1. Suppose two nodes start to transmit at the same time a packet of length L over a broadcast channel of rate R. Denote the propagation delay between the two nodes as dprop. Will there be a collision if dprop < L/R? Why or why not?

Solution:

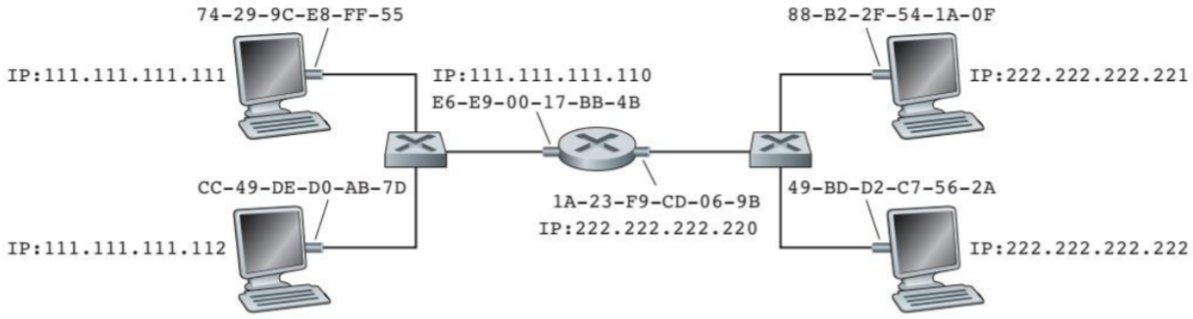
There will be a collision in the sense that while a node is transmitting it will start to receive a packet from the other node.

2. Why is an ARP query sent within a broadcast frame? Why is an ARP response sent within a frame with a specific destination MAC address?

Solution:

An ARP query is sent in a broadcast frame because the querying host does not which adapter address corresponds to the IP address in question. For the response, the sending node knows the adapter address to which the response should be sent, so there is no need to send a broadcast frame (which would have to be processed by all the other nodes on the LAN).

3. For the given network, the router has two ARP modules, each with its own ARP table. Is it possible that the same MAC address appears in both tables?



Solution:

No it is not possible. Each LAN has its own distinct set of adapters attached to it, with each adapter having a unique LAN address.

4. Suppose the information content of a packet is the bit pattern 1110 0110 1001 1101 and an even parity scheme is being used. What would the value of the field containing the parity bits be for the case of a two-dimensional parity scheme? Your answer should be such that a minimum-length checksum field is used.

Solution:

1 1 1 0 1

0 1 1 0 0

1 0 0 1 0

1 1 0 1 1

1 1 0 0 0

5. Consider the 7-bit generator, G=10011, and suppose that D has the value 1010101010. What is the value of R?

Solution:

If we divide 10011 into 1010101010 0000, we get 1011011100, with a remainder of R=0100. Note that, G=10011 is CRC-4-ITU standard.