

Midterm Review

- When: **Mar 10 (Tu) 11:00-12:15 pm**
- Where: **ST 302**
- closed-book and closed-notes, you are allowed to bring a cheat sheet to each exam (one letter page single-sided)
- Topics covered
 - Overview: [Kurose&Ross 1.1-1.5]
 - Statistical multiplexing and queues: discrete probability and [Srikant and Ying 3.1-3.4]
 - Application layer: [Kurose&Ross 2.1-2.2, 2.4-2.5, 2.7], [Srikant and Ying 8.2-8.3]
 - Transport layer: [Kurose&Ross 3.1-3.4]

Introduction

- Network edge: hosts/switches/links, services, protocols, access networks
- Network core
 - circuit switching: multiplexing (FDM, TDM)
 - packet switching: store-and-forward, statistical multiplexing
- Performance measures:
 - Four types of delays
 - Queueing and packet loss
 - Throughput

Statistical Multiplexing and Queues

- Discrete probability
- Statistical multiplexing
 - The Chernoff bound
- Discrete-time Markov chains
 - state transition diagram, transition probability matrix
 - irreducible/aperiodic chains, stationary distributions, local balance equations
- Queues: Geo/Geo/1, Little's law

Application layer

- Basic principles
 - client-server vs. peer-to-peer, addressing (IP address & port)
 - transport service requirement of various applications
 - services provided by Internet: TCP, UDP
- Important applications and protocols
 - Web and HTTP: non-persistent vs persistent HTTP, request/response, cookies, web caches
 - Domain Name System (DNS): name resolution procedures, four types of DNS records
 - Peer-to-Peer File Sharing: BitTorrent, file distribution (CS vs. P2P), **structural P2P File sharing**

Transport layer

- Transport-layer services
 - service model, multiplexing/demultiplexing
- Connectionless Transport: UDP
 - checksum
- Principles of reliable data transfer
 - rdt 1.0-3.0
 - GBN
 - SR