1.  **(5 points total)** Consider a wireless network operating according to the 802.11b protocol.  The network has two access points AP1 and AP2, but unfortunately, they were configured independently and both use channel 1.  We focus on three hosts in the network (there could be others), A, B, and C, where A can hear B but not C, B can hear both A and C, and C can hear B but not A.  All hosts can hear both access points.  Hosts A and B are associated with AP1 and host C is associated with AP2.  RTS/CTS is disable in all hosts and the APs.

    **(1 point)** What mechanism would be involved in allowing the different hosts to associate with different access points?

    **(4 point)** At time $t$=0, AP1 is transmitting a packet to some hosts (say, D), and the transmission will last until $t$=400µs.  At time $t$=100µs host A gets a packet to transmit, but senses that the medium is busy and initializes its backoff timer to 100µs.  At time $t$=150µs host C gets a packet to transmit, but senses that the medium is busy and initializes its backoff timer to 600µs.  At time $t$=200µs host B gets a packet to transmit, but senses that the medium is busy and initializes its backoff timer to 300µs.  At time $t$=400µs AP2 starts transmitting a packet to some host (say F), and its transmission lasts for 400µs as well.
    When do hosts A, B, and C start sending their packets, and which of them are delivered successfully?  Assume that all packets from A, B, and C take 200µs to transmit, and ignore time spent on ACKs and/or *IFS.

2.     **(5 points total)** Consider a simple block cipher encryption scheme that operates on 8-bit blocks.  Encryption proceeds in two steps: (1) swap the first and last four bits of an 8-bit block, *e.g.,* 11100111 becomes 01111110, (2) add 15 to the resulting 8-bit block and throw away any overflow bits.  To improve the scheme's security, cipher block chaining is used prior to the encryption step.  The initial vector (IV) is set to 10101010.

Assume a clear text input of the form: 00001111 11101110 11001100, what would be the cipher text?