CSCI 466 Final Exam Study Guide

Logistics

Wednesday December 14th @ 12:00-1:50 PM in Reid 202 (Our Normal Classroom)

Note sheets are **NOT** allowed

Final Exam is worth 15% of your final grade

Format:

Part I. Document all seven layers of OSI model *from memory*. For each layer, you will need to (1) list the name, (2) list the function/primary responsibility for the layer, and (3) the unit of data that is being transmitted in that layer

See next page for template. You will see the exact same template on the final exam

Part II. Short Answer Conceptual Questions. For each major chapter we covered in the class you can expect 2-4 questions about topics we covered in that chapter. Most of these will be short answer (1-2 sentences), but there may be some fill in the blank and matching. Some of these questions will be pulled straight from the homework (HW1, HW2, HW3). You can find a list of possible topics that can appear on the final exam starting on page three.

OSI Model

Layer Name	Description/Function	Unit of Data

Final Exam Short Answer Study Guide

The stuff in green indicates the subjects I think are particular worth your time to study (wink wink)

Internet Structure

- Network Edge vs Network Core
- Basic internet structure: hosts, clients, servers, packet switch, link, router
- Definition of a protocol
- Definition of throughput and traffic intensity
- Definition of Encapsulation

Application Layer

- Definition of client-server architecture
- Definition of P2P architecture
- Pros/Cons of Client Server vs P2P
- Basics of HTTP, how URLs are used
- HTTP Request methods (GET, PUT, POST, DELETE)
- HTTP Response Codes (200s, 300s, 400s, 500s)
- HTTP Cookies
- Definition of Cache and purpose of cache
- Definition and basic understanding of how FTP works
- Definition and basic understanding of how DNS works

Transport Layer

- Multiplexing vs. Demultiplexing
- Port
- Common Reserved Port #s (http, https, dns, ftp, ssh)
- UDP vs TCP
- Pros/Cons of TCP and UDP
- Be able to understand application requirements and justify a choice between UDP and TCP
- RDT Principles: Checksum, Timer, Sequence Number, Acknowledgement, Negative Acknowledgement, Pipelining
- TCP Handshake
- TCP Congestion and Flow Control (Window size, timeouts, self-clocking)

Network Layer (Data Plane)

- Forwarding vs Routing
- Forwarding Tables
- Longest Prefix Matching
- IP protocol
- IPv4 vs IPv6
- IP addresses
- Subnets
- Network Bits vs Host Bits (and how to identify them)
- DHCP (what its used for, basic understanding of the process)
- NAT
- SDN and OpenFlow Standard

Network Layer (Control Plane)

- Routing Techniques (Link-state, Distance Vector)
- Centralized Routing Algorithm
- Autonomous Systems
- OSPF vs BGP (When each is used)
- ICMP

Link Layer

- Mac Address (What it is, why we need it, how do we get assigned one)
- Methods for preventing/dealing with collisions (Channel partitioning, token passing, ALOHA)
- ARP (What it is, when it is used)
- LAN
- Packet switches vs routers
- Ethernet
- Ethernet frame components (preamble, crc, addresses)
- Full duplex vs half duplex vs simplex

Network Security

- Confidentiality vs Authentication vs Message Integrity
- Symmetric vs Asymmetric Cryptography
- Basic Cryptosystem Terminology (plaintext, ciphertext, key, encryption, etc)
- Block Cipher
- Asymmetric Crypto: What a public and private key are, when each one is used.
- What the Diffie Hellman Key Exchange is (high level why it is secure, and why it is difficult for a 3rd party to crack the secret)
- Limitations of RSA
- Hashing (what is is, why it works for authentication)
- Message Authentication Code
- Digital Signature (Creating and Verifying)
- TLS (what does it do)
- VPN
- Firewalls
- IDS vs IPS


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