

Digital Design Supervision 1

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1 Ex1

1.2.1 $a.b.c + a.c.\bar{c} = a.b.(c + \bar{c}) = ab$

1.2.2 $a(\bar{a} + b) = a\bar{a} + ab = 0 + ab = ab$

1.2.3 $(a + c)(\bar{a} + b)$

$\bar{a}c + ab + cb$

$\bar{a}c + ab + (\bar{a} + a)cb$

$\bar{a}c + ab$ (adsorbition) btw. this is consensus

1.2.4 $(a + c)(a + d)(b + c)(b + d)$

$\overline{\bar{a}\bar{c} + \bar{a}\bar{d} + \bar{b}\bar{c} + \bar{b}\bar{d}}$

$\bar{a} + \bar{b} + \bar{c} + \bar{d}$

$ab + cd$

2 Ex2

3 Ex3

4 Ex4

(a) $\overline{abc\dots} = \bar{a} + \bar{b} + \bar{c}\dots$

$\overline{a + b + c\dots} = \bar{a}\bar{b}\bar{c}\dots$

(b) Minterms: the junction of all variables in complemented or uncomplemented form

Essential terms: covers a term that no other term covers it. (Do you mean Essential Prime terms or not?)

prime terms: cannot be further combined.

(c) sum of products form: disjunctions of junction (OR of AND variables).

minimised sum of products form: simplified SOP by K-map or Q-M method

disjunctive normal form: the disjunction of its minterms

(d) All circles are essential prime term.

minimum SOP: $bd + bc + \bar{a}d + \bar{a}c + \bar{a}\bar{b}\bar{c}\bar{d}$

5 Ex5

(a) $(X + Y)(X + Z)$

$$\overline{XY + XZ}$$

$$\overline{X(Z + Y)}$$

$$X + YZ$$

(b) The same as 1.2.3

(c) Tristate Buffer

$$(d) (A + B + \bar{C}DE)(A + \bar{D} + E)(\bar{A} + C)$$

$$(AC + \bar{A}(B + \bar{C}DE))(A + \bar{D} + E)$$

$$(AC + \bar{A}B + \bar{A}\bar{C}DE)(A + \bar{D} + E)$$

$$AC + AC\bar{D} + ACE + 0 + \bar{A}\bar{D}B + \bar{A}BE + 0 + 0 + \bar{A}\bar{C}DE$$

$$AC + \bar{A}\bar{D}B + \bar{A}BE + \bar{A}\bar{C}DE$$

(e) cell adjacency: 010 011 001 000 100 101 111 110
method: a(n-1) and reversed a(n-1) then add 0 or 1 to head. (f) picture

6 Ex6

7 Ex7

8 Ex8