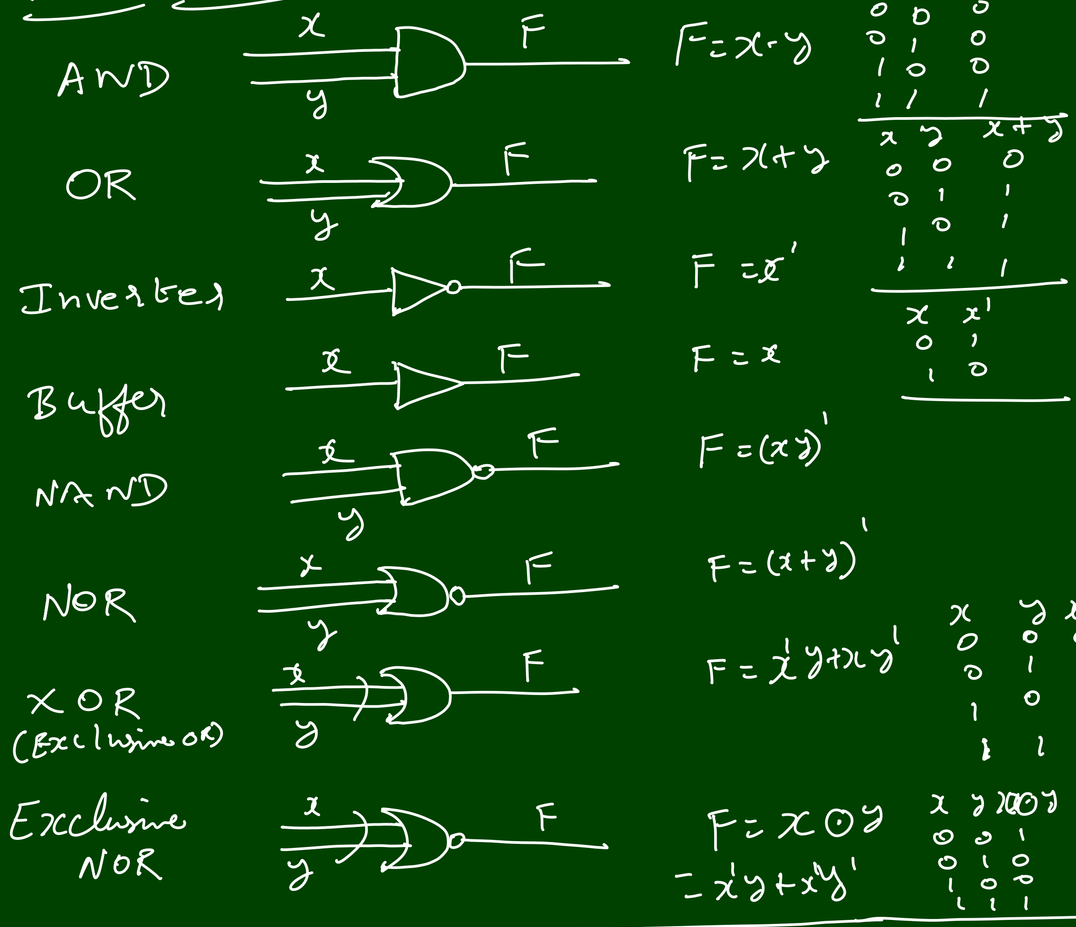
02/11/21 Tuesday

Boolean Functions	Name	operator symbol
$F_0 = 0$	Null	
$F_1 = xy$	AND	$x \cdot y$
$F_2 = xy'$	Inhibition	x/y
$F_3 = x$	Transfer	
$F_4 = x'y$	Inhibition	y/x
$F_5 = y$	Transfer	
$F_6 = xy' + x'y$	Exclusive OR	$x \oplus R$
$F_7 = x+y$	OR	$x+y$
$F_8 = (x+y)'$	NOR	$\downarrow$
$F_9 = xy + x'y'$	Equivalence	$x \odot y$
$F_{10} = y'$	Complement	y'
$F_{11} = x+y'$	Implication	$x \subset y$
$F_{12} = x'$	Complement	x'
$F_{13} = x'+y$	Implication	$y \subset x$
$F_{14} = (xy)'$	NAND	$\uparrow$
$F_{15} = 1$	Identity	

x	y	y'	x'	x/y	y/x	xy	$x'y$	$x \odot y$ $= xy + x'y'$
				xy'				
0	0	1	1	0	0	0	1	1
0	1	0	1	0	1	0	0	0
1	0	1	0	1	0	0	0	0
1	1	0	0	0	0	1	0	1

Logic Gates:-



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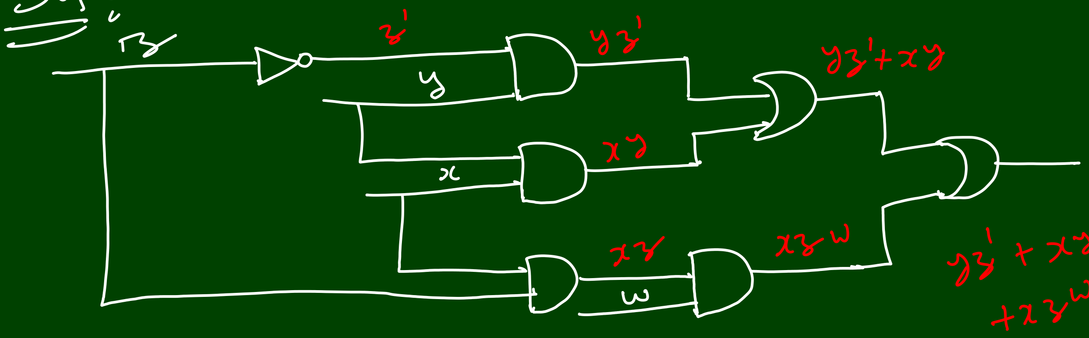
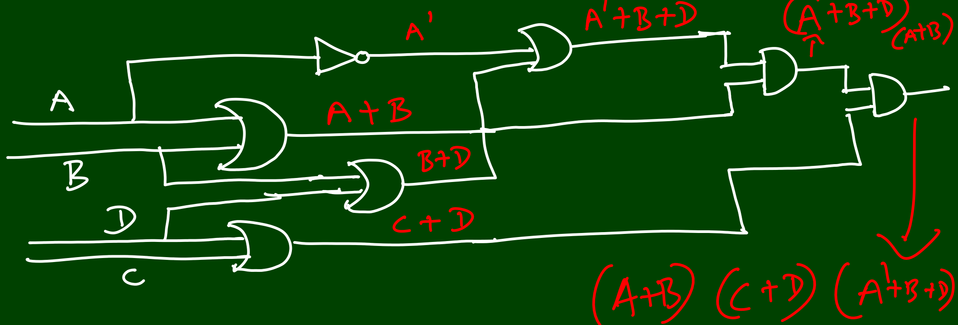
(1) Construct the logic circuit for the following Boolean functions

1) $yz' + xy + xzw$
2) $(A+B)(C+D)(A'+B+D)$
H.W 3) $(AB + A'B')(CD' + C'D)$

Sol:-



(2) $(A+B)(C+D)(A'+B+D)$



$yz' + xy + xzw$

$y(z'+x) + xzw$

$x(y+zw) + yz'$

$(A+B)(C+D)(A'+B+D)$

$= (A+B)(A'+B+D)(C+D)$ [Commutative]

$= ((A\cdot(A'+D))+B)(C+D)$ [Distributive]

$= ((A\cdot A'+A\cdot D)+B)(C+D)$ [Distributive]

$= ((0+AD)+B)(C+D)$ [Complement]

$= (AD+B)(C+D)$ [Identity]

$= ADC + AD + BC + BD$ [Distributive]

$= AD + BC + BD$ [Absorption]

$= AD + B(C+D)$ [Distributive]

$x+(x\cdot y) = x$

$AD+(AD\cdot C) = AD$

$A(D\cdot D)$

$x+(y\cdot z) = (x+y)\cdot(x+z)$

$x = B$

$y = A$

$z = A'+D$

$(A+B)(A'+B+D)$

$= (A+B)((A'+D)+B)$

$= (B+A)(B+(A'+D))$

$= B+(A\cdot(A'+D))$