Digital Electronics (Diploma Only) 2004

p10q1
SWM

Context: Boolean algebra (lecture 2)
Logic minimisation (lecture 3)

(a) De Morgan's theorem: $\overline{a.b} = \bar{a} + \bar{b}$

$\overline{a+b} = \bar{a}.\bar{b}$

(b) A minterm of n Boolean variables is the conjuction of all variables in either their complemented or uncomplemented form

A prime implicant is a term which cannot be further combined.

An essential term is a prime implicant ~~that no other~~ which covers a minterm that no other prime implicant covers.

(c) K-map for $f = (a.b) \oplus (c+d)$:

	a		b	
	0	0	1	0
c	1	1	0	1
c, d	1	1	0	1
d	1	1	0	1

$f = \bar{a}.c + \bar{b}.c + \bar{a}.d + \bar{b}.d + a b \bar{c} \bar{d}$

All terms are prime & essential terms

(d) K-map for f above with don't cares for a.b

	a		b	
	0	0	X	0
c	1	1	X	1
c, d	1	1	X	1
d	1	1	X	1

f is now $= c + d$