? How does it improve web page responsiveness?
- What is a Content Distribution Network?
- Simple Mail Transfer Protocol (SMTP)
  - In the context of mail, what are the roles of a user agent? a mail Server?
  - What transport protocol does SMTP use?
  - Into what format does data sent using SMTP get encoded?
  - When we get email there is often a From and a To header line. Are these SMTP commands?
  - Once mail gets to the destination mail server, what protocol is used by the person's device or computer to fetch mail from the destination mail server?
  - When a person sends email, they initiate the mail via their local mail server. When mail is sent from the local mail server to the destination mail server are intermediate mail servers involved with the transfer?
- DNS is the acronym for what?
  - Know what transport protocol DNS uses
  - How are host computers identified?
  - In the 5-layer internet protocol stack, in what layer does DNS fit?
  - Be knowledgeable about host aliasing and mail server aliasing
  - Be familiar with the big-picture architecture of DNS servers; Root servers, Top-level servers, authoritative, and local DNS servers.
  - Recursive vs iterative queries
  - What information is contained in a DNS resource record?
- Section 2.5 peer-to-peer file distribution
  - Be familiar with the general concept. The text gives numerical examples. On this exam I will not ask quantitative questions about distribution times
- Section 2.6 on video streaming, we didn't talk much about. No questions from this section
- Sectoin 2.7 on socket programming. Review this section. Pay attention to the sequence of actions required by a UDP client and UDP server to set-up a connection. And the same for TCP.