CS M51A, Sec. 1, Class Exercises No. 1

Ex. 2.11

a) For the integer with decimal representation 34567, give the corresponding bit-vectors for the BCD code and for the Excess-3 code.

b) Perform the subtraction of $z_{10} = (99999_{10} - 34567_{10})$ for the integers represented in BCD and in the 2-4-2-1 codes. Use the fact that in the 2-4-2-1 code the complement with respect to 9 is obtained by complementing each bit.

Ex. 2.13

a) Determine the radix-16 representation of the integer whose radix-2 representation is 1001010100011110.

Hint: partition the radix-2 vector into groups of four bits and determine the radix-16 digit values which are coded by each group (using the binary code).

b) Determine the radix-2 representation of the integer whose radix-8 representation is 3456.

Hint: code each radix-8 digit using the binary code and concatenate the resulting groups of three bits.

c) Using the hints above, give a procedure to convert from radix-2 to radix-2^k and vice-versa.

Ex. 2.15 Prove or disprove the following equalities, by constructing the corresponding tables.

a) $f_{\text{XOR}}(f_{\text{AND}}(x_1, x_0), f_{\text{AND}}(x_1, x_0)) = f_{\text{EQUIVALENCE}}(x_1, x_0)$

b) $f_{\text{NAND}}(f_{\text{NAND}}(x_1, x_0), f_{\text{NAND}}(x_1, x_0)) = f_{\text{AND}}(x_1, x_0)$

Ex. 2.16 Determine the number of different switching functions of n variables.