CS 356 (Fall 2014)

Bring a calculator and one page of notes (printed or handwritten)

Review homework solutions

Note: Following lists of major topics for your reference only - It is possible to have exam questions on materials covered in my lectures that are not in the following lists

Chapter 1 topics

Modulation and demodulation, FDM and TDM, Shannon Theorem, and Sampling Theorem

Circuit switching, message switching, packet switching, virtual circuit packet switching; Internet structure

Four components of delay in packet switching; bottleneck and throughput; traffic intensity and server utilization; packet loss

Little's Law, mean value and second moment formulas of a random variable

M/G/1 waiting time and delay formulas (and two special cases), justification of packet switching over circuit switching

Internet layered architecture, encapsulation, de-encapsulation

Chapter 2 topics

Client-server vs P2P architecture

Sockets (welcome, connection, datagram), IP address and port number

Application needs vs transport protocol services

DNS, HTTP, SMTP, P2P:

Stateful vs stateless protocol, complexity at the network’s edge

HTTP - including client-server delay in terms of round-trip times, persistent vs, nonpersistent, cookies and proxy cache, base 64 encoding

SMTP - using ascii characters only, how to deal with it

Various DNS servers and various DNS records

File distribution delay analysis to show why P2P is more scalable than client-server

Sockets for TCP and UDP

Chapter 3 topics

IP address and port numbers, multiplexing/demultiplexing

Services provided by TCP and UDP
Internet checksum, TCP timeout estimation algorithms

Protocol design for Lossy FIFO and Lossy, Reordering, and Duplicative (LRD) channels

Alternating-bit protocol, pipelined protocols

sliding window protocol (general principles and implementation in TCP), cumulative acks

ARQ, sliding window (including selective repeat, and go-back-N) performance analysis

TCP three-way handshake protocol, connection close protocol, SYN flood attack and defense

TCP flow control, TCP congestion control (Reno versus Tahoe, slow start, fast retransmission, fast recovery), TCP throughput