

Week 6: Connections and Review

CSCI 4431/6431 Computer Networks

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Guest Lecture

Today

- Guest lecture
- **TCP connection management**: flow control, the handshake, closing
- **Midterm review**: a timeline worksheet, then old worksheet problems worked together

Housekeeping

- **Project 1 Spec v2** due **tonight, 11:59 PM**: tag spec-v2/1
- **Midterm next week, 10/7**, in class
- **Discord** and office hours for questions

TCP Connection Management

Slides: https://gaia.cs.umass.edu/kurose_ross/ppt-9e/Chapter_3_v9.0.pptx

Chapter 3 - Slides 93 - 98: flow control

- The receiver tells the sender how much buffer space it has left: **rwnd**
- The sender keeps in-flight data $\leq$ rwnd

Chapter 3 - Slides 99 - 105: the handshake

- Why a 2-way handshake fails on a network that delays and duplicates
- **SYN → SYN-ACK → ACK**
- Why the starting sequence number must be **fresh**

Chapter 3 - Slide 106: closing

- Each side sends its own **FIN**, and each FIN is ACKed
- The ACK of a FIN may ride on the other side's FIN

Midterm Review

Timeline Worksheet

- **Q1:** draw a DNS lookup, message by message
- **Q2:** draw an HTTP request over one TCP connection, from SYN to FIN

You will be asked to draw timelines like these.

What to Study: Chapters 1–2

Topic	Practice
Throughput and the bottleneck link	Ch. 1 Worksheet Q4, Quiz 2 Q1
Transmission vs. propagation delay, store-and-forward	Ch. 1 Worksheet Q2–Q3
Circuit vs. packet switching	Ch. 1 Worksheet Q1 part 2
Queuing delay: waiting behind the packets ahead of you	<i>Slides only</i>
Page load time: non-persistent, parallel, persistent	Ch. 2 Worksheet Q1, Quiz 2 Q2
DNS: iterated queries and caching	Quiz 3 (DNS), Timeline Worksheet Q1
The Internet's layered architecture	<i>Slides only</i>

What to Study: Chapter 3

Topic	Practice
Seq and ACK numbers, duplicate ACKs, fast retransmit	TCP Worksheet Q1
The handshake, and a whole HTTP connection	Timeline Worksheet Q2, TCP Worksheet Q2–Q3
Walking a state machine, message by message	RDT Worksheet Q1–Q2, Ch. 2 Worksheet Q2
Lost messages, timeouts and retransmissions	UDP Worksheet part 5
Reliable Data Transfer protocols	<i>Slides 53–56 and RDT worksheet/quiz</i>
UDP vs. TCP sockets	Quiz 4 Q2–Q3
Pipelining vs. stop-and-wait	<i>Slides 59–73</i>

Midterm: 10/7

- Chapters **1–3**
- **Not on it:** congestion control, flow control and rwnd, DASH, CDNs, HTTP/2, QUIC, email
- Two questions ask you to **draw** a timeline, and one asks you to **walk a state machine**
- You may bring your **quizzes and worksheets + 1 page of handwritten notes**
 - Don't waste too much time going through your notes!
 - No electronics out

Chapter 3 Resources

- Textbook Slides
- Videos (Full playlist):
 - 3.5 TCP, part 1 and part 2
 - 3.6 Principles of Congestion Control
 - 3.7 TCP Congestion Control