

In **routing**, mention destination, next hop, cost and CIDR (if asked). In **BGP**: From perspective of mentioned node, mention how every part of network can be reached. Make table on basis of that. In **DV routing of WAN**, routing congestion = $(\text{totalLinks}-1)(\text{duplex})(\text{number of switches})(\text{bit storage number})$. In next hop routing, if required for P, Q, R, consider routing to *all* destinations, and add take shortest route from source to destination, and add the cost between source and lowest cost next neighbour. **Split Horizon** prevents a router from sending routing information about a route back in the direction from which it came. **Route poisoning** uses D-V routing to send an infinite metric (eg 16) about a link that is down. Different note: **Route convergence** is the process of a network topology adjusting to changes in routing information, such as a link failure or a new route being advertised. **BGP** does not guarantee convergence because it does not have any control mechanisms in place that can determine whether or not a route has been converged. It can only detect changes in path attributes, and it relies on the neighboring routers to update their local routing tables. This means that each router can have different views of the same network, resulting in a lack of convergence. **DHCP**: 4 types of messages in DHCP: Discover, Offer, Request, Ack. In **Full-Duplex**, do not add time for ACK, it piggybacks on a returning data packet.

In **Congestion Control: Slow start** - sending small packets

In **subnetting**: `255.255.255.0` means the range can be 192.168.1.0-192.168.1.255, but total usable addresses are $256-3=253$, the 3 addresses reserved are .0 (network addr), .1 (default addr) and .255 (broadcast addr). 8 bits = 1 byte. Each IP is 32 bits, 4 bytes. Convert all

octets to binary representation incase too confused. To convert to binary use $2^{128}, 2^{64}, 2^{32}, 2^{16}, 2^8, 2^4, 2^0$ trick. To find **range from subnet mask**, convert subnet mask and network to binaries, and match. Where both 1, keep 1, otherwise 0. To turn CIDR into subnet mask and IP, turn the IP to binary, count from 0 till CIDR number (`/number`), keep that 1, rest 0 - that's your subnet mask. **Quick Hack** for IP addressing problem. If you want to reserve `N` bits, then your CIDR number is `32-N`.

Data Link Layer: The two sublayers are the Logical Link Control (LLC) sublayer and the Media Access Control (MAC) sublayer. The LLC sublayer is responsible for providing an interface between the network layer and the MAC sublayer. It implements a number of functions including error control, frame sequencing, and flow control. The MAC sublayer is responsible for controlling access to the shared communication media. It implements the medium access control protocol and provides the means for devices to communicate over the network. **ARP** is **address resolution protocol**.

1Byte=8bit. **Bandwidth Delay product** = bandwidth or capacity * Delay or RTT. Number of bits needed to represent the sequence number = $\log_2(SWS + RWS)$. S&W: SWS=RWS=1, GBN:RWS =1,SR: SWS=RWS. SR gives us highest amount of control, SW lowest.