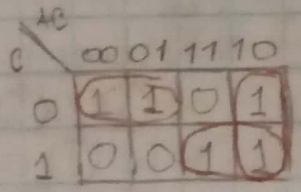
Fernando Amºbars.

Lab 04 Digital 1

I

1.

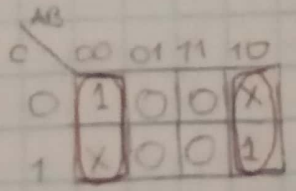
A	B	C	Y
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	0
1	1	1	1



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

2.

A	B	C	Y
0	0	0	1
0	0	1	X
0	1	0	0
0	1	1	0
1	0	0	X
1	0	1	1
1	1	0	0
1	1	1	0



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

$Y = \bar{B}$

3.

A	B	C	D	Y
0	0	0	0	1
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	0
1	0	0	0	0
1	0	0	1	1
1	0	1	0	1
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	1

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

$$Y = \bar{A}\bar{B}\bar{C}\bar{D} + \bar{A}\bar{B}CD + \bar{A}B\bar{C}D + \bar{A}BC\bar{D}$$

$$+ AB\bar{C}\bar{D} + ABCD + A\bar{B}\bar{C}D + A\bar{B}C\bar{D}$$

4.

A	B	C	D	Y
0	0	0	0	X
0	0	0	1	X
0	0	1	0	X
0	0	1	1	0 ✓
0	1	0	0	0 ✓
0	1	0	1	X
0	1	1	0	0 ✓
0	1	1	1	X
1	0	0	0	1 ✓
1	0	0	1	0 ✓
1	0	1	0	X
1	0	1	1	1 ✓
1	1	0	0	1 ✓
1	1	0	1	1 ✓
1	1	1	0	X
1	1	1	1	1 ✓

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

$$Y = AB + AC + A\bar{D}$$

3. II.

1. $Y = A \cdot B \cdot C \cdot \bar{D} + A \cdot \overline{B \cdot C \cdot D} + \overline{(A+B+C+D)}$

A B C D	Y
0 0 0 0	1 ✓
0 0 0 1	0
0 0 1 0	0
0 0 1 1	0
0 1 0 0	0
0 1 0 1	0
0 1 1 0	0
0 1 1 1	0
1 0 0 0	1 ✓
1 0 0 1	1 ✓
1 0 1 0	1 ✓
1 0 1 1	1 ✓
1 1 0 0	1 ✓
1 1 0 1	1 ✓
1 1 1 0	1 ✓
1 1 1 1	0

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

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

$(0,0,0,1) = 0 \cdot 0 \cdot 0 \cdot 1 + 0 \cdot \overline{(0 \cdot 0 \cdot 0)} + \overline{(0+0+0+0)} = 1$

$(0,0,0,1) = 0 \cdot 0 \cdot 0 \cdot 0 + 0 \cdot \overline{(0 \cdot 0 \cdot 1)} + \overline{(0+0+0+1)} = 0$

$(0,0,1,0) = 0 \cdot 0 \cdot 1 \cdot 1 + 0 \cdot \overline{(0 \cdot 1 \cdot 0)} + \overline{(0+0+1+0)} = 0$

$(0,0,1,1) = 0 \cdot 0 \cdot 1 \cdot 0 + 0 \cdot \overline{(0 \cdot 1 \cdot 1)} + \overline{(0+0+1+1)} = 0$

$(0,1,0,0) = 0 \cdot 1 \cdot 0 \cdot 1 + 0 \cdot \overline{(1 \cdot 0 \cdot 0)} + \overline{(0+1+0+0)} = 0$

$(0,1,0,1) = 0 \cdot 1 \cdot 0 \cdot 0 + 0 \cdot \overline{(1 \cdot 0 \cdot 1)} + \overline{(0+1+0+1)} = 0$

$(0,1,1,0) = 0\cdot1\cdot1\cdot1 + 0(\overline{1\cdot1\cdot0}) + (\overline{0+1+1+0}) = 0$

$(0,1,1,1) = 0\cdot1\cdot1\cdot0 + 0(\overline{1\cdot1\cdot1}) + (\overline{0+1+1+1}) = 0$

$(1,0,0,0) = 1\cdot0\cdot0\cdot1 + 1(\overline{0\cdot0\cdot0}) + (\overline{1+0+0+0}) = 1$

$(1,0,0,1) = 1\cdot0\cdot0\cdot0 + 1(\overline{0\cdot0\cdot1}) + (\overline{1+0+0+1}) = 1$

$(1,0,1,0) = 1\cdot0\cdot1\cdot1 + 1(\overline{0\cdot1\cdot0}) + (\overline{1+0+1+0}) = 1$

$(1,0,1,1) = 1\cdot0\cdot1\cdot0 + 1(\overline{0\cdot1\cdot1}) + (\overline{1+0+1+1}) = 1$

$(1,1,0,0) = 1\cdot1\cdot0\cdot1 + 1(\overline{1\cdot0\cdot0}) + (\overline{1+1+0+0}) = 1$

$(1,1,0,1) = 1\cdot1\cdot0\cdot0 + 1(\overline{1\cdot0\cdot1}) + (\overline{1+1+0+1}) = 1$

$(1,1,1,0) = 1\cdot1\cdot1\cdot1 + 1(\overline{1\cdot1\cdot0}) + (\overline{1+1+1+0}) = 1$

$(1,1,1,1) = 1\cdot1\cdot1\cdot0 + 1(\overline{1\cdot1\cdot1}) + (\overline{1+1+1+1}) = 0$

A	B	C	D	Y
1	0	x	x	1
1	x	0	x	1
1	x	x	0	1
x	0	0	0	1

2. $Y = \bar{A} \cdot B \cdot C + \overline{B \cdot \bar{C}} + B \cdot C$

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

A \ BC	00	01	11	10
0	1	0	0	1
1	1	1	1	1

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

$$Y = \underbrace{\bar{A} \cdot B \cdot C}_{0\text{-}1\text{-}1} + \underbrace{\overline{B \cdot \bar{C}}}_{0\text{-}1} + \underbrace{B \cdot C}_{1\text{-}1}$$

A	B	C	Y
x	0	x	1
x	x	1	1

3.

A	B	C	D	Y
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	1
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	1
1	1	1	1	1

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

$$Y = B + \bar{C}D + AD$$

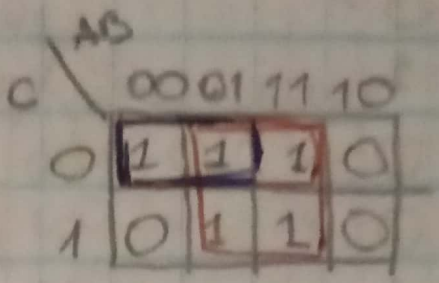
$$Y = \overline{(A+B+C)} \cdot D + A \cdot D + B$$

$$0+0+0 \cdot 1 + 1 \cdot 1 + 1$$

A	B	C	D	Y
x	1	x	x	1
x	x	0	1	1
1	x	x	1	1

4.

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



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

$$y = \underbrace{B \cdot C}_{1 \cdot 1} + \underbrace{\bar{A} \cdot \bar{B} \cdot \bar{C}}_{0 \cdot 0 \cdot 0} + \underbrace{B \cdot \bar{C}}_{1 \cdot 0}$$

A	B	C	Y
0	X	0	1
X	1	X	1

I

Y Alarma y luces encendidas → salida 1 = encendido
A sensor ventana/puerta → Entrada 1 = ok
B Sensor de movimiento → Entrada 0 = no mov
C Alarma armada → Entrada 1 = armado

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

SOP =

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

POS =

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

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

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

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