Homework #2

1.25 Represent the decimal number 6,514 in (a) BCD, (b) excess-3 code, (c) 2421 code, and (d) a 6311 code.

1.28 Write the expression "George B." in ASCII, using an eight-bit code. Include the period and the space. Treat the leftmost bit of each character as a parity bit. Each eight-bit code should have odd parity. (George Boole was a 19th-century mathematician. Boolean algebra, introduced in the next chapter, bears his name.)

2.1 Demonstrate the validity of the following identities by means of truth tables:
(a) DeMorgan's theorem for three variables: $(x + y + z)' = x'y'z'$ and $(xyz)' = x' + y' + z'$

2.3 Simplify the following Boolean expressions to a minimum number of literals:
(a)* $A'B'C + AB'C + BC$ (b)* $x'y'z' + y'z$

2.9 Find the complement of the following expressions:
(a)* $x'y' + xy$ (b) $ac + ab' + a'bc'$

1.25 (a) $(6514)_{10} = (0110\ 0101\ 0001\ 0100)_{BCD}$ #

(b) BCD 每位+3 轉 2 進位

$(6514)_{10} = (1001\ 1000\ 0100\ 0111)_{excess\text{-}3}$ #

6+3 5+3 1+3 4+3

(c) **2421碼** [編輯]

2421碼是一種有權碼，權值由高到低分別為2、4、2、1，特點是大於等於5的4位元二進位數中最高位為1，小於5的最高位為0。如5的2421碼表示為1011而不是0101。

$(6514)_{10} = (1100\ 1011\ 0001\ 0100)_{2421}$ #

2×1 + 4×1　2×1 + 2×1 + 1×1　1×1　4×1

(d) 帶權 code rule: Σ weight ⇒ 進位

$(6514)_{10} = (1000\ 0111\ 0001\ 0101)_{6311}$ #

use these table

6311-code

6	3	1	1
0	0	0	0
0	0	0	1
0	0	1	1
0	1	0	0
0	1	0	1
0	1	1	1
1	0	0	0
1	0	0	1
1	0	1	1
1	1	0	0

1.28 "George B." (odd parity: # of 1 is odd)

= (11000111 11100101 11101111 11110010

01100111 11100101 00100000 11000010

10101110)ASCII

2.1 (a)

x	y	z	(x+y+z)	(x+y+z)'	x'y'z'
0	0	0	0	1	1
0	0	1	1	0	0
0	1	0	1	0	0
1	0	0	1	0	0
0	1	1	1	0	0
1	0	1	1	0	0
1	1	0	1	0	0
1	1	1	1	0	0

$\Rightarrow (x+y+z)' = x'y'z'$ □

2.1(b)

x	y	z	$(xyz)'$	$x'+y'+z'$
0	0	0	1	1
0	0	1	1	1
0	1	0	1	1
1	0	0	1	1
0	1	1	1	1
1	0	1	1	1
1	1	0	1	1
1	1	1	0	0

$\Rightarrow (xyz)' = x' + y' + z'$

2.3(a) $A'B'C + AB'C + BC = B'CA' + B'CA + BC$ (commutitive)

$= B'C(A'+A) + BC$ (distributive)

$= B'C + BC$ $(A'+A=1)$

$= CB' + CB$ (commutitive)

$= C(B'+B)$ (distributive)

$= C$ $(B'+B=1)$

(b) $x'y'z' + y'z = y'x'z' + y'z$ (commutitive)

$= y'(z+z')(z+x')$ (distribution)

$= y'(x'+z)$

2.9. (a) $(x'y'+xy)'$

$= ((x'y')')(xy)'$ (DeMorgan's Thm)

$= (x+y)(x'+y')$ (DeMorgan's Thm)

(b) $(ac+ab'+a'bc')'$

$= ((ac)')((ab')')((a'bc')')$ (DeMorgan's Thm)

$= \cancel{(a'+c')(a'+b)(a+b'+c)}$ (DeMorgan's Thm)

$a \oplus bc'$