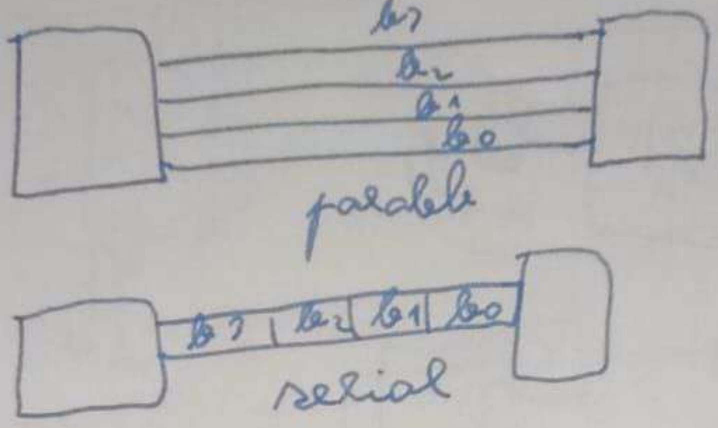
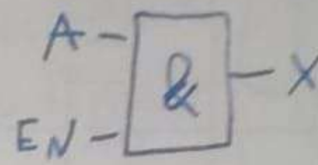
Curs 6 Proiectare Logică

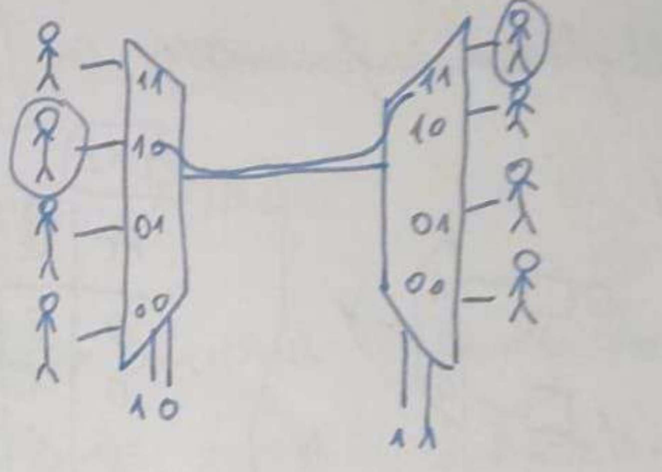


$$\begin{cases} A \cdot 0 = 0 \\ A \cdot 1 = A \end{cases}$$



Gating (&)

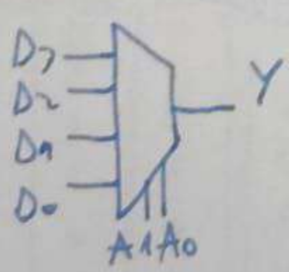
EN	A	Y
0	0	0
0	1	0
1	0	0
1	1	1



MULTIPLEXARE DEMULTIPLEXARE

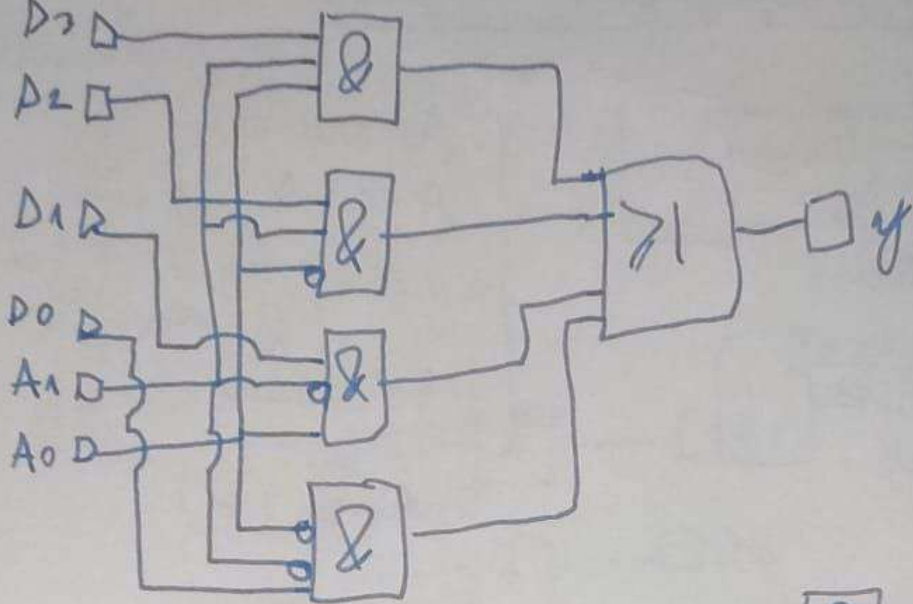
Encodere

ⓐ Multiplexor (MUX)



$$Y = D_3 A_1 A_0 + D_2 A_1 \bar{A}_0 + D_1 \bar{A}_1 A_0 + D_0 \bar{A}_1 \bar{A}_0$$

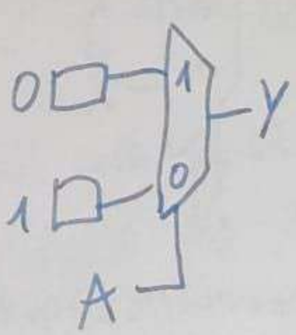
nu putem folosi tabel de adevăr pentru multe linii 2^6



Multiplexor implementat cu $\boxed{\&}$ și $\boxed{\geq 1}$

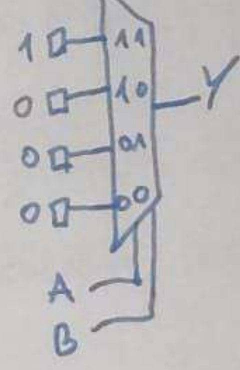
$\boxed{\text{NOT}}$

A	Y
0	1
1	0



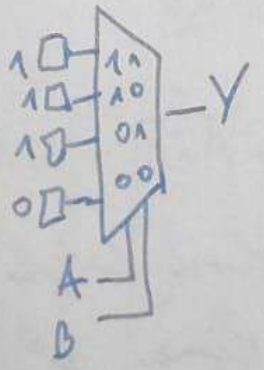
$\boxed{\text{AND}}$

A	B	Y
0	0	0
0	1	0
1	0	0
1	1	1



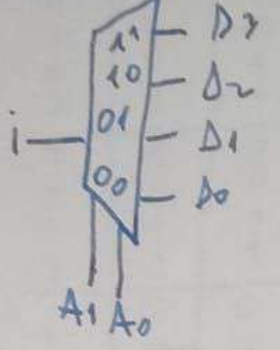
$\boxed{\text{OR}}$

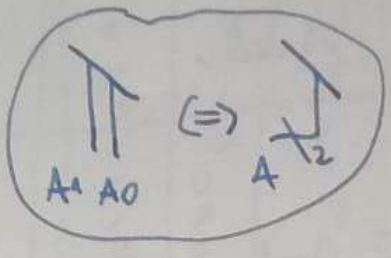
A	B	Y
0	0	0
0	1	1
1	0	1
1	1	1



Un multiplexor poate exprima o problemă logică complexă direct din tabela de adevăr

Demultiplexor



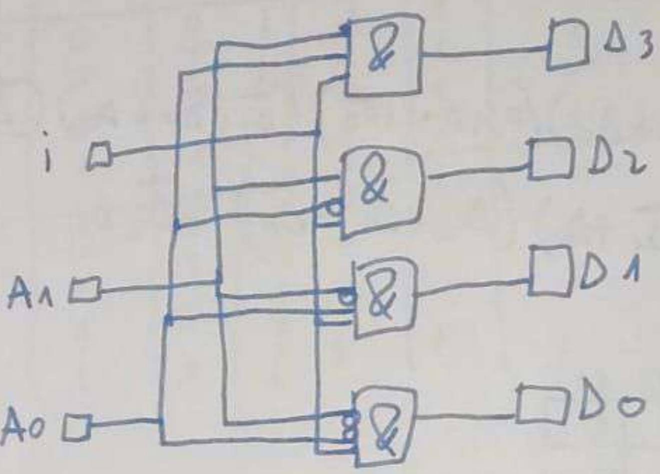


$D_3 = A_1 A_0 i$

$D_2 = A_1 \overline{A_0} i$

$D_1 = \overline{A_1} A_0 i$

$D_0 = \overline{A_1}\,\overline{A_0} i$



DEMUX-ul este operația inversă a multiplexorului și este folosit de regulă pentru selectarea destinației.

Extremele funcțiilor de mai multe variabile

D_2	D_1	D_0	A_1	A_0	V
0	0	0	0	0	0
0	0	1	0	0	1
0	1	0	0	1	1
0	1	1	0	1	1
1	0	0	1	0	1
1	0	1	1	0	1
1	1	0	1	0	1
1	1	1	1	0	1

$A_1 = \sum(4,5,6,7) = \sum(4 \ldots 7) =$

$= D_2\overline{D_1}\,\overline{D_0} + D_2\overline{D_1}D_0 + D_2 D_1\overline{D_0} + D_2 D_1 D_0$

$= \prod(0,1,2,3) = \prod(0 \ldots 3) =$

$= (D_2+D_1+D_0)(D_2+D_1+\overline{D_0})(D_2+\overline{D_1}+D_0)(D_2+\overline{D_1}+\overline{D_0})$

$D_0 \backslash D_2 D_1$	00	01	11	10
0	0	0	1	1
1	0	0	1	1

$A_1 = D_2$

$A_0 = \sum(2,3) = \bar{D}_2 D_1 \bar{D}_0 + \bar{D}_2 D_1 D_0.$

$= \Pi(0,1,4,..,7) = (D_2 + D_1 + D_0)(D_2 + D_1 + \bar{D}_0)(\bar{D}_2 + D_1 + D_0)(\bar{D}_2 + D_1 + \bar{D}_0)\cdot$

$\cdot (\bar{D}_2 + \bar{D}_1 + D_0)(D_2 + \bar{D}_1 + \bar{D}_0) = \bar{D}_2 D_1$

$D_0 \backslash D_2 D_1$	00	01	11	10
0	0	1	0	0
1	0	1	0	0

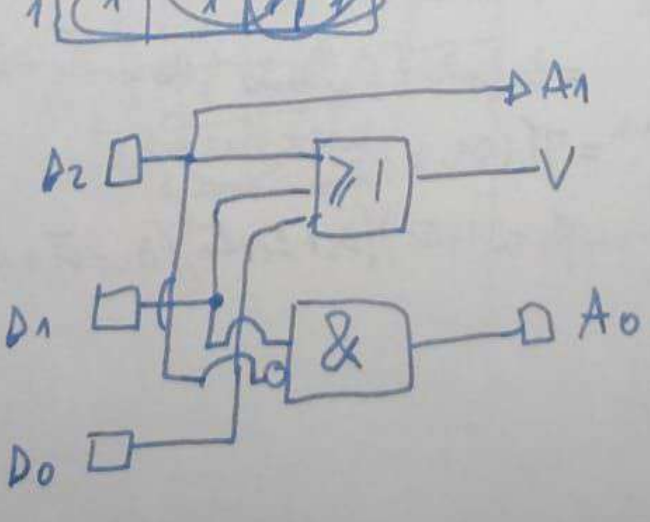
$V = \sum(1,..,7) = \bar{D}_2 \bar{D}_1 D_0 + \bar{D}_2 D_1 \bar{D}_0 + \bar{D}_2 D_1 D_0 + D_2 \bar{D}_1 D_0 + D_2 \bar{D}_1 D_0 +$

$D_2 D_1 \bar{D}_0 + D_2 D_1 D_0$

$= \Pi(0) = (A + B + C) = (D_2 + D_1 + D_0)$

$D_0 \backslash D_2 D_1$	00	01	11	10
0	0	1	1	1
1	1	1	1	1

$Y = D_0 + D_1 + D_2$



3-2 Priority Encoder

D_3	D_2	D_1	D_0	A_1	A_0	V
0	0	0	0	0	0	0
0	0	0	1	0	0	1
0	0	1	0	0	1	1
0	0	1	1	0	1	1
0	1	0	0	1	0	1
0	1	0	1	1	0	1
0	1	1	0	1	0	1
0	1	1	1	1	0	1
1	0	0	0	1	1	1
1	0	0	1	1	1	1
1	0	1	0	1	1	1
1	0	1	1	1	1	1
1	1	0	0	1	1	1
1	1	0	1	1	1	1
1	1	1	0	1	1	1
1	1	1	1	1	1	1

$V = D_3 + D_2 + D_1 + D_0 = \Pi(0) =$

$= \sum(1 \ldots 15) =$

$A_1 = \sum(4 \ldots 15) = \Pi(0,1,2,3) = D_2 + D_3$

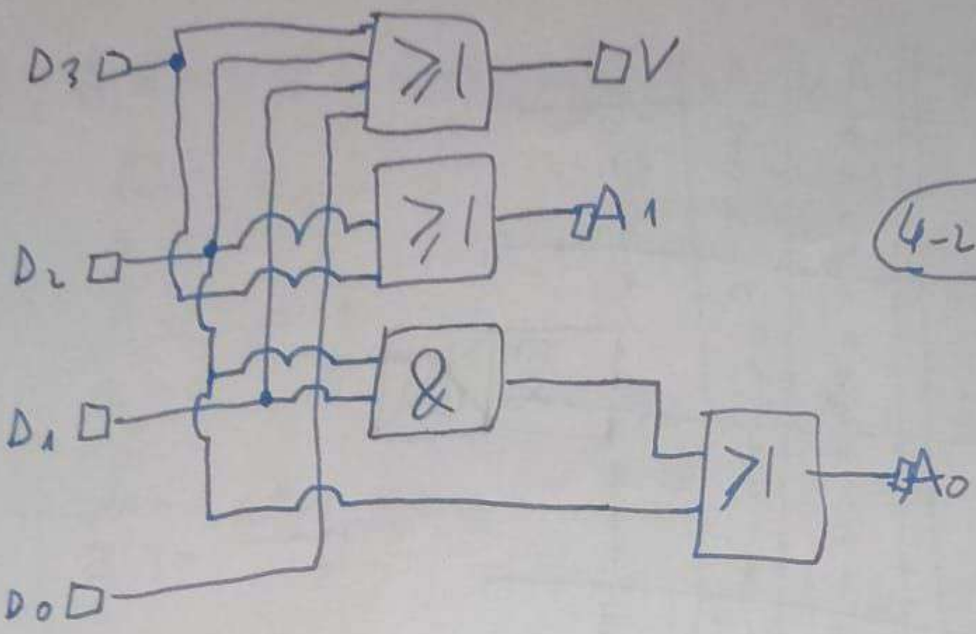
$A_0 = \sum(2,3,8, \ldots 15)$

$= \Pi(0,1,4,5,6,7)$

D_1D_0 \ D_3D_2	00	01	11	10
00	0	1	1	1
01	0	1	1	1
11	0	1	1	1
10	0	1	1	1

D_1D_0 \ D_3D_2	00	01	10	11
00	0	0	1	1
01	0	0	1	1
11	1	0	1	1
10	1	0	1	1

$A_0 = D_3 + \overline{D_2} D_1$



(4-2 Priority Encoder)

CD \ AB	00	01	11	10
00	0	0	1	1
01	0	0	1	1
11	1	1	1	1
10	1	1	1	1

$A + C$