Comparator & Decoder

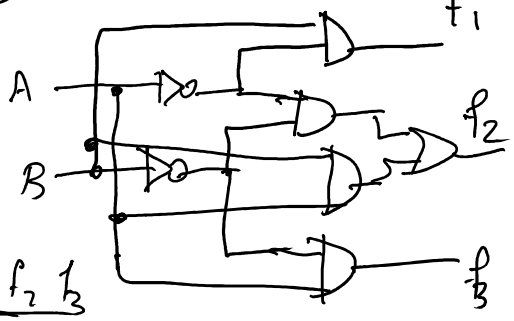
Monday, April 20, 2020 9:56 AM

A	B	f_1	f_2	f_3
0	0	0	1	0
0	1	1	0	0
1	0	0	0	1
1	1	0	1	0

$f_1 = A'B$

$f_2 = A'B' + AB = A \odot B = (A \oplus B)'$

$f_3 = AB'$



A $a_1\ a_0$

B $b_1\ b_0$

a_1	a_0	b_1	b_0	f_1	f_2	f_3

$x_1 = a_1 b_1 + a_1' b_1'$

$x_0 = a_0 b_0 + a_0' b_0'$

$f_2 = (a_1 b_1 + a_1' b_1')(a_0 b_0 + a_0' b_0')$

$f_2 = x_1 x_0$

f_1 : $a_1\ a_0$, $b_1\ b_0$

$f_1 = a_1' b_1 + (a_0' b_0) x_1$

A $a_1 a_0$ (1 0) $f_1 = 1$ ✗

B $b_1 b_0$ (0 1)

$a_1' b_1 = 0$ $a_0' b_0 = 1$

$f_1 = 0 + 0 \cdot 1 = 0$ ✓

$x_i = a_i b_i + a_i' b_i'$

$x_i = a_i b_i + a_i' b_i'$

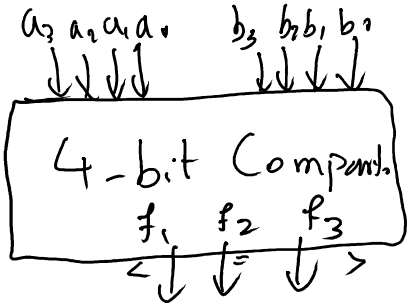
$A = a_3\ a_2\ a_1\ a_0$ $\quad i = 0, 1, 2, 3$

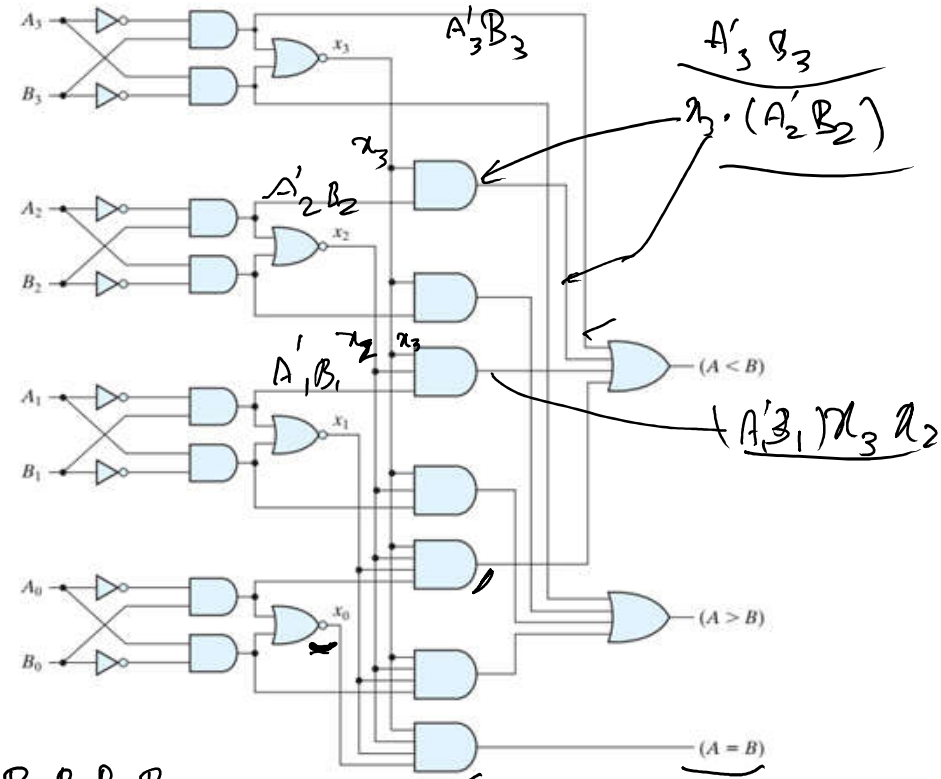
$B = b_3\ b_2\ b_1\ b_0$

$f_2 = x_0 x_1 x_2 x_3$

$f_1 = a_3' b_3 + x_3 \cdot (a_2' b_2) + x_3 x_2 (a_1' b_1) + x_3 x_2 x_1 (a_0' b_0)$

$f_3 = a_3 b_3' + x_3 (a_2 b_2') + x_3 x_2 (a_1 b_1') + x_3 x_2 x_1 (a_0 b_0')$





$A_3' B_3$

$A_3' B_3$

$x_3 \cdot (A_2' B_2)$

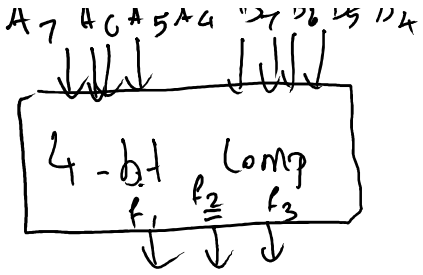
$+ A_1' B_1 x_3 x_2$

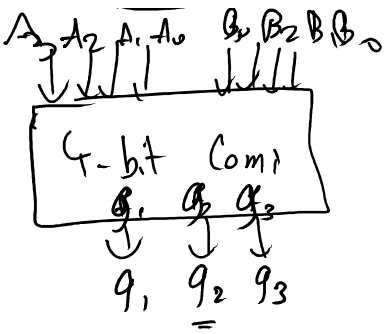
$(A_0' B_0 + A_0 B_0')'$

$= A_0 B_0 + A_0' B_0'$

$A_7\ A_6\ A_5\ A_4 \quad B_7\ B_6\ B_5\ B_4$

$A_3\ A_2\ A_1\ A_0 \quad B_3\ B_2\ B_1\ B_0$





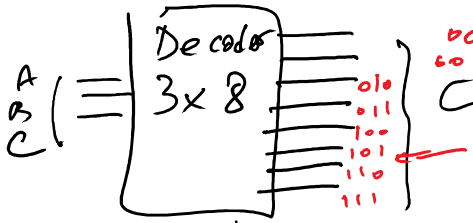
$$(A=B)\ F_2 = f_2 \cdot g_2$$

(En Coder) Decoder

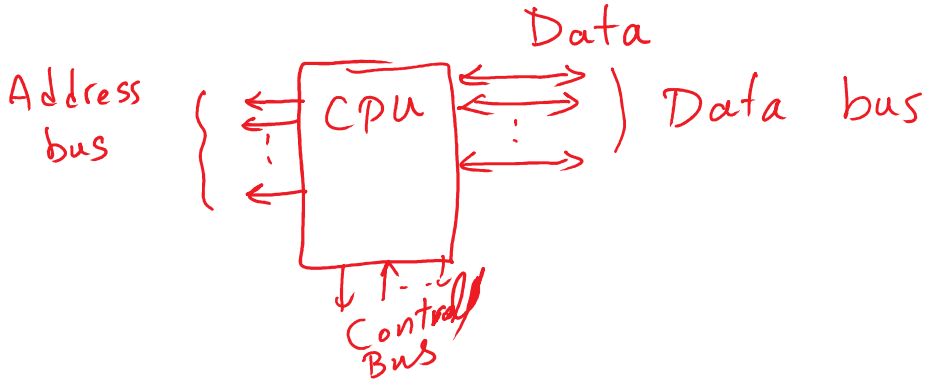
(Decoder / De multiplexer)

Decoder $n \longrightarrow 2^n$

2	4
3	8
4	16



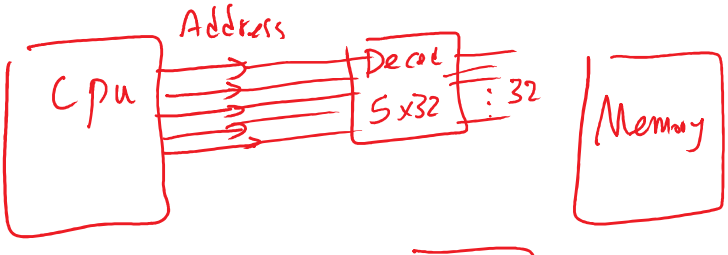
A	B	C
0	0	0



$2^3 = 8$

$2^4 = 16$

$2^5 = 32$



$2^{10} = 1K$

$2^{20} = 1M$

$2^{30} = 1G$

4 GByte

$2^{30} = 1G$

$4G$ Byte

$2^{32} = 4G$

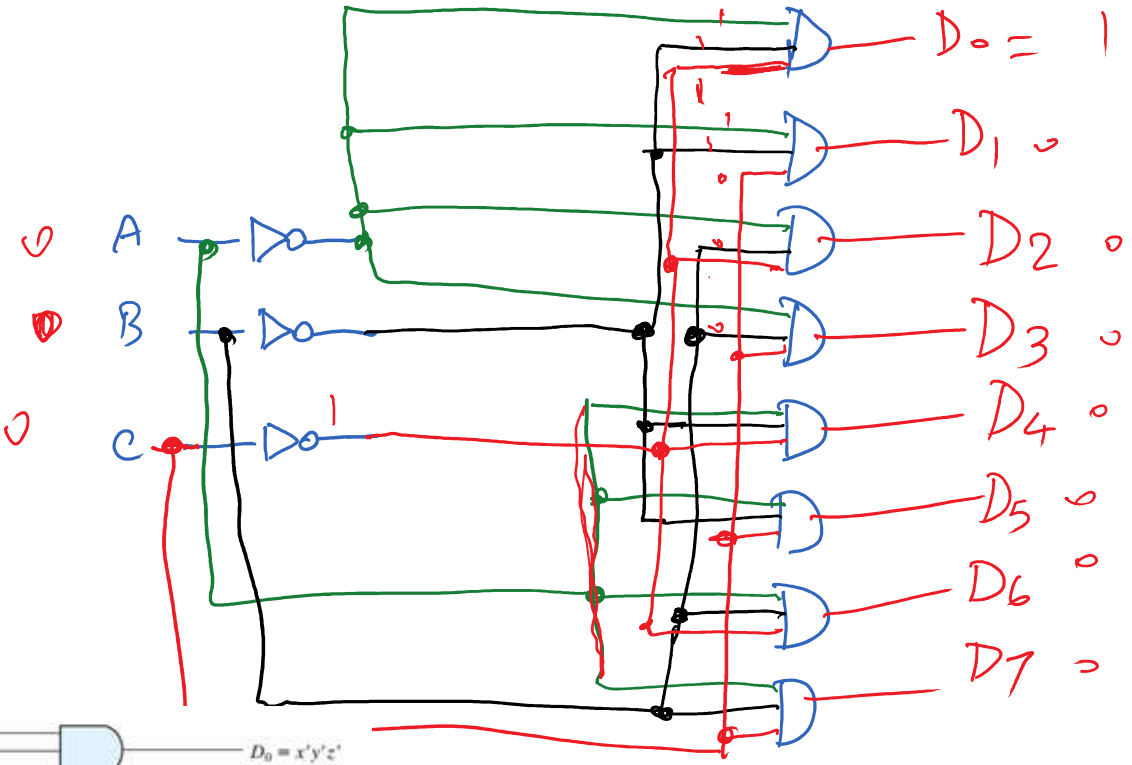
Decoder $n \times 2^n$

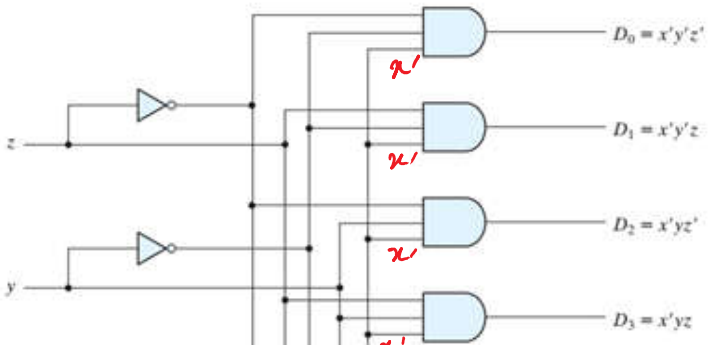
Decoder 3×8

$m_0 = A'B'C'$

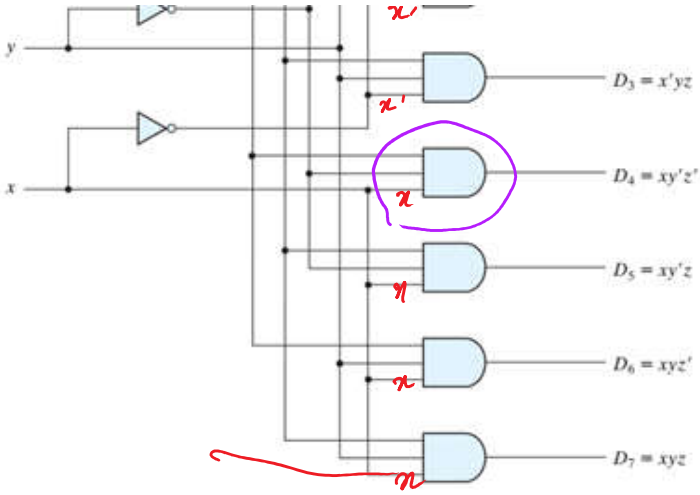
$m_1 = A'B'C$

	A	B	C	m_0 D_0	m_1 D_1	D_2	D_3	D_4	D_5	D_6	D_7
m_0 0	0	0	0	1	0	0	0	0	0	0	0
m_1 1	0	0	1	0	1	0	0	0	0	0	0
m_2 2	0	1	0	0	0	1	0	0	0	0	0
m_3 3	0	1	1	0	0	0	1	0	0	0	0
m_4 4	1	0	0	0	0	0	0	1	0	0	0
m_5 5	1	0	1	0	0	0	0	0	1	0	0
m_6 6	1	1	0	0	0	0	0	0	0	1	0
m_7 7	1	1	1	0	0	0	0	0	0	0	1

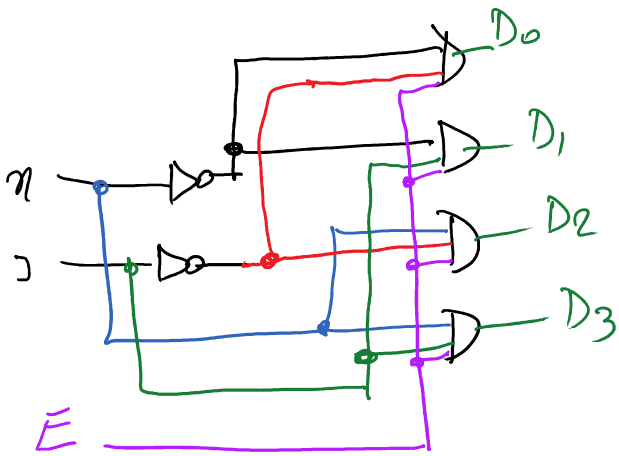




Inputs			Outputs							
x	y	z	D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0



0	0	1	0	1	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0
0	1	1	0	0	0	1	0	0	0
1	0	0	0	0	0	0	1	0	0
1	0	1	0	0	0	0	0	1	0
1	1	0	0	0	0	0	0	0	1
1	1	1	0	0	0	0	0	0	0

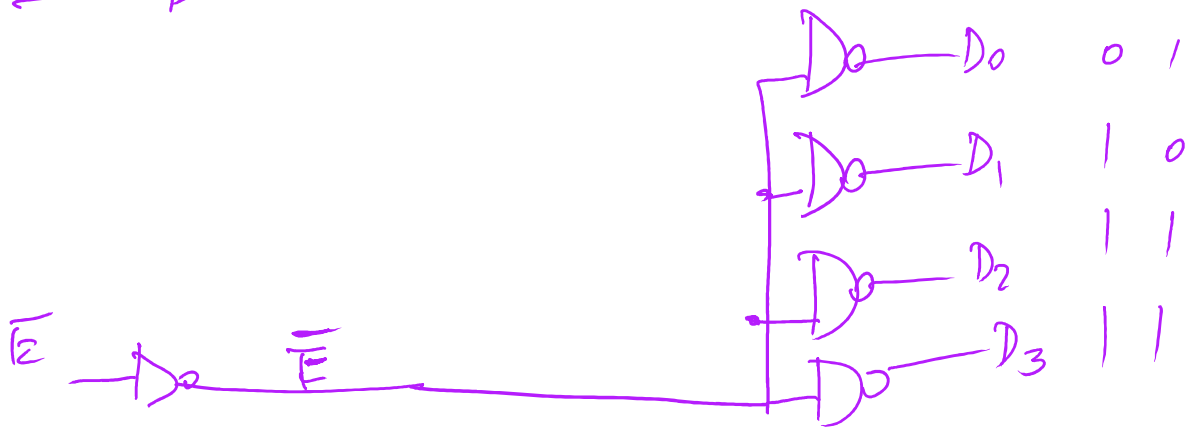


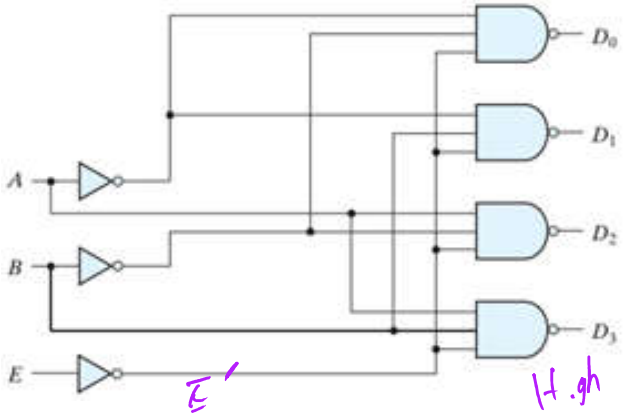
Enable

فعال ساز کننده

E 1 Decoder

E 0 0





5 × 32

Low Active

E	A	B	D_0	D_1	D_2	D_3
1	X	X	1	1	1	1
0	0	0	0	1	1	1
0	0	1	1	0	1	1
0	1	0	1	1	0	1
0	1	1	1	1	1	1

NAND

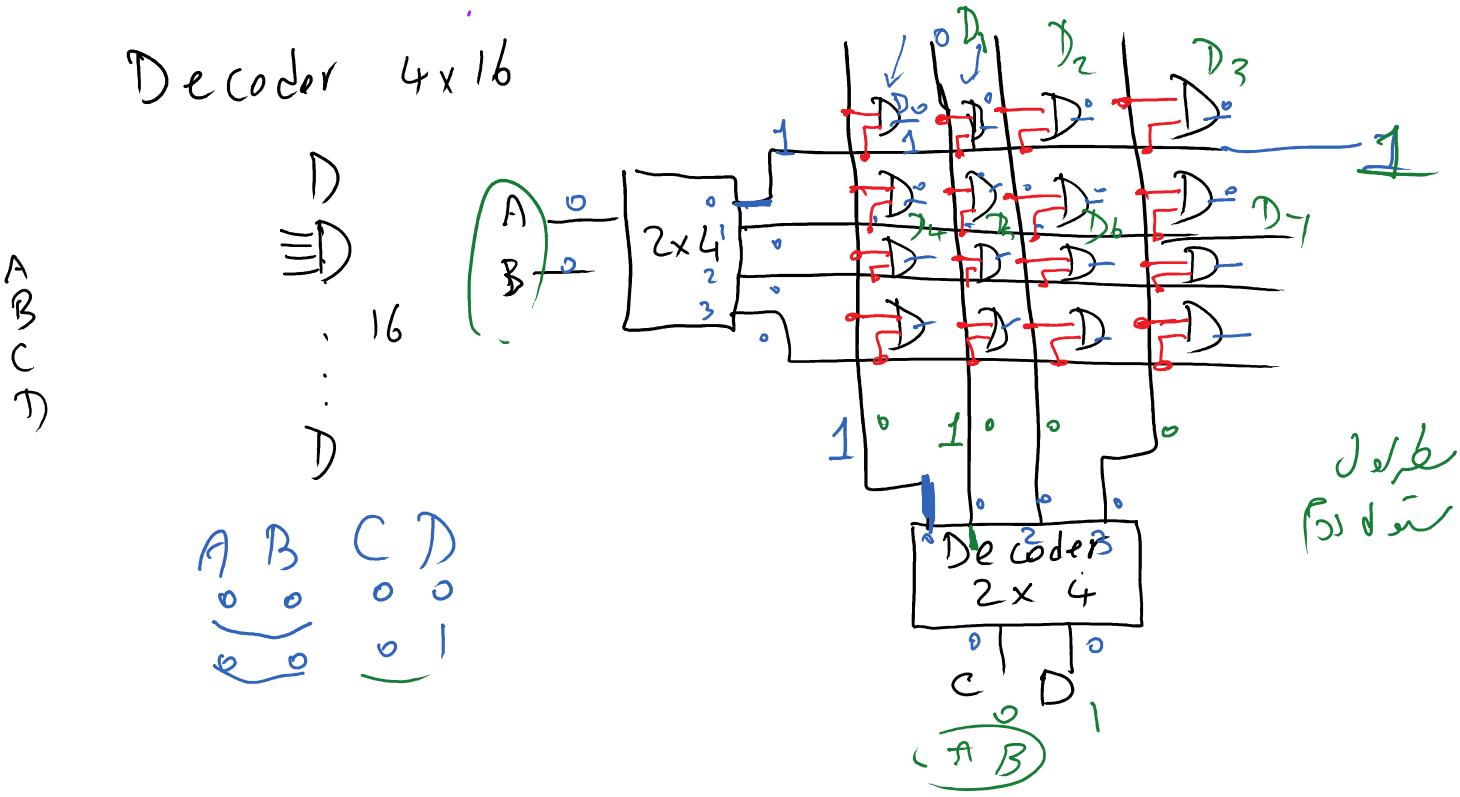
High Active

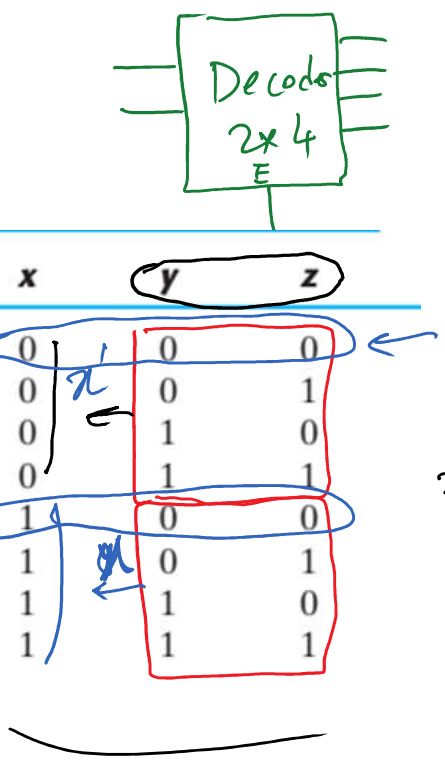
E	A	B	D_0	D_1	D_2	D_3
0	X	X	0	0	0	0
1	0	0	1	0	0	0
1	0	1	0	1	0	0
1	1	0	0	0	1	0
1	1	1	0	0	0	1

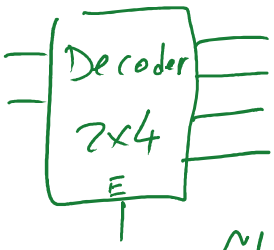
AND

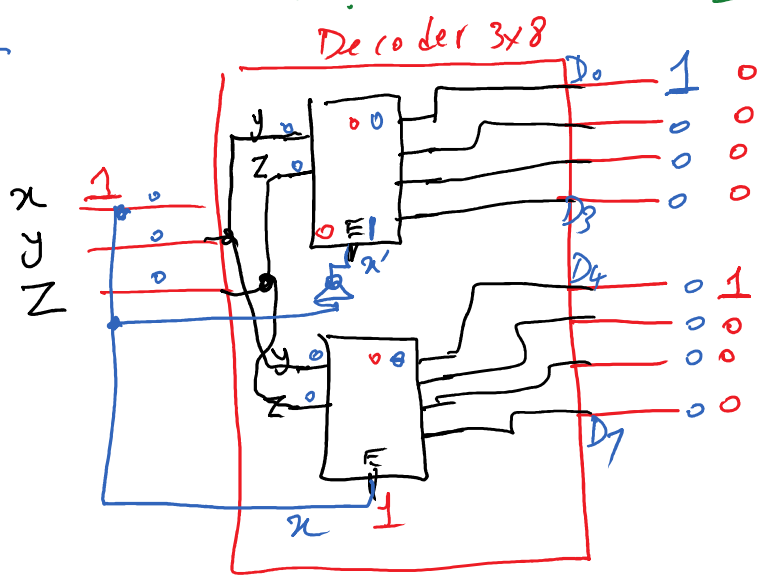
32

Decoder 4x16

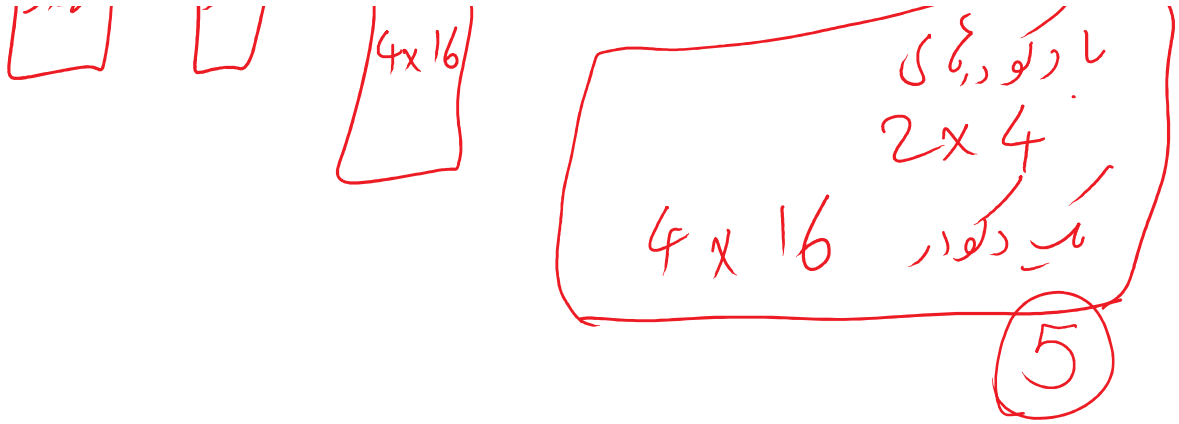








3x8 3x8 4x16


4x16
یا دیکودینگ
2x4
4x16 دیکودر
5