Example problems chapter 1

Ex 1-2. Hexadecimal Addition

Addition $(59F)_{16} + (E46)_{16}$: $= 13E5$

Hex	Equivalent Decimal Calculation			
	1 ← Carry 1	1 ←		Carry 1
59F	5	9	15	
E46	14	4	6	
	1 19 = 16+3	E	21 = 16+5	
	1 ← 3	E	5	

1-3 $(762)_8 \times (45)_8$

octal	octal	Dec	octal
762	5×2	= 10 = 8+2	= 12
45	5×6+1	= 31 = 24+7	= 37
4672	5×7+3	= 38 = 32+6	= 46
3710	4×2	= 8 = 8+0	= 10
43772	4×6+1	= 25 = 24+1	= 31
	4×7+3	= 31 = 24+7	= 37

→ number of 8's

Ex 1-4 Convert Decimal to octal

153 to octal

153/8 = 19 + 1/8 , Reminder = 1

19/8 = 2 + 3/8 = 3

2/8 = 0 + 2/8 = 2

so, $(153)_{10} = (231)_8$

Ex 1-5. Convert 41 to binary

	remider
41/2 = 20	= 1
20/2 = 10	= 0
10/2 = 5	= 0
5/2 = 2	= 1
2/2 = 1	= 0
1/2 = 1	= 1

$(41)_{10} = (100101)_2$

Ex 1-6 Convert Decimal Fractions to Binary

0.6875 to Binary. $0.6875 \times 2 = 1.3750$ Integer = 1

$0.3750 \times 2 = 0.7500$ = 0

$0.7500 \times 2 = 1.5000$ = 1

$0.5000 \times 2 = 1.0000$ = 1

$(0.6875)_{10} = (0.1011)_2$

Ex 1-7 Conversion of Decimal Fraction to octal

0.513 to 3 digital octal fraction

$0.513 \times 8 = 4.104$ Integer = 4

$0.104 \times 8 = 0.832$ = 0

$0.832 \times 8 = 6.656$ = 6 only choose three

$0.656 \times 8 = 5.248$ = 5

$(0.513)_{10} = (0.407)_8$

Chapter 2 Examples

2-2 Complementing Functions

$$\overline{F_1} = \overline{\bar{x}y\bar{z} + x\bar{y}z} = \overline{\bar{x}y\bar{z}} \cdot \overline{x\bar{y}z}$$
$$= (x + \bar{y} + z)(\bar{x} + y + \bar{z})$$

$$\overline{F_2} = \overline{x(\bar{y}\bar{z} + yz)} = \bar{x} + \overline{(\bar{y}\bar{z} + yz)}$$
$$= \bar{x} + \overline{\bar{y}\bar{z}} \cdot \overline{yz}$$
$$= \bar{x} + (y + z)(\bar{y} + \bar{z})$$

2-3 Comple by using duals

$$F_1 = \bar{x}y\bar{z} + x\bar{y}z = (\bar{x}y\bar{z}) + (x\bar{y}z)$$

The dual for F_1 is

$$(\bar{x} + y + \bar{z})(\bar{x} + \bar{y} + z)$$

Complementing each literal, $(x + y + \bar{z}) = \bar{F}_1$

$$F_2 = x(\bar{y}\bar{z} + yz) = x((\bar{y}\bar{z}) + (yz))$$

The dual of F_2 is

$$x + (\bar{y} + \bar{z})(y + z)$$

Complementing each literal

$$\bar{x} + (y + z)(\bar{y} + \bar{z}) = F_2$$

Ex 2-4 $G(A,B) = \bar{A}B + A\bar{B}$

Ex 2-5 Three variable map simplification 1

$F(A,B,C) = \Sigma m(0,1,2,3,4,5)$

$F = \bar{A} + \bar{B}$

Ex 2-6. Three variable map simplification 2

$G(A,B,C) = \Sigma m(0,2,4,5,6)$

$m_0 + m_2 = \bar{A}\bar{B}\bar{C} + \bar{A}B\bar{C} = \bar{A}\bar{C}(\bar{B}+B) = \bar{A}\bar{C}$

$\bar{B}+B = 1$

Ex 2-7

$H(A,B,C) = \Sigma m(1,3,4,5,6)$

$H(A,B,C) = \bar{A}C + A\bar{B} + A\bar{C}$

Ex 2-8

$F(A,B,C,D) = \Sigma m(0,1,2,4,5,6,8,9,10,12,13)$

$F = \bar{C} + \bar{A}\bar{D} + \bar{B}\bar{D}$

Ex 2-9

$G(A,B,C,D) = \bar{A}\bar{C}\bar{D} + \bar{A}D + \bar{B}C + CD + A\bar{B}\bar{D}$

②

$= \Sigma m(0,1,2,3,4,5,7,8,10,11,15)$

$= \bar{B}\bar{D} + \bar{A}\bar{C} + CD$

Example 2-12. Simplifying a Fraction Using the selection Rule

$F(A,B,C,D)$

$= \bar{A}\bar{C} + ABD + A\bar{B}C + \bar{A}\bar{B}\bar{D}$

Example 2-13 Simplifying a product-of-sums

$F(A,B,C,D) = \Sigma m\,(0,1,2,5,8,9,10)$

$\bar{F} = AB + CD + B\bar{D}$

$F = (\bar{A}+\bar{B})(\bar{C}+\bar{D})(\bar{B}+D)$

$= (\bar{A}+\bar{B}+C)(B+D)$

$= AB\bar{C} + \bar{B}\bar{D}$

2-14 - Simplification with Don't care Condition

$F(A,B,C,D) = \Sigma m(1,3,7,11,15)$

$d(A,B,C,D) = \Sigma m\,(0,2,5)$

$F = CD + \bar{A}\bar{B}$

$= CD + \bar{A}D$

$\bar{F} = \bar{D} + A\bar{C}$

$F = D(\bar{A}+C)$.