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DLD
Hw 5

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1) 3 Bit Binary → Gray Decoding using mux 151

Data	B_2 B_1 B_0	G_{r_2} G_{r_1} G_{r_0}	Decimal to Gray
D_0	0 0 0	0 0 0	0
D_1	0 0 1	0 0 1	1
D_2	0 1 0	0 1 1	3
D_3	0 1 1	0 1 0	2
D_4	1 0 0	1 1 0	6
D_5	1 0 1	1 1 1	7
D_6	1 1 0	1 0 1	5
D_7	1 1 1	1 0 0	4

2) 3 Bit Gray → Binary Decoding using 151 mux

Gray			Binary		
G_{r_2}	G_{r_1}	G_{r_0}	B_2	B_1	B_0
0	0	0	0	0	0
1	0	0	0	0	1
1	1	0	0	1	0
0	1	0	0	1	1
0	1	1	1	0	0
1	1	1	1	0	1
1	0	1	1	1	0
0	0	1	1	1	1

3) 3-Bit Binary → Gray decoding using KMAPS & XORS

G_0 :

B_0 \ B_2B_1	00	01	11	10
0	0	1	1	0
1	1	0	0	1

G_1 :

B_0 \ B_2B_1	00	01	11	10
0	0	1	0	1
1	0	1	0	1

G_2 :

B_0 \ B_2B_1	00	01	11	10
0	0	0	1	1
1	0	0	1	1

4) 3-Bit Gray → Binary decoding using Kmaps & xors

$B_1 = \sum_{G_2 G_1 G_0}(2,3,4,5)$

G_0 \ G_2G_1	00	01	11	10
0	0	1	0	1
1	0	1	0	1

$B_1 = G_2 \oplus G_1$

$B_2 = \sum G_2 G_1 G_0$

G_0 \ G_2G_1	00	01	11	10
0	0	0	1	1
1	0	0	1	1

$B_2 = G_2$

4: Continued:

$B_0 = \sum_{G_2 G_1 G_0} (1247)$

G_2G_1 \ G_0	00	01	11	10
0	0	1	0	1
1	1	0	1	0

$B_0 = G_2 \oplus G_1 \oplus G_0$

5) $A \cdot B = 0$ & $A + B = 1$

$A = B'$

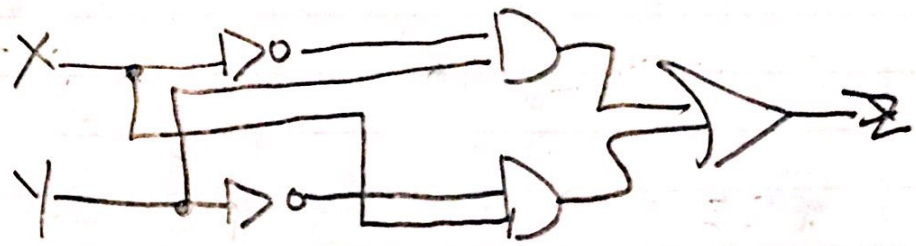
$A \cdot B = 0$ means either A or B = 0 or both equal 0
$A + B = 1$ means 1 input has to be one
therefore $A = B'$
by the $(A \cdot A = 0$ and $A + A = 0$ rule)

b) $X \cdot Y = 0$ & $X + Y = 1$ implies that $X = Y'$
by the same logic above:

35)

X	Y	Z
0	0	0
0	1	1
1	0	1
1	1	0

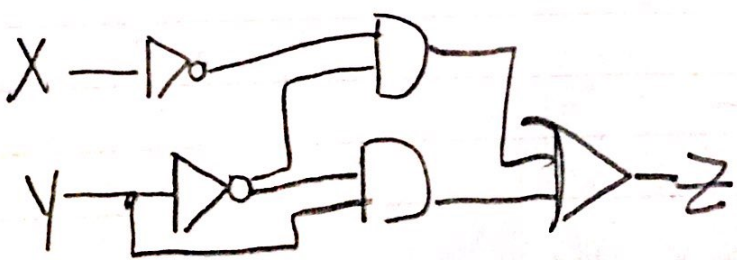
$Z = x'y + xy'$



36)

X	Y	Z
0	0	1
0	1	0
1	0	0
1	1	1

$Z = x'y' + xy$



55) $P = P_2 P_1 P_0$ $Q = Q_2 Q_1 Q_0$

Output = 1 ; iff $P < Q$

P_2Q_2	P_1Q_1	P_0Q_0	$P<Q$	$P=Q$	$P>Q$
$P_2 < Q_2$	X	X	1	0	0
$P_2 = Q_2$	$P_1 > Q_1$	X	0	0	0
$P_2 = Q_2$	$P_1 = Q_1$	$P_0 > Q_0$	0	0	1
$P_2 = Q_2$	$P_1 = Q_1$	$P_0 = Q_0$	0	1	0
$P_2 < Q_2$	X	X	1	0	0
$P_2 = Q_2$	$P_1 < Q_1$	X	1	0	0
$P_2 = Q_2$	$P_1 = Q_1$	$P_0 < Q_0$	1	0	0

$(P<Q) = P_2' Q_2 + X_2 P' Q_1 + X_2 X_1 P_0' Q_0$