CSE 3461 Final Exam Study Guide
Instructor: Adam C. Champion

The final will cover material on the network and link layers and wireless networks from the course textbook (Kurose and Ross, *Computer Networking: A Top-Down Approach*, 7th ed., Addison Wesley, 2017). The textbook is denoted [CNTDA]. **I strongly suggest you buy a physical copy of [CNTDA] if you haven’t already; I find it’s easier to read on paper.** The final material is from Chapters 4–6 in [CNTDA] (Sects. 6.1–6.3) and the corresponding lecture slides. (If you have the 7th edition, the material includes Sects. 7.1–7.3 due to the book’s reorganization.) Some material is from [CNTDA]’s companion website, http://wps.pearsoned.com/ecs_kurose_compmnetw_6/; click on the link, Student Resources, then Material from Previous Editions. You need to register an account with the publisher using the scratch-off code on your book’s inside front cover before you can read this material. “Material from previous editions” on PPP and Frame Relay will help. Other good free references are:

- Peter Dordal’s book *An Introduction to Computer Networks* (http://intronetworks.cs.luc.edu/); this book is denoted [ICN].

Below, § means Section; §§ means Sections. Sections are given for [CNTDA]’s 6th edition and 7th edition, respectively. For example, (§4.5 or §5.1) means read §4.5 if you have the 6th edition; read §5.1 if you have the 7th.

Chap. 4: Network Layer (6th ed.); Sects. 4.1–4.3, 5.1–5.3 (7th ed.)
- Introduction (§4.1): know the distinction between forwarding and routing; router’s forwarding table; connection setup; network service models (best-effort vs. guaranteed)
- Virtual circuit and datagram networks (§4.2): know the distinction between them; prefixes; longest prefix matching
- Router internals (§4.3): forwarding plane and control plane; input processing; switching (via memory, bus, or crossbar interconnection network); output processing; queuing; head-of-line blocking
- IP (§4.4): know IPv4 datagram format; fragmentation; IPv4 addressing concepts (interfaces, subnets, classful addressing, CIDR); DHCP; NATs and NAT traversal; ICMP (§5.6, 7th ed.); IPv6; dual-stack vs. tunneling approaches for IPv4-to-IPv6 transition
- Routing algorithms (§4.5 or §5.1): know (basic) graph theory; link state and distance vector algorithms and their properties; poisoned reverse; hierarchical routing; ASs and gateways
- Internet routing (§4.6 or §§5.2–5.4): know routing tables; intra-AS routing (IS-IS, RIP, OSPF) (including RIP advertisements, OSPF backbones/areas); inter-AS routing (BGP) (including eBGP, iBGP, AS-PATH and NEXT-HOP properties); stub, multihomed stub, and provider ASs
- Broadcast, multicast routing (§4.7, 6th ed.): know the distinction among unicast, broadcast, multicast, and anycast; flooding and broadcast storms; RPF; (minimum) spanning trees (MSTs) and MST construction algorithms; multicast groups; multicast routing via center-based, source-based trees

Chap. 5: Link Layer (6th ed.); Chap. 6 (7th ed.)
- Intro (§5.1 or §6.1): link layer services (framing, MAC, “reliable” delivery, error handling), network adapters
- Error detection and error correction (§5.2 or §6.2): Know parity check schemes, CRC checksum scheme