1. 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) My ISP provides each customer a /56 IPv6 network block. If my IP is
        `2a00:23c4:bfb9:6801:a58f:b33f:26ad:d13c`, what is the routing pre-
        fix? How many subnets can I have on my network?

2. DHCP and SLAAC

    (a) On a network with a DHCPv4 server, hosts can obtain an IP address
        from a DHCPv4 server. How does the host know how to reach the DHCP
        server?

    (b) How does a DHCPv4 server send a reply message back to a new host
        when the new host does not yet have an IP?

    (c) What is the point of the gateway IP provided in the DHCPv4 message?

    (d) DHCPv6 messages differ from DHCPv4 messages in that they no longer
        mandate information about DNS servers and gateway IPs. Where can
        hosts obtain this information from instead?

3. Give a scenario where each of the following IPv4 to IPv6 transition technologies
   would be useful

    (a) 4in6 - Allows tunneling of IPv4 traffic in IPv6 packets

    (b) 6in4 - Allows tunneling IPv6 traffic in IPv4 packets

    (c) NAT64 - Allows multiple IPv6 hosts to share a single IPv4 address