

Quest 4 Boolean Logic

$$\begin{array}{r} 8- \\ 10 \\ \times 01000 - \\ y 01010 \\ \hline \end{array}$$

$$x - y = x + [y]_2$$

$$[y]_2 = \bar{y} + 1$$

$$\begin{array}{r} 01000 + \\ 10110 \\ \hline 011110 \end{array}$$

$$\begin{array}{r} 00001 + \\ 1 \\ \hline 00010 \end{array}$$

$$= x - y$$

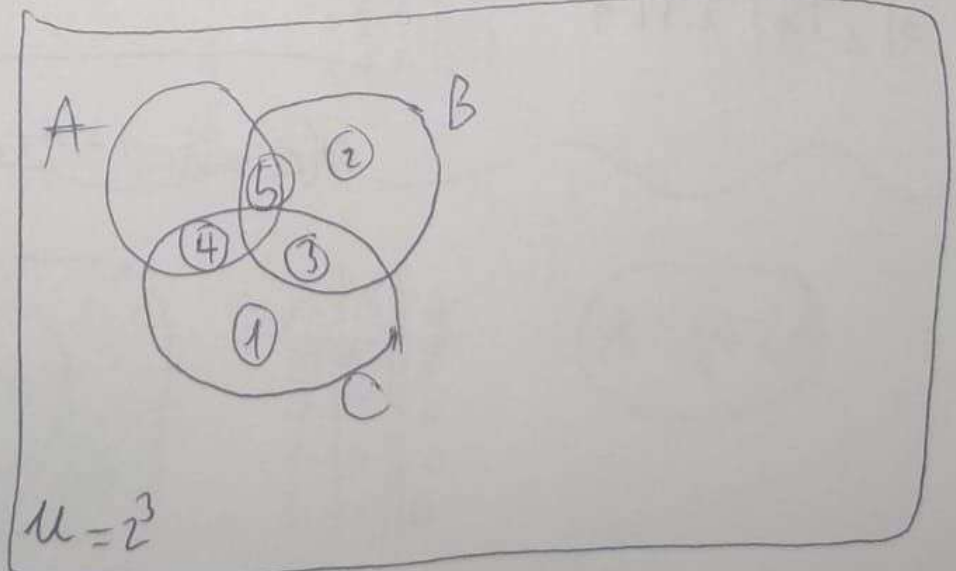
$$\begin{array}{r} 10- \\ 8 \\ \hline \end{array} \Rightarrow \begin{array}{r} 01010 - \\ 01000 \\ \hline 00010 \end{array} \times y \quad [y]_2 = 01111 + 1$$

$$\begin{array}{r} 11000 \\ 111 \end{array}$$

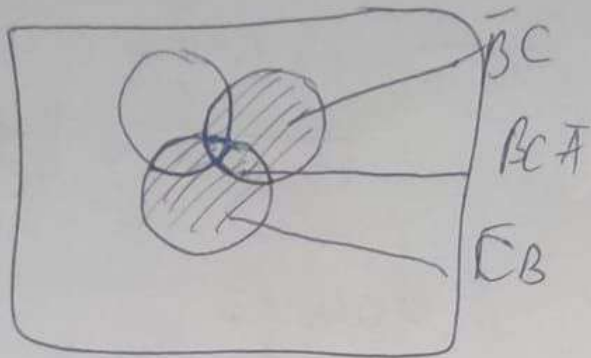
#	A	B	C	y
0	0	0	0	0
1	0	0	1	1
2	0	1	0	1
3	0	1	1	1
4	1	0	0	0
5	1	0	1	1
6	1	1	0	1
7	1	1	1	0

$$F_{CD,y} = \sum (1, 2, 3, 5, 6)$$

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



$$B + C + \bar{A}$$



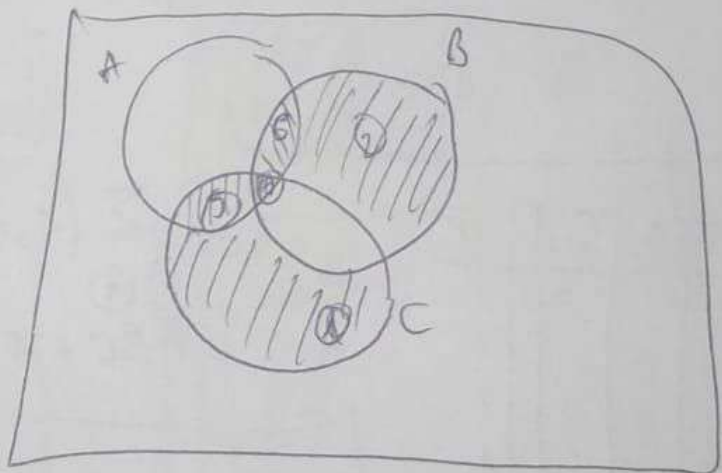
$$y_v = \bar{A}BC + \bar{B}C + B\bar{C}$$

#	A	B	C	$\bar{A}BC$	$\bar{B}C$	$B\bar{C}$	y_v
0	0	0	0	0	0	0	0
1	0	0	1	0	1	0	1
2	0	1	0	0	0	1	1
3	0	1	1	1	0	0	1
4	1	0	0	0	0	0	0
5	1	0	1	0	1	0	1
6	1	1	0	0	0	1	1
7	1	1	1	0	0	0	0

$$y: 2^3 \rightarrow 1$$

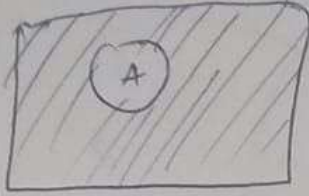
$$y = \sum(1, 2, 5, 6, 4) = \bar{A}\bar{B}C + \bar{A}B\bar{C} + A\bar{B}C + A\bar{B}\bar{C} + A\bar{B}C$$

#	A	B	C	y
0	0	0	0	0
1	0	0	1	1
2	0	1	0	1
3	0	1	1	0
4	1	0	0	0
5	1	0	1	1
6	1	1	0	1
7	1	1	1	1



$$A(\bar{B}C + B\bar{C}) = A + B + C$$

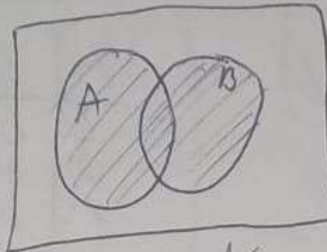
1) Negată
 $y = \bar{A}$



A	y
0	1
1	0

$R \setminus A$

2) SAU
 $y = A + B$

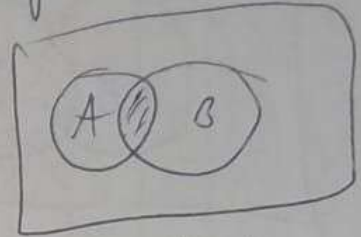


A	B	y
0	0	0
0	1	1
1	0	1
1	1	1

3)

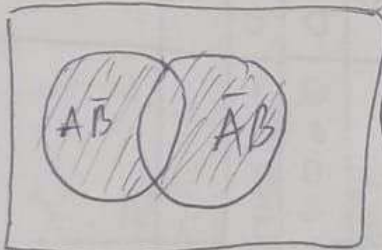
SI
 $y = AB$

$A \cap B$



A	B	y
0	0	0
0	1	0
1	0	0
1	1	1

4) XOR
 $y = A \oplus B = A\bar{B} + \bar{A}B$

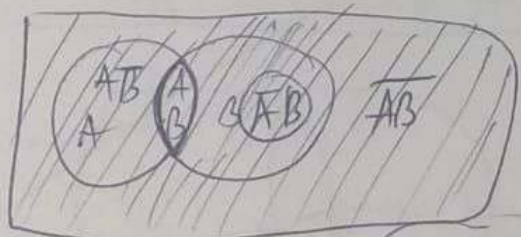


$(A \cup B) \setminus (A \cap B)$

A	B	y
0	0	0
0	1	1
1	0	1
1	1	0

5) $y = \overline{A \cap B}$

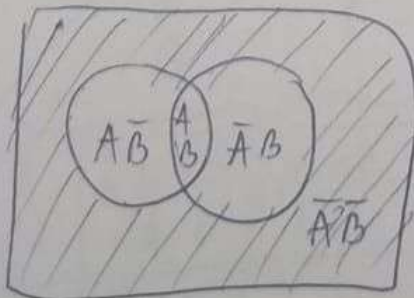
(Poarta universală
NAND)



$R \setminus (A \cap B)$

A	B	y
0	0	1
0	1	1
1	0	1
1	1	0

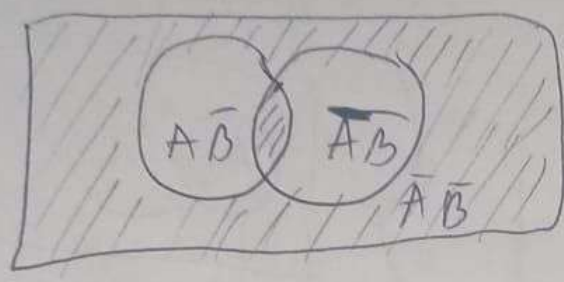
6) NOR



A	B	y
0	0	1
0	1	0
1	0	0
1	1	0

$R \setminus (A \cup B)$

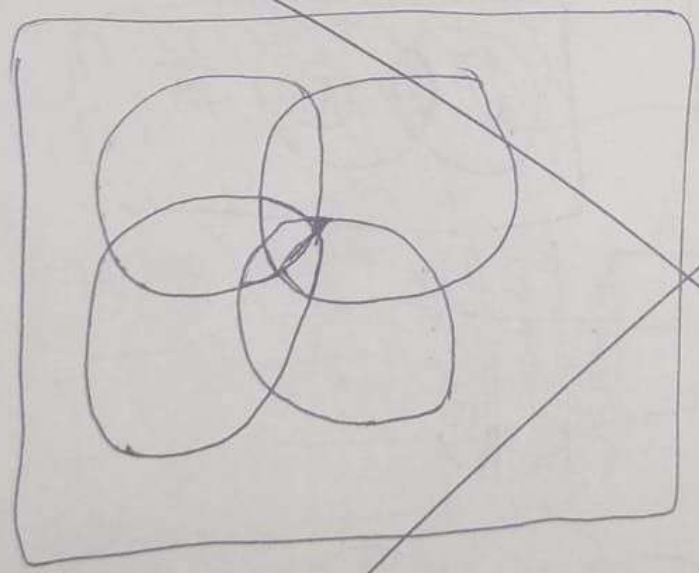
7) XOR $y = A \oplus B$



$$R \setminus (A \cup B) + (A \cap B)$$

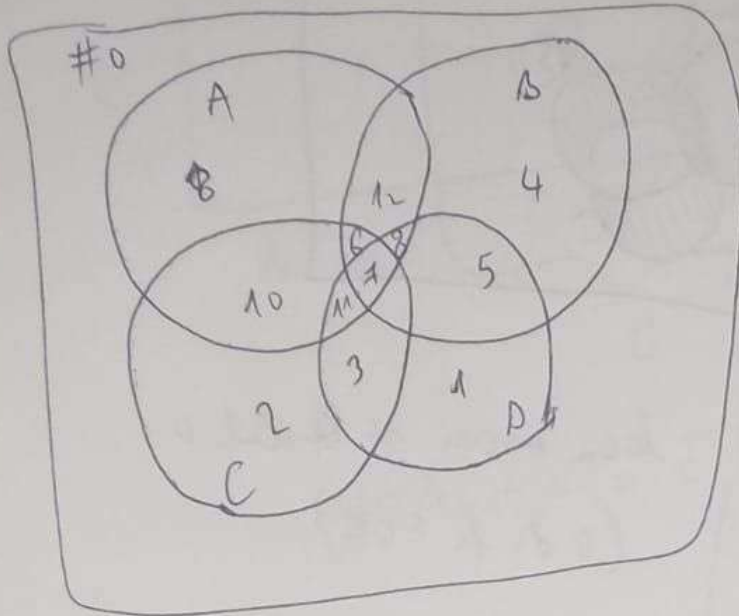
A	B	Y
0	0	1
0	1	0
1	0	0
1	1	1

~~Forma canonică a diagramei Venn~~
~~Diagrame Venn~~



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

Forma canonică a diagramei Venn Diagrame Venn



#	A	B	C	D	
0	0	0	0	0	$\bar{A}\bar{B}\bar{C}\bar{D}$
1	0	0	0	1	$\bar{A}\bar{B}\bar{C}D$
2	0	0	1	0	$\bar{A}\bar{B}C\bar{D}$
3	0	0	1	1	$\bar{A}\bar{B}CD$
4	0	1	0	0	$\bar{A}B\bar{C}\bar{D}$
5	0	1	0	1	$\bar{A}B\bar{C}D$
6	0	1	1	0	$\bar{A}BC\bar{D}$
7	0	1	1	1	$\bar{A}BCD$
8	1	0	0	0	$A\bar{B}\bar{C}\bar{D}$
9	1	0	0	1	$A\bar{B}\bar{C}D$
10	1	0	1	0	$A\bar{B}C\bar{D}$
11	1	0	1	1	$A\bar{B}CD$
12	1	1	0	0	$AB\bar{C}\bar{D}$
13	1	1	0	1	$AB\bar{C}D$
14	1	1	1	0	$ABC\bar{D}$
15	1	1	1	1	$ABCD$

$$X = \mathbb{R}_{\bar{A}}^m, Y = \mathbb{R}_A^m$$

	$\bar{A}\bar{B}\bar{C}\bar{D}$	$\bar{A}\bar{B}\bar{C}D$	$\bar{A}\bar{B}C\bar{D}$	$\bar{A}\bar{B}CD$	
\bar{C}	0 0 0 0	0 1 0 0	1 1 0 0	1 0 0 0	\bar{B}
C	$\bar{A}\bar{B}C\bar{D}$	$\bar{A}\bar{B}CD$	$A\bar{B}\bar{C}\bar{D}$	$A\bar{B}CD$	B
	0 0 0 1	0 1 0 1	1 1 0 1	1 0 0 1	
	$\bar{A}B\bar{C}\bar{D}$	$\bar{A}B\bar{C}D$	$A\bar{B}C\bar{D}$	$A\bar{B}CD$	\bar{D}
	0 0 1 1	0 1 1 1	1 1 1 1	1 0 1 1	
	$\bar{A}B\bar{C}D$	$\bar{A}BC\bar{D}$	$A\bar{B}C\bar{D}$	$A\bar{B}CD$	D
	0 0 1 0	0 1 1 0	1 1 1 0	1 0 1 0	

	\bar{A}	A
\bar{B}	0	1
B	1	0

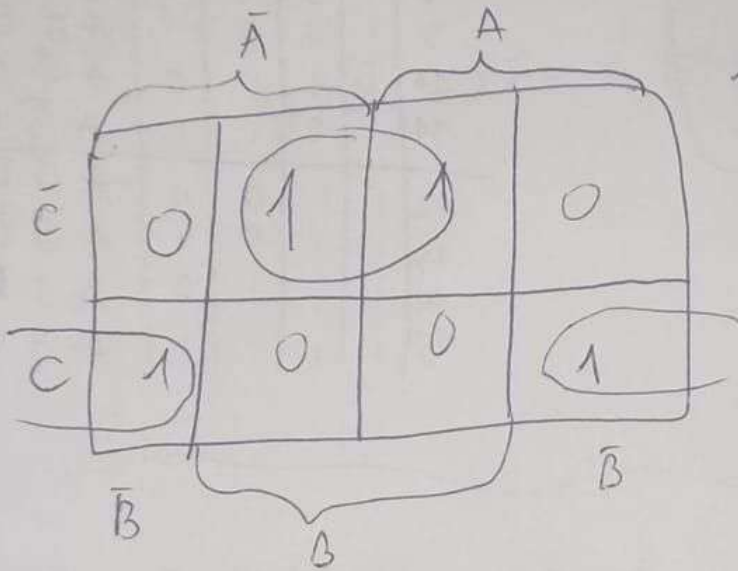
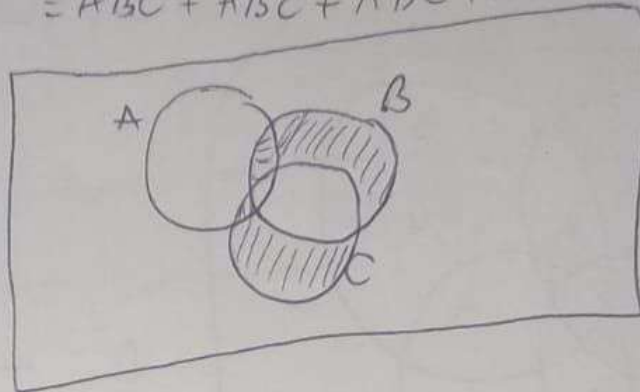
	\bar{A}	A
\bar{B}	0	1
B	1	1

	$\bar{A}\bar{B}\bar{C}$	$\bar{A}\bar{B}C$	$A\bar{B}\bar{C}$	$A\bar{B}C$
\bar{C}	0 0 0	0 1 0	1 1 0	1 0 0
C	$\bar{A}\bar{B}C$	$\bar{A}BC$	$A\bar{B}C$	ABC
	0 0 1	0 1 1	1 1 1	1 0 1

$x \#$	A	B	C	y
0	0	0	0	0
1	0	0	1	1
2	0	1	0	1
3	0	1	1	0
4	1	0	0	0
5	1	0	1	1
6	1	1	0	1
7	1	1	1	0

$$FCC = \sum (1, 3, 5, 6)$$

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



folosim variabilele și leștăm 0
(0 și fi FCC)

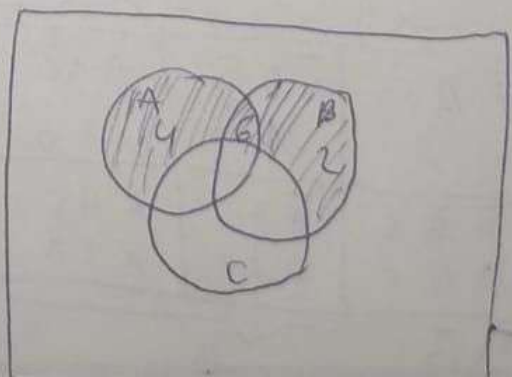
$$y = \bar{B}C + B\bar{C} = B \oplus C$$

plouă prognoză mazăre umbrelă

$$\bar{C}(A+B) = y$$

$$FCC_y = \sum (2, 4, 6) =$$

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



#	A	B	C	A+B	\bar{C}	y
0	0	0	0	0	1	0
1	0	0	1	0	0	0
2	0	1	0	1	1	1
3	0	1	1	1	0	0
4	1	0	0	1	1	1
5	1	0	1	1	0	0
6	1	1	0	1	1	1
7	1	1	1	1	0	0

	\bar{A}		$-1-$	A
\bar{C}	0	1	1	1
C	0	0	0	0
	\bar{B}	B		\bar{B}

$$Y = \bar{B}\bar{C} + A\bar{C} = \bar{C}(A+B)$$