

Sample Midterm 1 Solutions

Problem 1:

$$(a) \quad F' = [(A'(B+C) + C')(A+B) + (ABC)'] \\ = [(A+B'C')C + A'B'](ABC)$$

$$F = (B+C)(A+B)(A+1) + AC' \\ = (AB+B+AC+BC)(A+1) + AC' \\ (b) \quad = (AB+AB+AC+ABC+AB+B+AC+BC) + AC' \\ = (B+AC) + AC' = A+B$$

Problem 2:

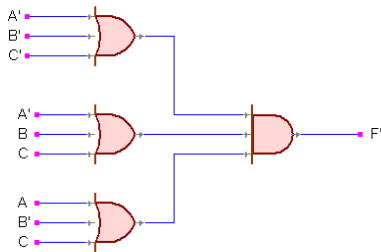
$$(a) \quad F = (A+B+C+D')(A+B+C'+D)(A+B+C'+D')(A+B'+C+D)(A+B'+C+D')$$

(b) Five 4 input OR gates, one 5 input AND gate

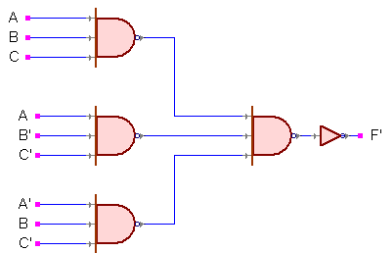
(c) Eleven 4 input AND gates, one 11 input OR gate

Problem 3: (Typo in sample midterm?)

$$(a) \quad F' = [ABC + AB'C' + A'BC'] \\ = (A' + B' + C')(A' + B + C)(A + B' + C)$$

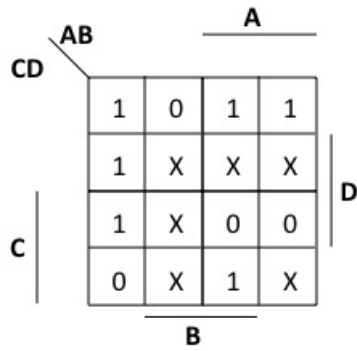


(b)

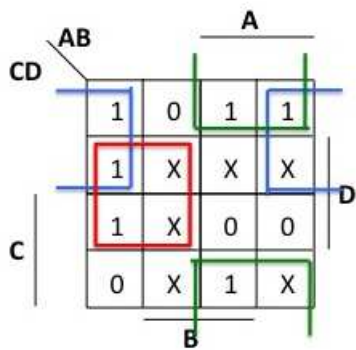


Problem 4:

(a)



(b)

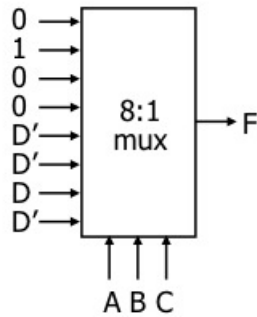


(c) $F = B'C' + AD' + A'D$

Problem 5:

(a)

A	B	C	D	F	
0	0	0	0	0	0
0	0	0	1	0	
0	0	1	0	1	1
0	0	1	1	1	
0	1	0	0	0	0
0	1	0	1	0	
0	1	1	0	0	0
0	1	1	1	0	
1	0	0	0	1	D'
1	0	0	1	0	
1	0	1	0	1	D'
1	0	1	1	0	
1	1	0	0	0	D
1	1	0	1	1	
1	1	1	0	1	D'
1	1	1	1	0	



(b)

A	B	C	D	F	
0	0	0	0	0	C
0	0	0	1	0	
0	0	1	0	1	
0	0	1	1	1	
0	1	0	0	0	0
0	1	0	1	0	
0	1	1	0	0	
0	1	1	1	0	
1	0	0	0	1	D'
1	0	0	1	0	
1	0	1	0	1	
1	0	1	1	0	
1	1	0	0	0	C'D+ CD'
1	1	0	1	1	
1	1	1	0	1	
1	1	1	1	0	

