



CS118 Discussion
Week 5

Taqi

Outline

- Midterm review
- Course Project 2
- Lecture Review: Network Layer

Midterm

Course Project 2: Reliable Data Transfer over UDP

- You are asked to implement the following functions **on top of UDP**
 - **Reliable data transfer:** Selective Repeat or Go-Back-N protocol
 - Which components are essential in your design?
 - **Data delivery**
 - The receiver sends a request to sender with the name of the file
 - If the file exists, the sender divides the file into multiple packets and send these packets to receiver
 - You can define your own packet header
 - **Congestion control is NOT mandatory, but recommended**

Course Project 2: Reliable Data Transfer over UDP

- To test reliable data transfer, you are asked to **emulate packet loss** in your program
 - Reason: extreme low packet loss in modern LAN
 - Your program accepts three parameters
 - **Pl**: packet loss ratio, i.e., ignore the received packet with probability Pl
 - **Pc**: packet corruption ratio, i.e., treat the received packet as corrupted with probability Pc
 - **CWnd**: window size
 - For congestion control, cwnd should be adaptive. **SSThresh** should be included

Network Layer

- Basic functions for network layer
 - Addressing
 - Routing
 - Fragmentation
- Network layer protocols
 - Addressing and fragmentation: IPv4, IPv6
 - Routing: RIP, OSPF, BGP, DVMRP, PIM
 - Others: DHCP, ICMP, NAT

IP Address

- Globally Recognizable Identifier
- IPv4: 0.0.0.0~255.255.255.255
 - Most IP addresses are globally unique
 - Exception: 10.0.0.0/8, 172.16.0.0/12, 192.168.0.0/16
 - Why?
- Hierarchical Addressing
 - subnet: a portion of addressing space
 - <network address>/<subnet mask>
 - Why hierarchical addressing?

IPv4 Header

- **Header Length:** 4-byte unit
- **Length:** 1-byte unit
- **Fragmentation:** id + MF/DF + offset (8-byte unit)
 - Why do we have to fragment packets?
 - Why not uniform MTU?
- **TTL:** why do we need it?
- **Checksum**
 - Since TCP/UDP already has checksum, is it redundant?
 - Why is it just header checksum, rather than including data?
- **Protocol:** is it always transport layer protocol?
- **Source IP and destination IP**

