

1. Course Handout: Topic 4, Question 13
2. You are running an ISP where you have been provisioned the 185.157.255.0/24 block of IPv4 addresses.
 - (a) You have three customers *A*, *B*, and *C*. *A* would like a subnet for at least 100 hosts, *B* and *C* need subnets that allow for 40 hosts each. Design a subnetting scheme to satisfy the above requests.
 - (b) Customer *A*'s organization has shrunk to only 13 hosts. Also, two new customers *D* and *E* have signed up, with each requesting blocks of at least 30 IPs. Modify your subnetting scheme to accomodate these changes.
 - (c) Customer *E* is growing. They would like an additional 50 IP addresses. Is it possible for you to accomodate this request? What if a customer is willing to have their IPs spread across multiple subnets?
 - (d) Explain why a /26 subnet can only support 62 hosts.
3. IPv6 Addresses
 - (a) Write the following IPv6 address in shortened form:
2041:0000:140F:0000:0000:0000:875B:131B
 - (b) Suppose the network interface has hardware id 00:e0:4c:53:44:58. What *should* the link-local IPv6 address for that interface be? Explain why on Windows and Mac OS X the address the computer picks might not match the address specified in the RFC.
 - (c) BT, my ISP, provides each customer a /56 IPv6 network block. If my IP is 2a00:23c4:bf9:6801:a58f:b33f:26ad:d13c, what is the routing prefix? How many subnets can I have on my network?
4. Questions about DHCP and SLAAC
 - (a) When a host first joins an IPv4 network, to obtain an IP address via DHCPv4, what IP address does it need to send a packet to?
 - (b) What key pieces of information is provided to a newly connected host in a DHCPv4 offer?
 - (c) When joining an IPv6 network, how does a host know whether to use SLAAC or DHCPv6?
 - (d) DHCPv6 messages differ from DHCPv4 messages in that they no longer contain information about DNS servers and gateway IPs. Where do hosts obtain this information from instead?