1. In the following network, suppose A needs to send an IP datagram to B.

   ![Diagram of the network showing interfaces and IP/MAC addresses]

   **a.** The destination hardware address in the Ethernet header of the Ethernet frame that leaves A's interface will be:

   **b.** A will have to make an ARP request for the HW address of the interface with IP:

   **c.** As the Ethernet frame encapsulating this datagram leaves eth1 interface of R1, the destination IP and destination MAC address fields will be:

   **d.** Consider the following ARP message that was seen on the wire between R1 and R2.

   ```plaintext
   0: 0905 a0d0 b312 xxxx xxxx xxxx 0806 0001
   16: 0800 0604 0002 yyyyyy yyyyyyyyy c0a8 04c8
   32: 0905 a0d0 b312 c0a8 04fa 0000 0000 0000
   48: 0000 0000 0000 0000 0000 0000
   xxxx xxxx xxxx = ?
   yyyy yyyy yyyy = ?
   ```

   **e.** Construct the ARP request that R2 will broadcast to discover the MAC address of 192.168.12.45
2. Is the netmask of a network relevant to ARP?

3. Why is hardware address necessary in an Ethernet header?

4. If an Ethernet card has HW address 00:C0:F0:3C:26:DB, who is its manufacturer?