ECE 265
Homework #5

Problems:

1. Write a short program segment to accomplish each of the following. You can assume that the registers are all available to be used.

   a) Without using the multiply instruction, multiply A by 6. Hint: multiplication by any power of 2 is easily performed by a left shift operation. Note that 6=2+4.

   b) Go to `HIGHER` if the address in X is bigger than the one in Y; go to `SAME` if they are the same and go to `LOWER` if the address in X is smaller than the one in Y. Don't change either X or Y.

   c) Replace the contents of A with 99 if it were originally larger than that.

   d) Suppose that X points to the most significant byte of a four-digit BCD number that is packed in two bytes. Suppose Y points to the most significant byte of another four-digit BCD number. Add the X BCD number to the Y BCD number and store the result in D.

   e) Check to see if the least significant bit of B (bit 0) is a 1, and branch to `ONE` if it is.

   f) Set the most significant bit of memory location `PORT` without changing any of the other bits.

   g) Go to `ODD` if memory location `CHECK` contains an odd number. Don't destroy `CHECK`.

2. Write a subroutine that produces the ASCII code for two HEX digits. Assume that on entry to the subroutine, the A accumulator contains the HEX digits. On exit, the A and B accumulators are to contain the ASCII code for the two digits. For example, on entry:

   A = $4C = %01001100

   On exit,

   A = '4 = $34
   B = 'C = $43

   Hint: what is the difference between a digit in the range of 0 to 9 and its ASCII code? How about for a digit in the range of A to F?

   Be sure to provide comments for every few instructions in your program. Make this a practice for any programs that you write for the homework or computer projects.

3. Write a subroutine that subtracts two BCD numbers. Assume that accumulators A and B contain the two-digit numbers on entry to the subroutine, and that A is to contain the result on exit from the subroutine. For example, on entry:

   A = $80
   B = $49

   On exit,

   A = $31

   Assume that the result will be positive in all cases.

   Hint: a BCD number can be subtracted from another by taking the ten's complement of the subtrahend and adding to the minuend. The ten's complement of a BCD number is found by taking the 9's complement and adding 1. For example:

   B = $49

   tens's complement of B = $99 - B + 1 = $51 .