

- IP (About 30 points)
- Why do we need IP?
- IP addressing, calculate IP addresses, subnets.
- Given an address space, how would you allocate addresses to subnets?
- How would you break down a larger subnet (/16) into smaller ones (/24s)? How many of those smaller subnets can you create?
- How does DHCP and ARP work? How do they contribute to creating networks?
- IP service model, fragmentation and reassembly
 - Given multiple hops with different L2 MTU sizes, calculate fragment number, packet sizes, and offset.
- NAT – why do we need it, what is a NAT table, show such a table
- ICMP – why needed, are they part of IP? What purpose does it serve? What makes traceroute work?

Routing (about 30 points)

- Routing vs switching,
 - Dijkstra's, Link state, Bellman ford, Distance vector, calculate a link state/distance vector table, count to infinity problem.
 - What are the differences between link state and distance vector?
- Why do we need interdomain routing?
 - How do we scale interdomain routing?
- BGP4 (about 30 points)
 - Why do we need BGP?
 - What information does BGP provide?
 - Goals of BGP
 - How does BGP allow for policies?
 - How does the BGP path vector protocol work?
 - Tables of BGP and how they work
 - BGP attributes – AS PATH, next hop, local_pref, MED

- Given a topology and a number of attributes, you will show how you can control traffic using those attributes
- Differences between different attributes
 - e.g., If you were sending traffic to another AS, would you use local_pref or MED
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