CS 181AG
Lecture 24

Final Exam Review

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Course Evaluations

Lecture Material – Quick Reference

- Lecture 1:
  - Intro, circuit switched vs. packet switched networks, intro to layered architecture
- Lecture 2:
  - Local Area Network communication over a single wire: collisions, Aloha, Slotted Aloha, p-persistence, exponential backoff, collision detection, wireless networks
- Lecture 3:
  - Moving beyond one wire: hubs, bridges, selective forwarding, Spanning Tree Protocol
- Lecture 4
  - Intro to Network Layer: IP addresses, public vs private IP, Address Resolution Protocol, routers, forwarding information base

Lecture Material – Quick Reference

- Lecture 5
  - Routing Protocols: Distance Vector (Bellman-Ford), count-to-infinity, poison reverse

- Lecture 6
  - Routing Protocols: Review of Spanning Tree Protocol, Link State (Dijkstra's), temporary loops

- Lecture 7
  - Current topics lecture (not on midterm)

- Lecture 8
  - Intro to Prefix Lookup – unibit tries, multibit tries

Lecture Material – Quick Reference

- Lecture 9
  - Prefix lookup: Variable stride tries, Lulea compressed tries
- Lecture 10
  - Non trie approach to prefix lookup: binary search on prefix lengths, binary search on prefix ranges
- Lecture 11
  - Intro to Packet Classification: firewalls, trie of tries (or grid of tries) with backtracking, grid of tries with keeping all possible sources in source trie
- Lecture 12
  - Packet Classification: Grid of tries with switch pointers, geometric view, divide and conquer using bitmaps

Lecture Material – Quick Reference

- ## Lecture 13
  - Packet Classification: using bitmaps (cont.), not on midterm: decision trees + neural packet classification

- ## Lecture 14
  - Vehicular Networking to Intro to cyber security (not on midterm)

- ## Lecture 15
  - Midterm Review

# Lecture Material – Quick Reference

- Lecture 16:
  - Switching (Take-a-Ticket, PIM, iSLIP)
- Lecture 17, 18:
  - TCP (goals, port numbers, seq/ack numbers, TCP header format, starting/ending a session, congestion control)
- Lectures 19/20:
  - Output Scheduling (Random Early Detect, Token Bucket Algorithm, Deficit Round Robin)

Lecture Material – Quick Reference

- Lecture 21:
  - Sockets and Application Layer

- Lecture 22:
  - DNS –DNS resolver, root/TLD/authoritative servers
  - HTTP – URLs, request, response format

- Lecture 23:
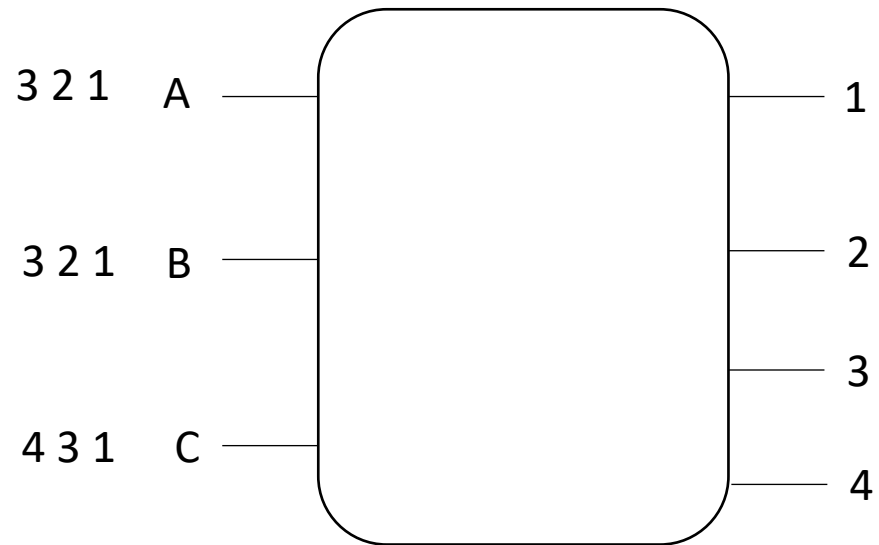 - Security & Wireless (not on midterm)

- Lecture 24
  - Final review

Switching

- Take-a-Ticket

Switching

- iSLIP

3 2 1 A ——

3 2 1 B ——

4 3 1 C ——

1

2

3

4
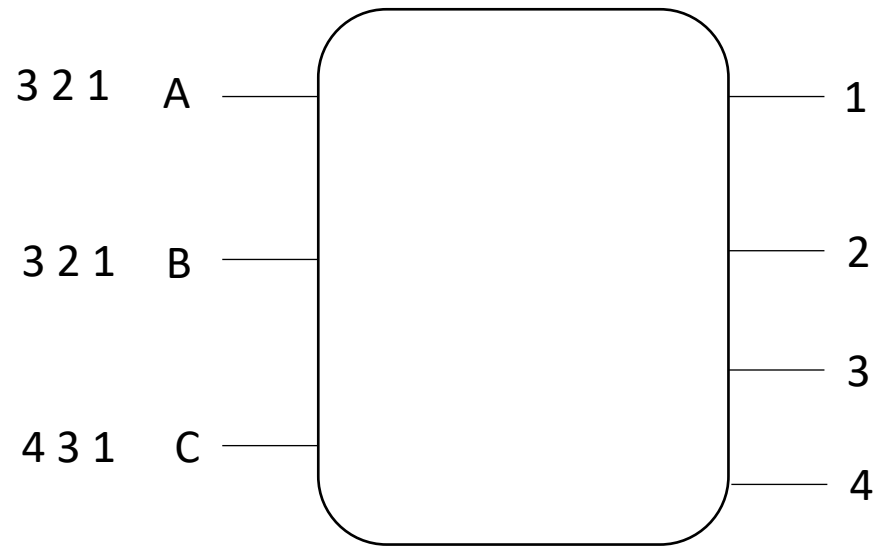
Longest Matching Prefix Methods

- Unibit trie: each node in the trie corresponds to looking at one bit in the IP
  - Easy to insert, memory isn't bad considering you only insert what is needed
  - Can be quite slow – worst-case number of lookup is 32
- Multibit trie: each node in the trie corresponds to looking at multiple bits in the trie
  - Faster and still easy to insert– lowers the number of lookups by looking at multiple bits at a time
  - Requires prefix expansion, which is not very memory-efficient because we now store several prefixes that could be represented by just one
- Lulea compressed trie: use leaf pushing, then use a bit array and val array to represent multibit tries compactly
  - Get the benefit of fast lookup, like multibit, and the efficient memory storage through compression
  - Because it uses leaf pushing, makes insertion very messy and slow