Due at the start of class Wednesday, September 24, 2003.

Problem 1. Assume we use 8 bits to store numbers. Consider the number 45. Show its representation in

(a) Unsigned binary
(b) Signed magnitude
(c) 1's complement
(d) 2's complement
(e) excess/bias
(f) BCD (Binary Coded Decimal)

Problem 2. Assume we use 8 bits to store numbers. Consider the number -45. Show its representation in

(a) Signed magnitude
(b) 1's complement
(c) 2's complement
(d) excess/bias

Problem 3. Assume you have logic where you can represent three values (0,1,2) for each location, so that you have "trits" rather than bits.

(a) How many different numbers can you represent using k trits? How many different numbers can you represent using 6 trits?
(b) How would you represent numbers in "unsigned trinary"? Write 45 as a six-trit unsigned trinary number.
(c) How would you represent numbers in "signed magnitude"? Write 0, 45, and -45 as six-trit signed magnitude numbers.
(d) How would you represent numbers equivalently to binary 1's complement? (You would like to have approximately the same number of positive numbers as negative numbers.) What should you call this notation? Write 0, 45, and -45 as six-trit numbers in your representation.
(e) How would you represent numbers equivalently to binary 2's complement? (You would like to have approximately the same number of positive numbers as negative numbers.) What should you call this notation? Write 0, 45, and -45 as a six-trit numbers in your representation.
(f) How would you represent numbers in excess/bias? (You would like to have approximately the same number of positive numbers as negative numbers.) Write 0, 45, and -45 as six-trit excess/bias numbers.
(g) How would you represent numbers in "TCD (Trinary Coded Decimal)". Write 45 as a six-trit TCD number.