

EGC221 Class Notes 2/23/2022



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□ TABLE 2-6

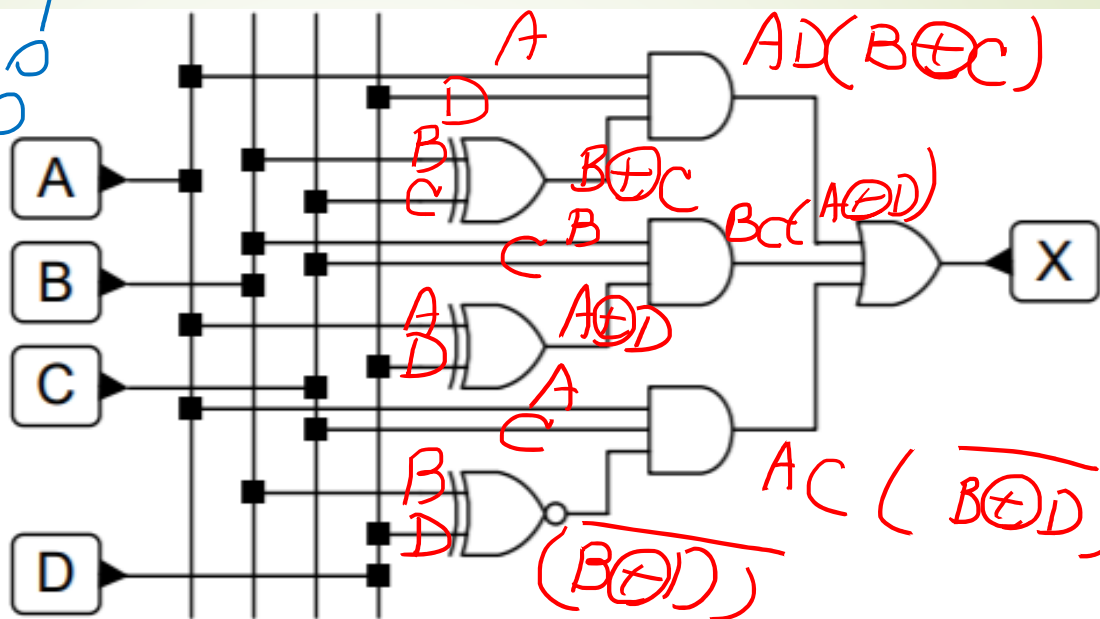
Basic Identities of Boolean Algebra

1. $X + 0 = X$	2. $X \cdot 1 = X$	
3. $X + 1 = 1$	4. $X \cdot 0 = 0$	
5. $X + X = X$	6. $X \cdot X = X$	
7. $X + \bar{X} = 1$	8. $X \cdot \bar{X} = 0$	
9. $\overline{\bar{X}} = X$		
10. $X + Y = Y + X$	11. $XY = YX$	Commutative
12. $X + (Y + Z) = (X + Y) + Z$	13. $X(YZ) = (XY)Z$	Associative
14. $X(Y + Z) = XY + XZ$	15. $X + YZ = (X + Y)(X + Z)$	Distributive
16. $\overline{X + Y} = \bar{X} \cdot \bar{Y}$	17. $\overline{X \cdot Y} = \bar{X} + \bar{Y}$	DeMorgan's

B	C	$B \oplus C$
0	0	0
0	1	1
1	0	1
1	1	0

$$X = \sum m(7, 10, 13, 14, 15)$$

$$(B \oplus C) = \bar{B}C + B\bar{C}$$



$$X = AD(B \oplus C) + BC(A \oplus D) + AC(\overline{B \oplus D})$$

$$= AD(\bar{B}C + B\bar{C}) + BC(\bar{A}D + A\bar{D}) + AC(\bar{B}\bar{D} + BD)$$

$$= \underbrace{A\bar{B}CD}_{m_{11}} + \underbrace{A\bar{B}\bar{C}D}_{m_{13}} + \underbrace{\bar{A}BCD}_{m_{7}} + \underbrace{A\bar{B}C\bar{D}}_{m_{14}} + \underbrace{A\bar{B}C\bar{D}}_{m_{10}} + \underbrace{A\bar{B}CD}_{m_{15}}$$

8421

$$F = \sum m(7, 10, 11, 13, 14, 15) \quad BCD(\bar{A}+A)$$

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

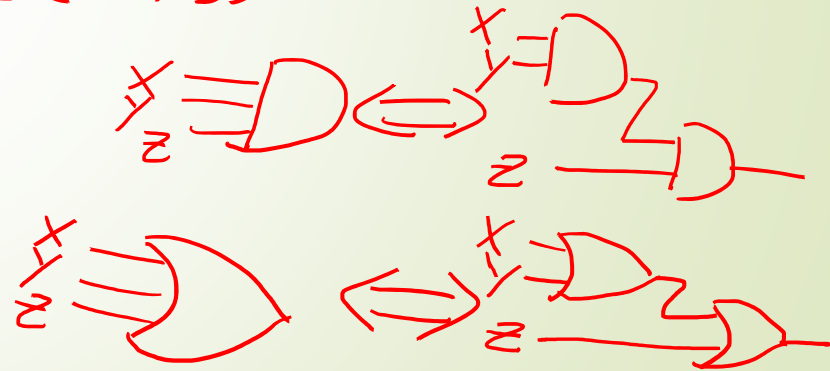
	\bar{C}		C		
AB	00	01	11	10	
\bar{A}	0	1	3	2	\bar{B}
A	4	5	7	6	B
	12	13	15	14	\bar{B}
	8	9	11	10	B
	\bar{D}	D	\bar{D}	D	

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

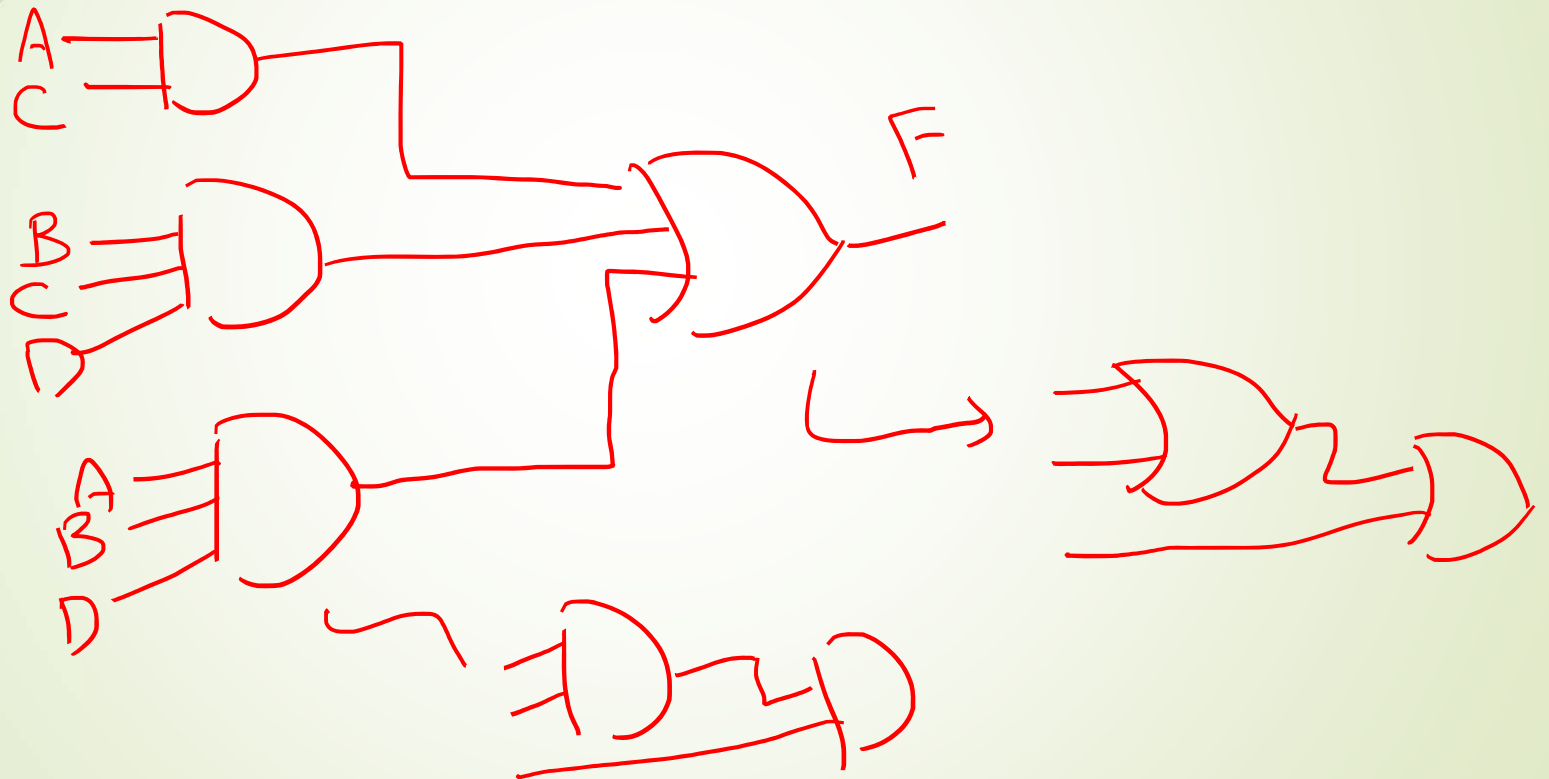
$$ABC(\bar{D}+D)$$

$$AC(\bar{B}+B)$$

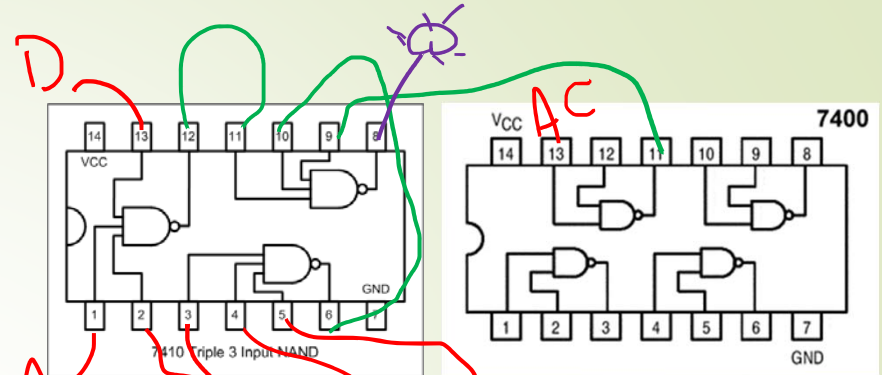
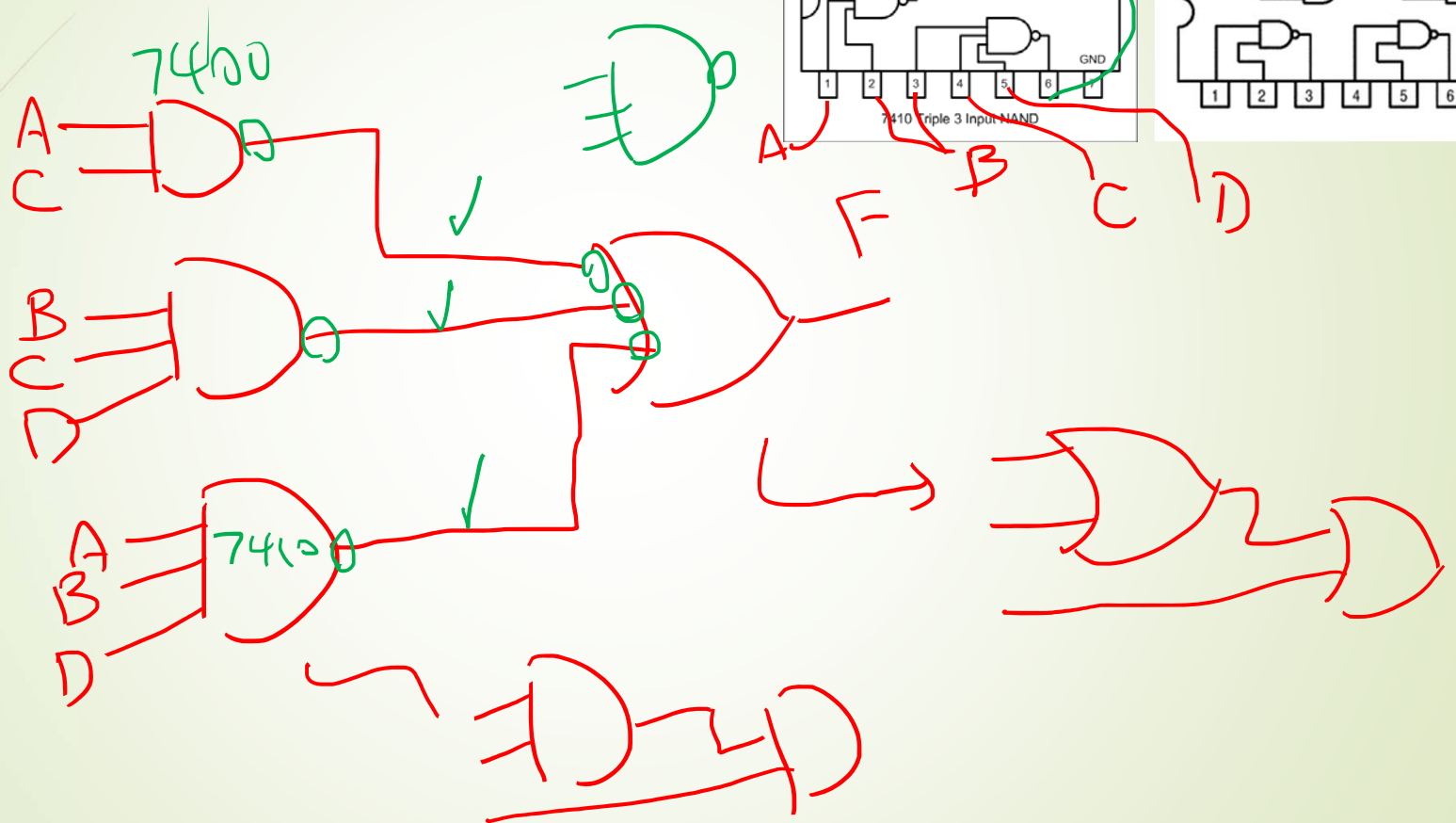
$$F = AC + BCD + ABD$$

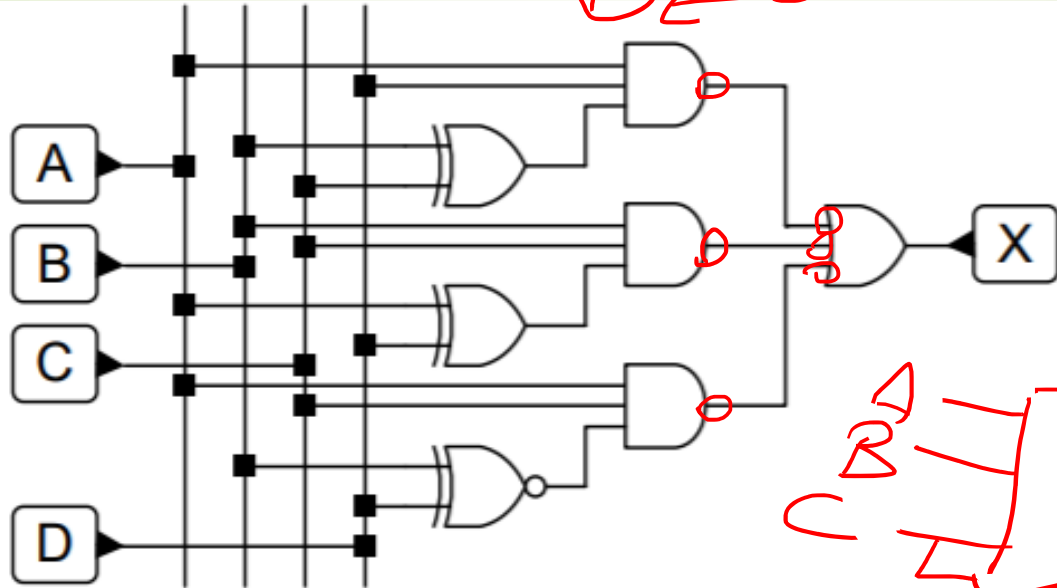


$$F = AC + BCD + ABD$$



$$F = AC + BCD + ABD$$

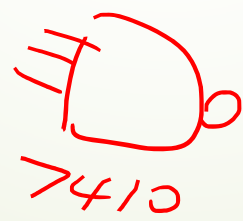
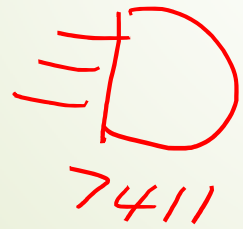




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FD

ABC^2C
 $= ABC$



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