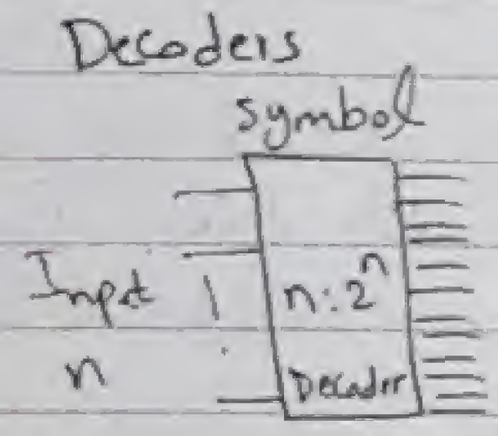
Lec (6)
DATE 1/11/2016

Data processing Circuits

Decoders



3bit Code word

$\frac{3}{2}$ = 8 bit Code word

3:8 decoder

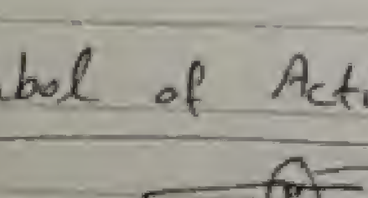
* Table f^n of decoder:- "Active high decoder"

A	B	C	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
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1

Active high decoder ⇝ output corresponding to minterm of input.

D_5 corresponding to "minterm" $\bar{A}B\bar{C}$.

* Symbol of Active low:-



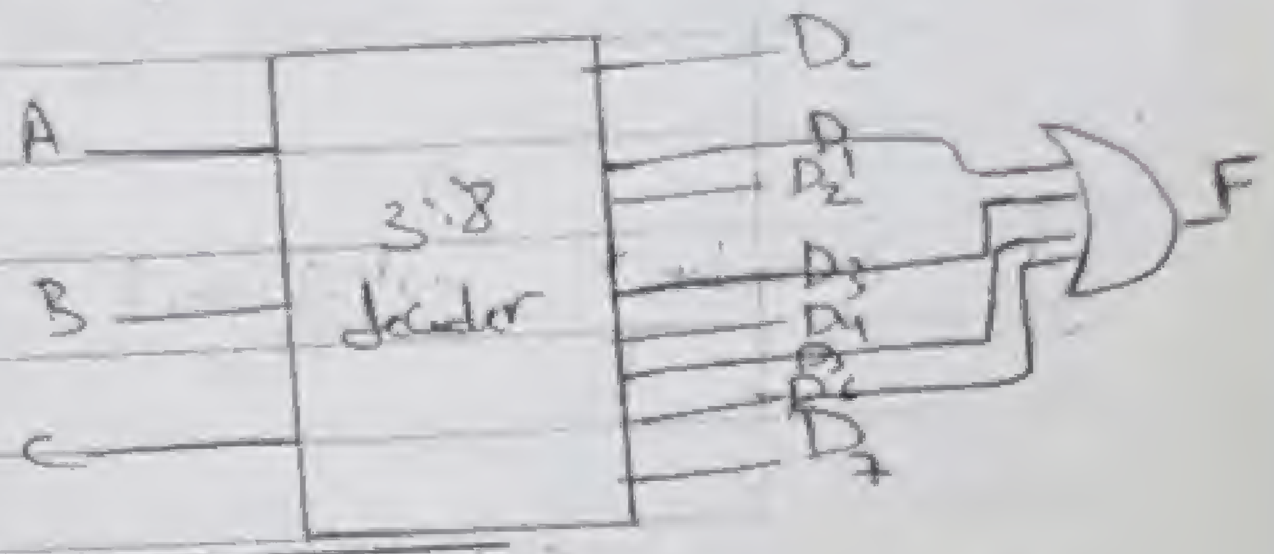
* Realization of Multiple output function using decoder:-

1.. Active high output 74138

* $F = \sum m(1,3,5,6)$

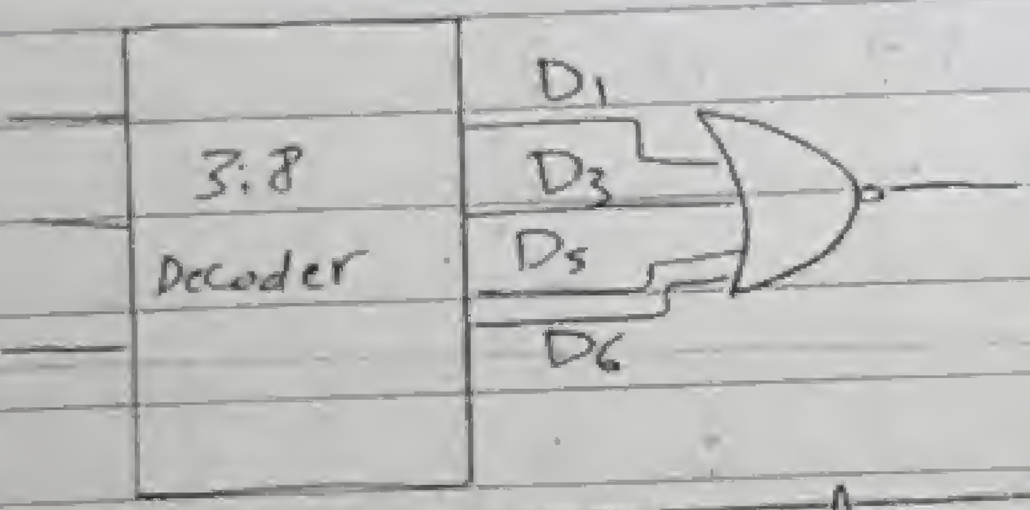
$= \bar{A}\bar{B}C + \bar{A}BC + A\bar{B}C + AB\bar{C}$

$= m_1 + m_3 + m_5 + m_6$



* $F = \prod M(1,3,5,6)$

$= (\bar{A}+\bar{B}+C) \cdot (\bar{A}+B+C) \cdot (A+\bar{B}+C) \cdot (A+B+\bar{C}) = M_1 M_3 M_5 M_6$



$F = \overline{(m_1 + m_3 + m_5 + m_6)}$

$= \bar{m}_1 \cdot \bar{m}_3 \cdot \bar{m}_5 \cdot \bar{m}_6$

$= M_1 M_3 M_5 M_6$

Active low decoder

* $F = \sum m(1,3,5,6)$

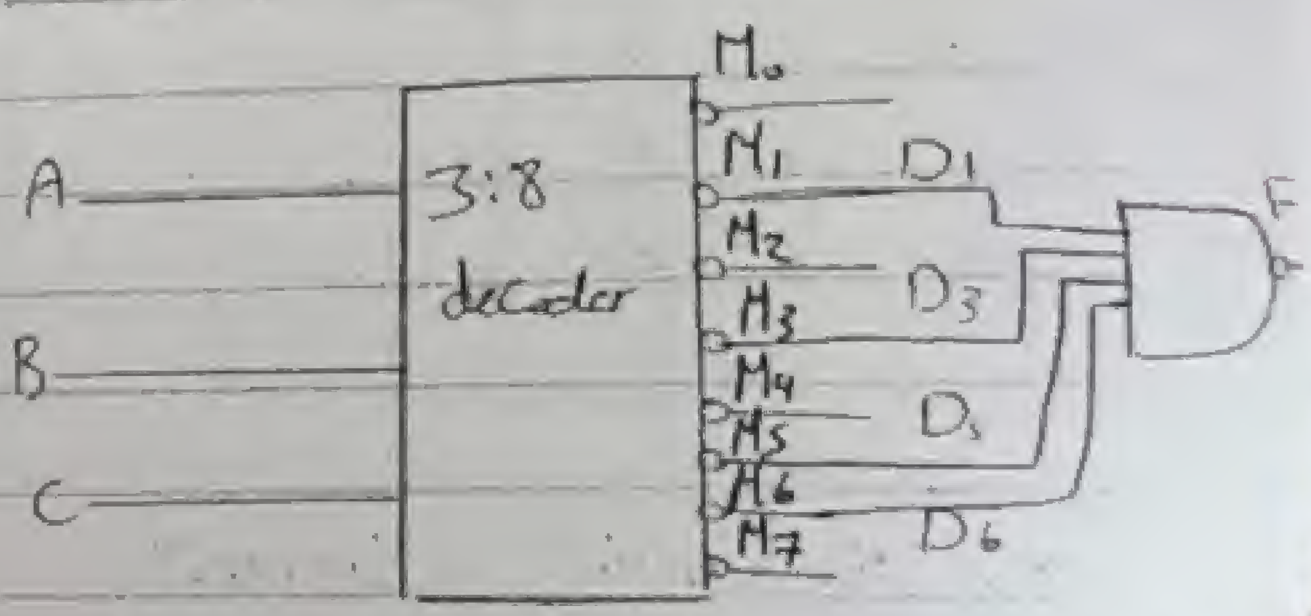
$\hookrightarrow = \prod M(0,2,4,7)$

$\overline{(M_1 M_3 M_5 M_6)} =$

$\bar{M}_1 + \bar{M}_3 + \bar{M}_5 + \bar{M}_6$

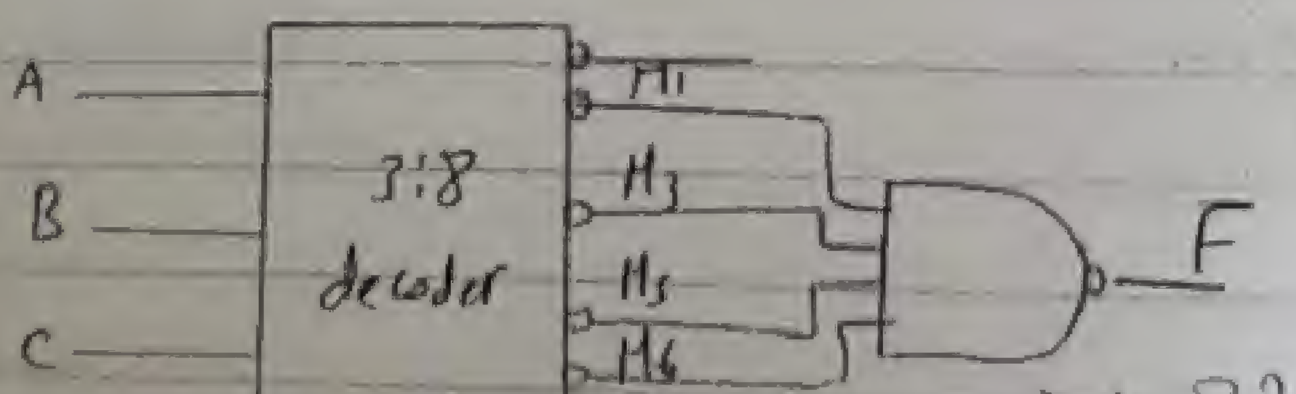
$= m_1 + m_3 + m_5 + m_6$

$\bar{F} = \sum m(0,2,4,7)$



?? OR اوضف الا بتام المعكوس

* $F = \prod M(1,3,5,6)$

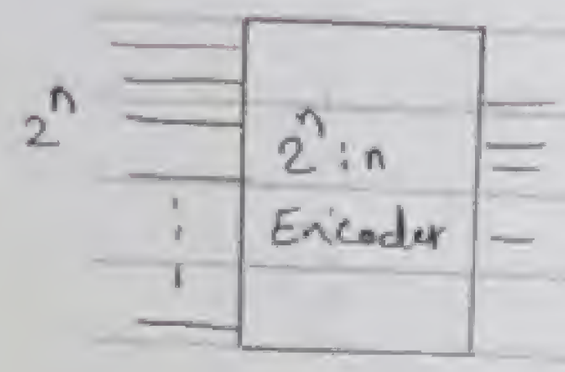


→ ?? AND?

0 → 9

* BCD (Binary coded Decimal) to 7-segment.

* Encoder :- Multiple i/p, Multiple o/p combinational logic circuit.



* Octal to Binary Encoder * 8x3 Encoder

"Code word of length 8 to code word of length 3"

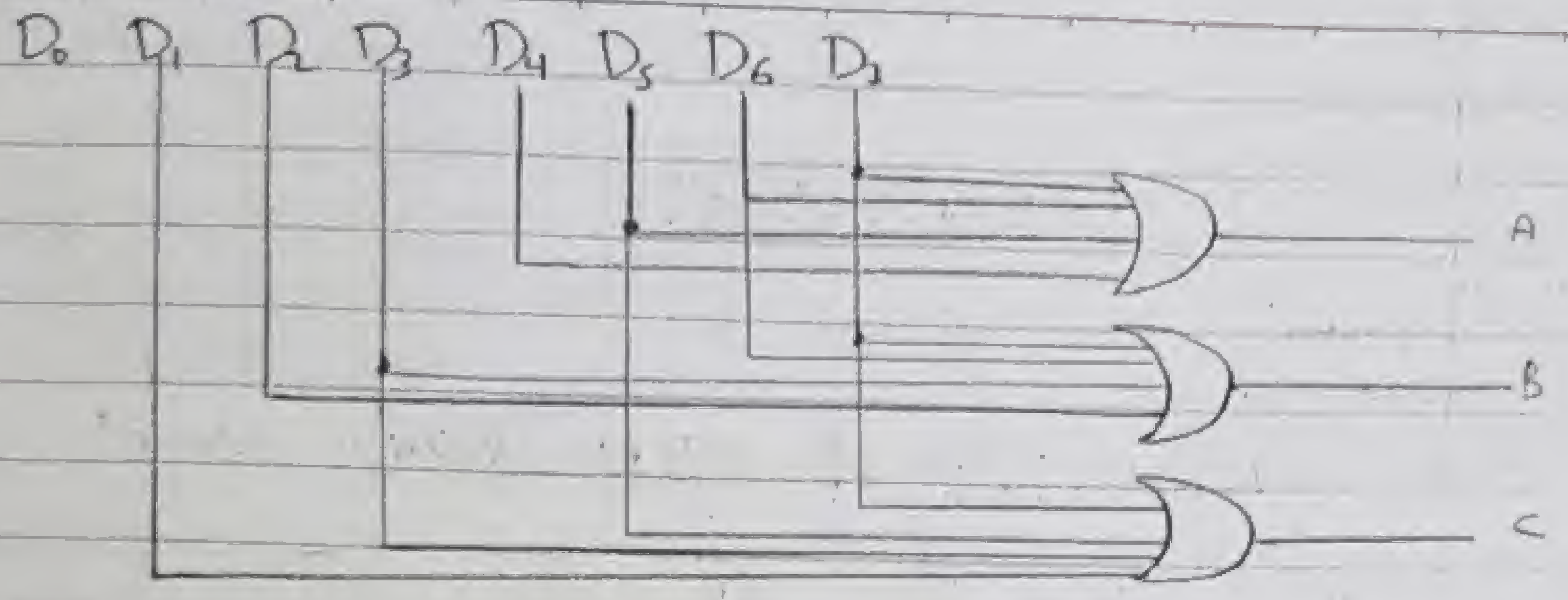
D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7	A	B	C
1	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	1	0
0	0	0	1	0	0	0	0	0	1	1
0	0	0	0	1	0	0	0	1	0	0
0	0	0	0	0	1	0	0	1	0	1
0	0	0	0	0	0	1	0	1	1	0
0	0	0	0	0	0	0	1	1	1	1

* logic circuit "Diagram"

$A = D_4 + D_5 + D_6 + D_7$

$B = D_2 + D_3 + D_6 + D_7$

$C = D_1 + D_3 + D_5 + D_7$



(000) $\bar{A}\bar{B}\bar{C}$ يعتبر بالدائرة غير موصلة D_0 سبب هذه الدائرة أن *

undermined output "خطأ" 2 لو أكثر من واحد داخل الـ *

Periority encoder حل هذه المشاكل *

* Periority encoder * → is a practical form of an encoder

(4bit Periority encoder)

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

(input: D_0–D_3; output: A, B, V)

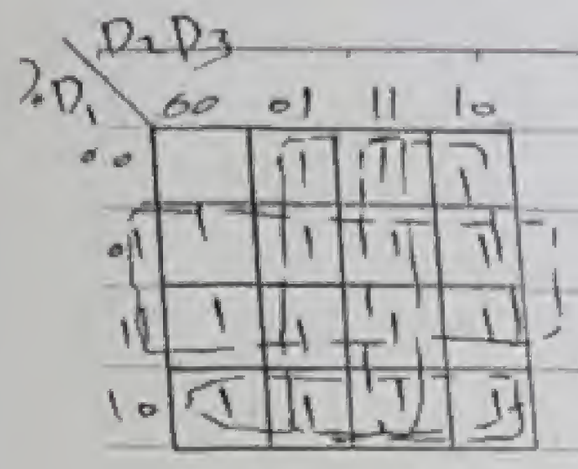
* 8 bit نفس الطريقة

D_0D_1 \ D_2D_3	00	01	11	10
00		1	1	1
01		1	1	1
11		1	1	1
10		1	1	1

→ $A = D_2 + D_3$

D_0D_1 \ D_2D_3	00	01	11	10
00		1	1	
01	1	1	1	
11	1	1	1	
10		1	1	

$B = D_3 + D_1 D_2'$ ←



$V = D_2 + D_3 + D_1 + D_0$

* Logic Circuit of A, B, V "Peroirity Encoder"