

Laboratorio #03

Ejercicio #01

Tabla 01

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

SOP:

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

POS:

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

Tabla 02

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

SOP:

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

POS:

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

Tabla 03

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

SOP:

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

POS:

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

Tabla 04

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

SOP:

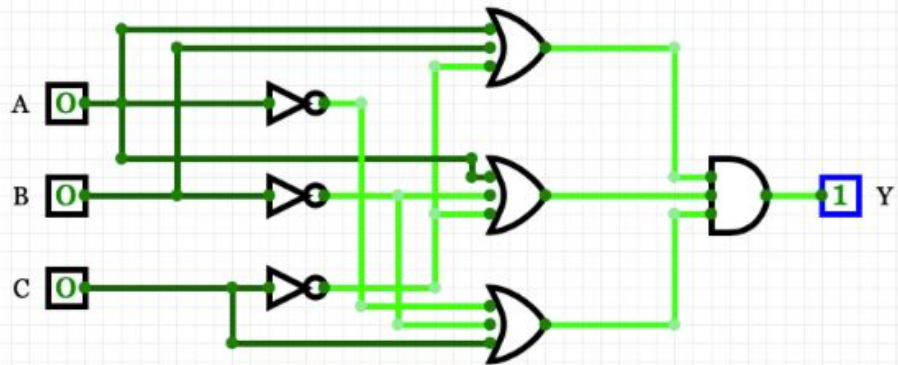
$$Y = (\bar{A} * \bar{B} * \bar{C} * \bar{D}) + (\bar{A} * \bar{B} * C * \bar{D}) + (\bar{A} * \bar{B} * C * D) + (\bar{A} * B * C * \bar{D}) + (\bar{A} * B * C * D) + (A * \bar{B} * \bar{C} * \bar{D}) + (A * \bar{B} * C * \bar{D})$$

POS:

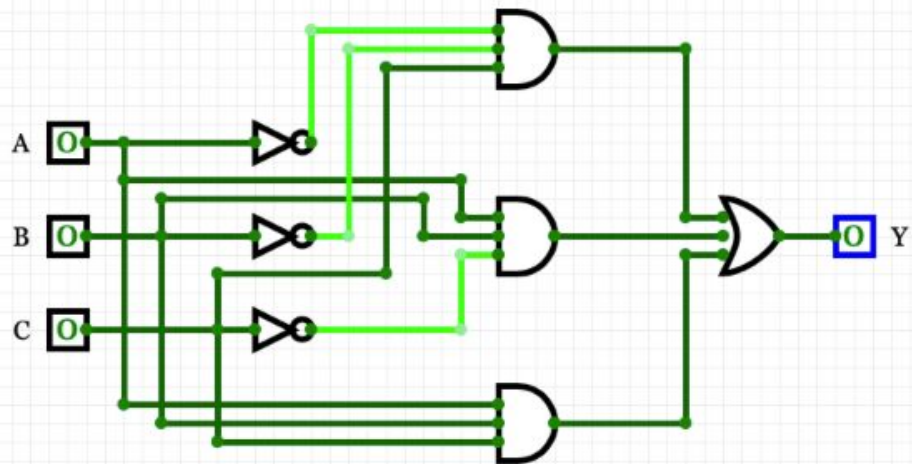
$$Y = (A + B + C + \bar{D}) * (A + \bar{B} + C + D) * (A + \bar{B} + C + \bar{D}) * (\bar{A} + B + C + \bar{D}) * (\bar{A} + B + \bar{C} + \bar{D}) * (\bar{A} + \bar{B} + C + D) * (\bar{A} + \bar{B} + C + \bar{D}) * (\bar{A} + \bar{B} + \bar{C} + \bar{D})$$

Ejercicio #02

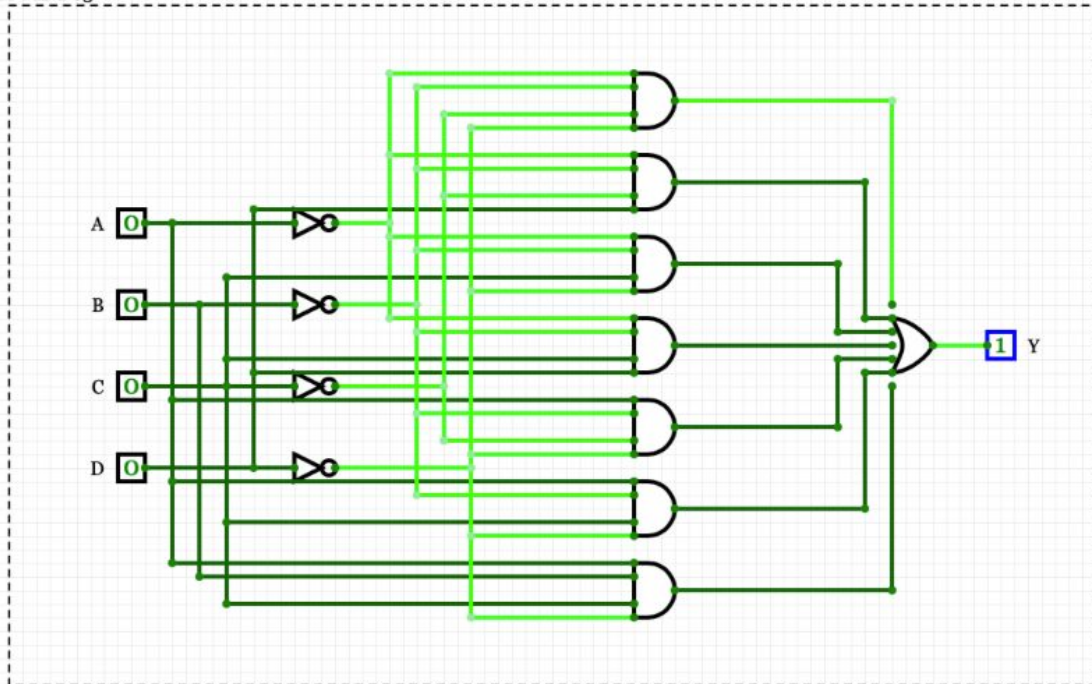
Circuito de Tabla 01



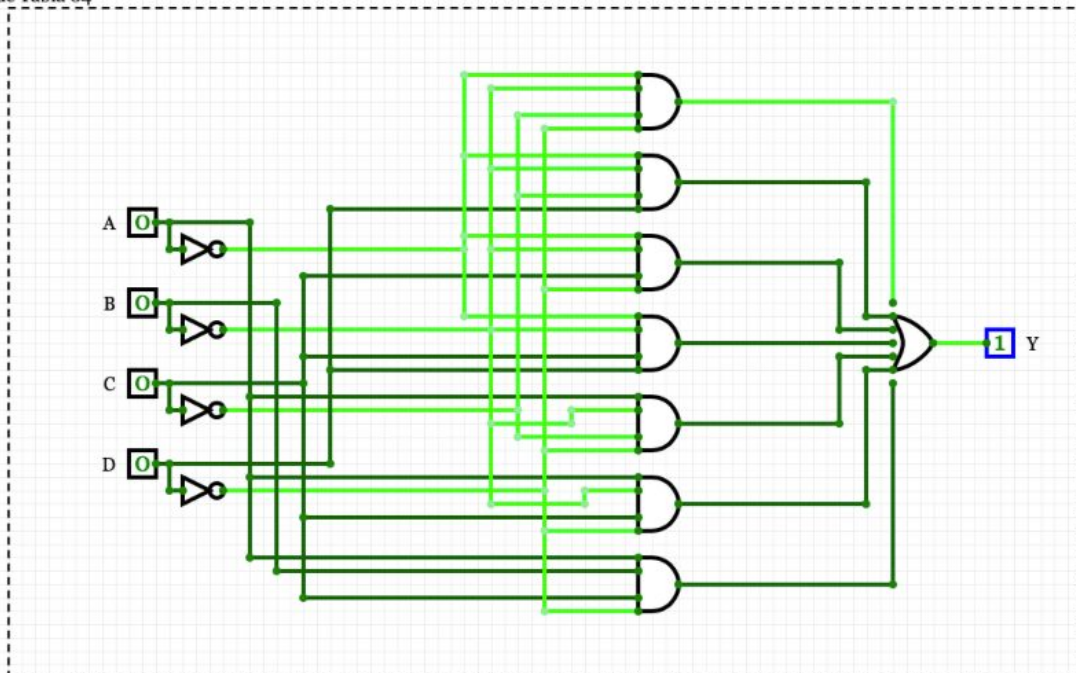
Circuito de Tabla 02



Circuito de Tabla 03



Circuito de Tabla 04



Ejercicio #03 https://github.com/maz131212/ed1_lab3

Tabla 01 SOP

```
MacBookPro13:01_tabla_SOP — -bash — 84x28
[MacBookPro13:01_tabla_SOP amazariegos$ apio sim

--> WARNING: no PCF file found (.pcf)

iverilog -B "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" -o tabla01sop_tb.out -D VCD_OUTPUT=tabla01sop_tb /Users/amazariegos/.apio/packages/toolchain-yosys/share/yosys/ice40/cells_sim.v tabla01sop.v tabla01sop_tb.v
vvp -M "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" tabla01sop_tb.out
A B C | Y
-----|---
VCD info: dumpfile tabla01sop_tb.vcd opened for output.
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
gtkwave tabla01sop_tb.vcd tabla01sop_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tabla01sop_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/bin/tabla01sop_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.67 seconds =====
MacBookPro13:01_tabla_SOP amazariegos$
```

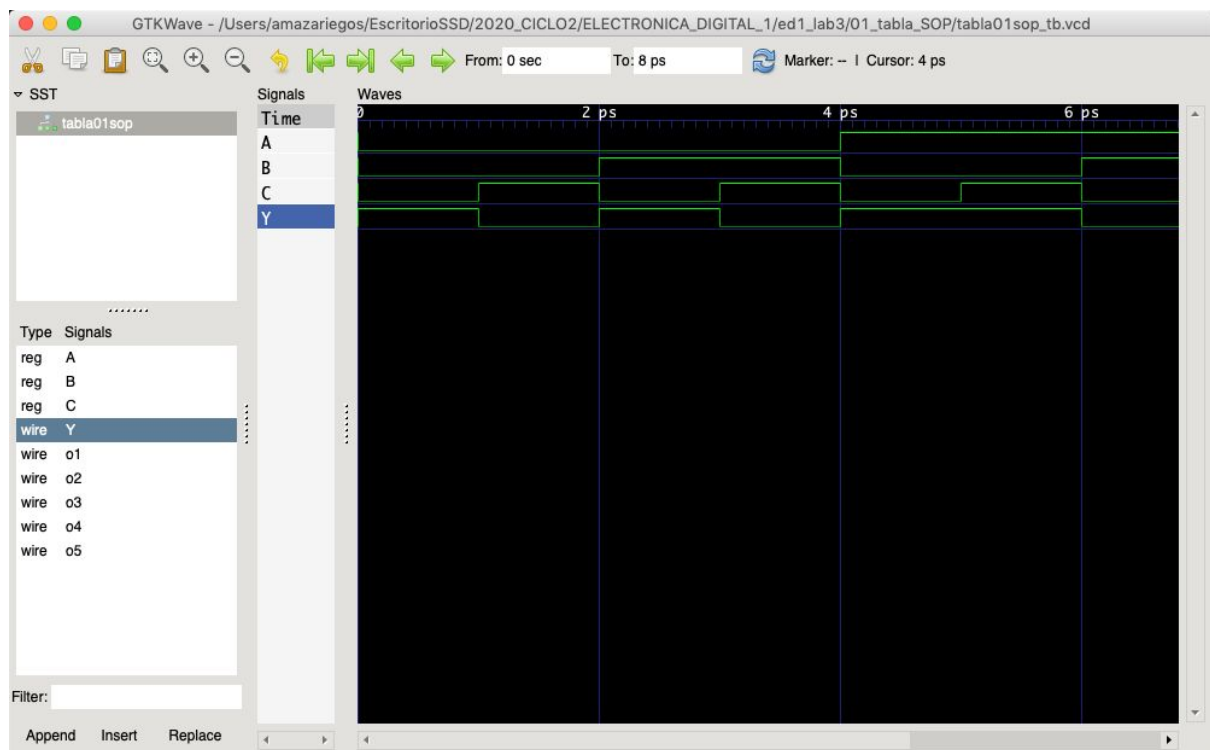


Tabla 01 POS

```

MacBookPro13:01_tabla_POS — -bash — 84x28
MacBookPro13:01_tabla_POS amazariegos$ apio sim

---> WARNING: no PCF file found (.pcf)

iverilog -B "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" -o tabla01pos_tb.out -D VCD_OUTPUT=tabla01pos_tb /Users/amazariegos/.apio/packages/toolchain-yosys/share/yosys/ice40/cells_sim.v tabla01pos.v tabla01pos_tb.v
vvp -M "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" tabla01pos_tb.out
A B C | Y
-----|--
VCD info: dumpfile tabla01pos_tb.vcd opened for output.
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
gtkwave tabla01pos_tb.vcd tabla01pos_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tabla01pos_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/bin/tabla01pos_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.57 seconds =====
MacBookPro13:01_tabla_POS amazariegos$

```

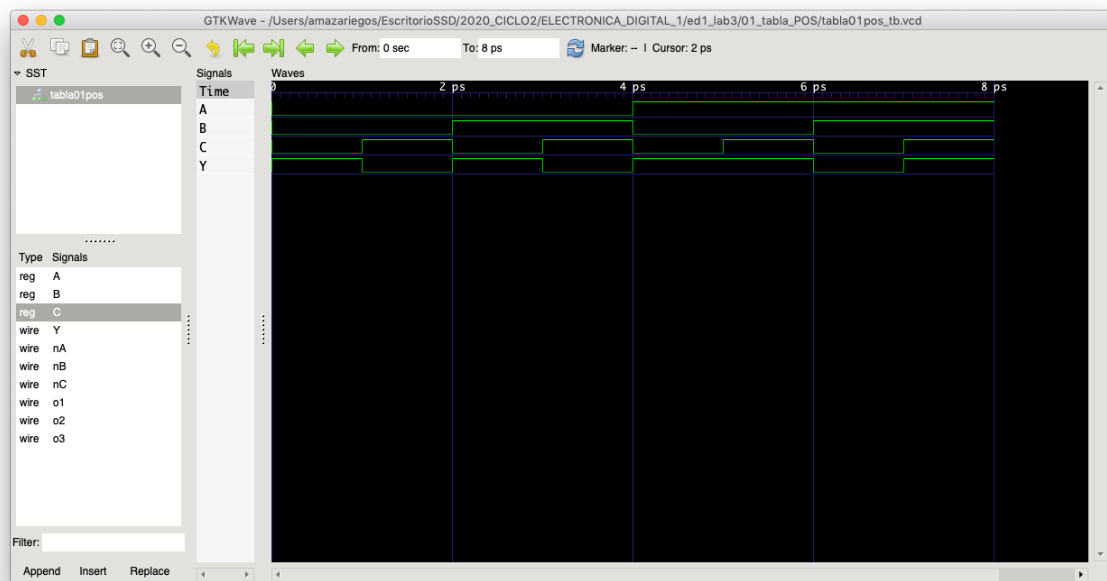


Tabla 02 SOP

```
MacBookPro13:02_tabla_SOP amazariegos$ apio sim

--> WARNING: no PCF file found (.pcf)

iverilog -B "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" -o tabla02sop_tb.out -D VCD_OUTPUT=tabla02sop_tb /Users/amazariegos/.apio/packages/toolchain-yosys/share/yosys/ice40/cells_sim.v tabla02sop.v tabla02sop_tb.v
vvp -M "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" tabla02sop_tb.out
A B C | Y
-----|---
VCD info: dumpfile tabla02sop_tb.vcd opened for output.
0 0 0 | 0
0 0 1 | 1
0 1 0 | 0
0 1 1 | 0
1 0 0 | 0
1 0 1 | 0
1 1 0 | 1
1 1 1 | 1
gtkwave tabla02sop_tb.vcd tabla02sop_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tabla02sop_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/bin/tabla02sop_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.63 seconds =====
MacBookPro13:02_tabla_SOP amazariegos$
```

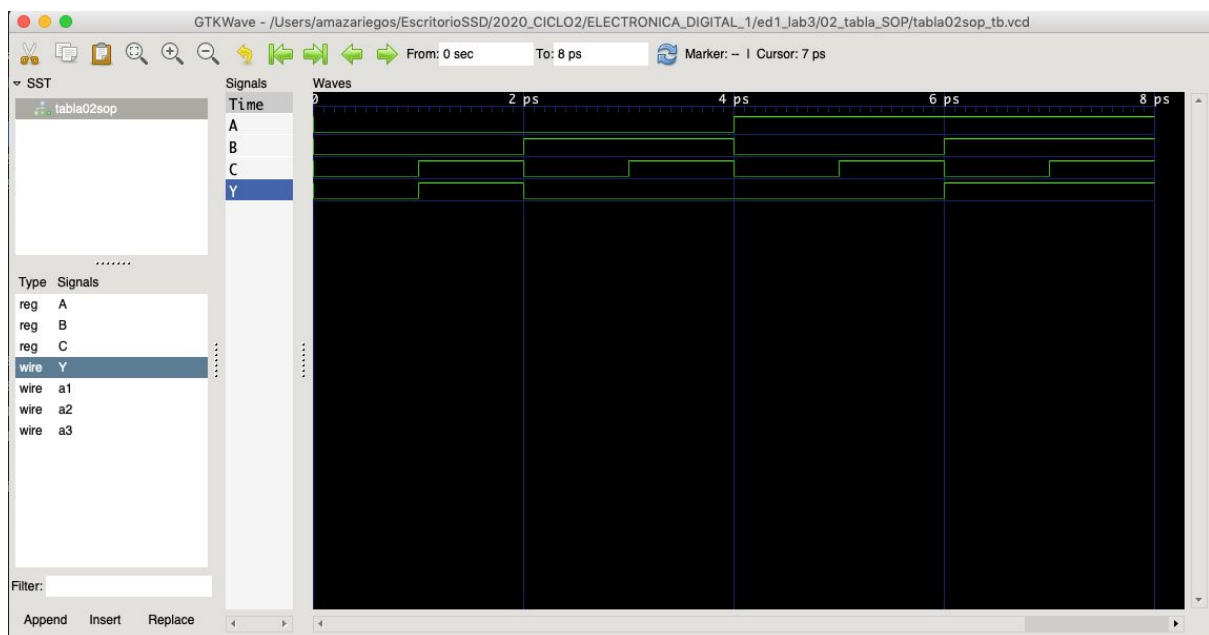


Tabla 02 POS

```
MacBookPro13:02_tabla_POS — -bash — 84x28
MacBookPro13:02_tabla_POS amazariegos$ apio sim

--> WARNING: no PCF file found (.pcf)

iverilog -B "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" -o tabla02pos_tb.out -D VCD_OUTPUT=tabla02pos_tb /Users/amazariegos/.apio/packages/toolchain-yosys/share/yosys/ice40/cells_sim.v tabla02pos.v tabla02pos_tb.v
vvp -M "/Users/amazariegos/.apio/packages/toolchain-iverilog/lib/ivl" tabla02pos_tb.out
A B C | Y
-----|--
VCD info: dumpfile tabla02pos_tb.vcd opened for output.
0 0 0 | 0
0 0 1 | 1
0 1 0 | 0
0 1 1 | 0
1 0 0 | 0
1 0 1 | 0
1 1 0 | 1
1 1 1 | 1
gtkwave tabla02pos_tb.vcd tabla02pos_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tabla02pos_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/bin/tabla02pos_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.65 seconds =====
MacBookPro13:02_tabla_POS amazariegos$
```

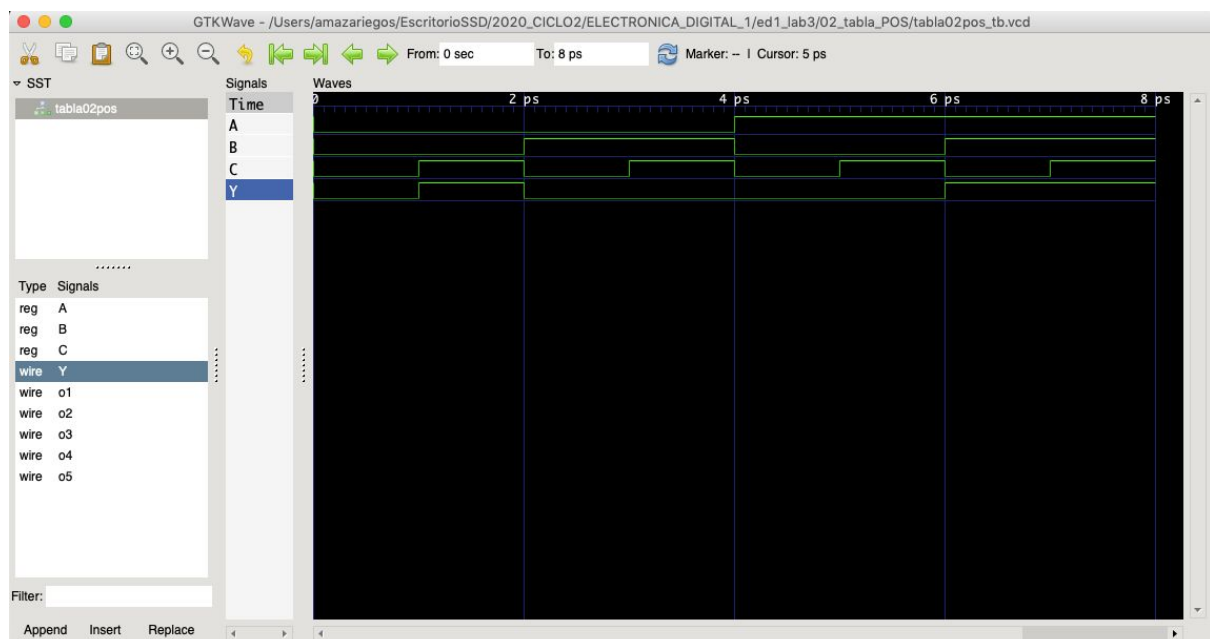


Tabla 03 SOP

```
03_tabla_SOP — -bash — 84x28

out
A B C D | Y
-----|---
VCD info: dumpfile tabla03sop_tb.vcd opened for output.
0 0 0 0 | 1
0 0 0 1 | 1
0 0 1 0 | 1
0 0 1 1 | 1
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 | 0
1 0 1 0 | 1
1 0 1 1 | 0
1 1 0 0 | 0
1 1 0 1 | 0
1 1 1 0 | 1
1 1 1 1 | 0

gtkwave tabla03sop_tb.vcd tabla03sop_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tab
la03sop_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/b
in/tabla03sop_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.63 seconds =====
MacBookPro13:03_tabla_SOP amazariegos$
```

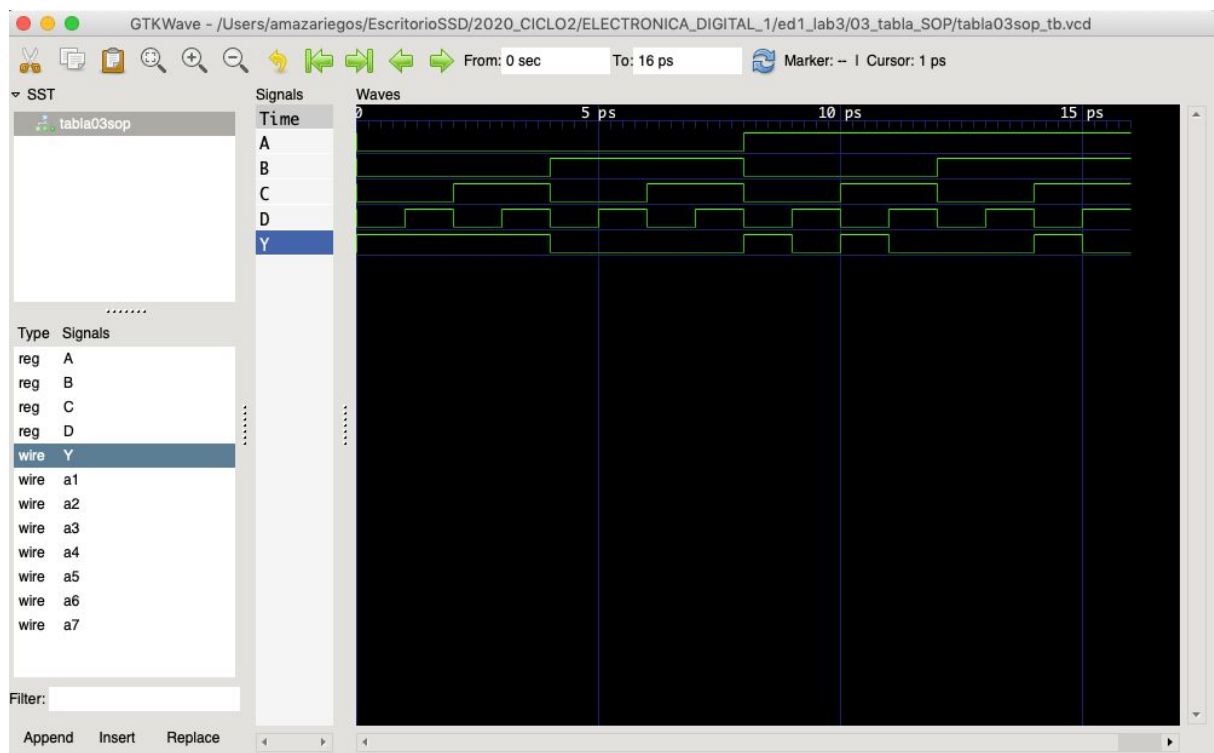


Tabla 03 POS

```
03_tabla_POS — -bash — 84x28

out
A B C D | Y
-----|---
VCD info: dumpfile tabla03pos_tb.vcd opened for output.
0 0 0 0 | 1
0 0 0 1 | 1
0 0 1 0 | 1
0 0 1 1 | 1
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 | 0
1 0 1 0 | 0
1 0 1 1 | 1
1 1 0 0 | 0
1 1 0 1 | 0
1 1 1 0 | 1
1 1 1 1 | 0

gtkwave tabla03pos_tb.vcd tabla03pos_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tab
la03pos_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/b
in/tabla03pos_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.64 seconds =====
MacBookPro13:03_tabla_POS amazariegos$
```

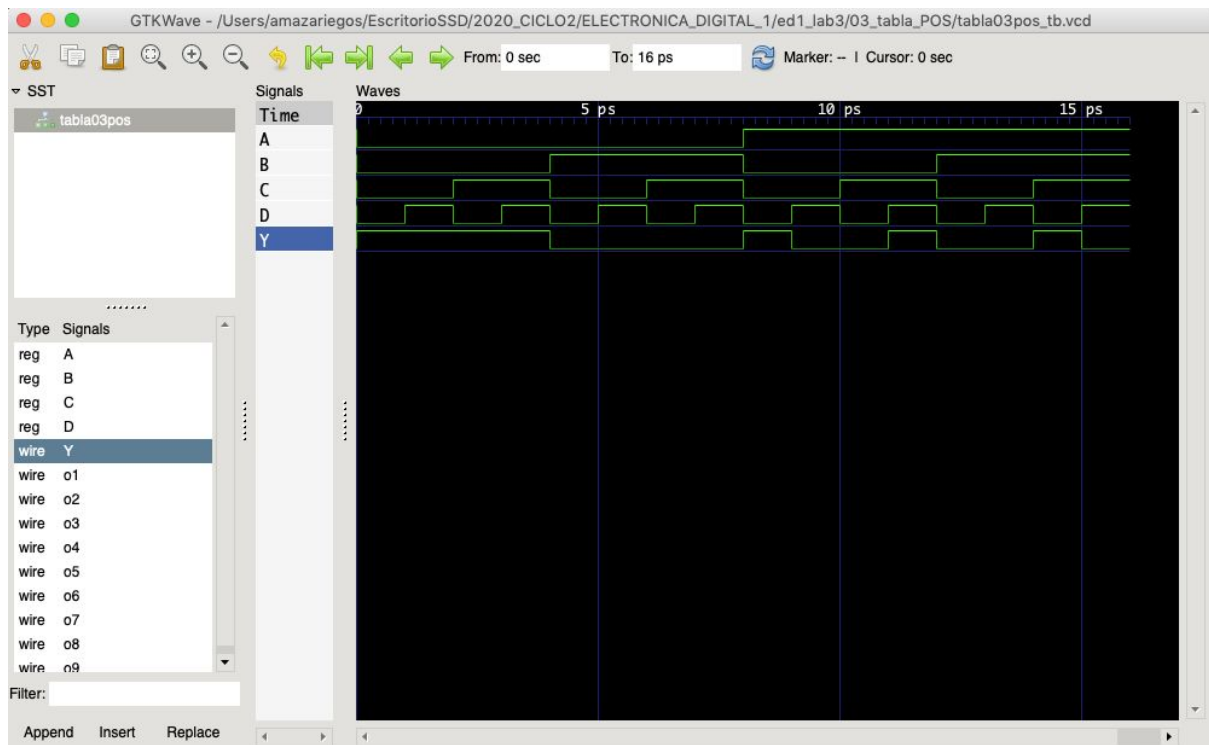


Tabla 04 SOP

```
04_tabla_SOP — -bash — 84x28
out
A B C D | Y
-----|---
VCD info: dumpfile tabla04sop_tb.vcd opened for output.
0 0 0 0 | 1
0 0 0 1 | 0
0 0 1 0 | 1
0 0 1 1 | 1
0 1 0 0 | 0
0 1 0 1 | 0
0 1 1 0 | 1
0 1 1 1 | 1
1 0 0 0 | 1
1 0 0 1 | 0
1 0 1 0 | 1
1 0 1 1 | 0
1 1 0 0 | 0
1 1 0 1 | 0
1 1 1 0 | 0
1 1 1 1 | 0
gtkwave tabla04sop_tb.vcd tabla04sop_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tab
la04sop_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/b
in/tabla04sop_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.66 seconds =====
MacBookPro13:04_tabla_SOP amazariegos$
```

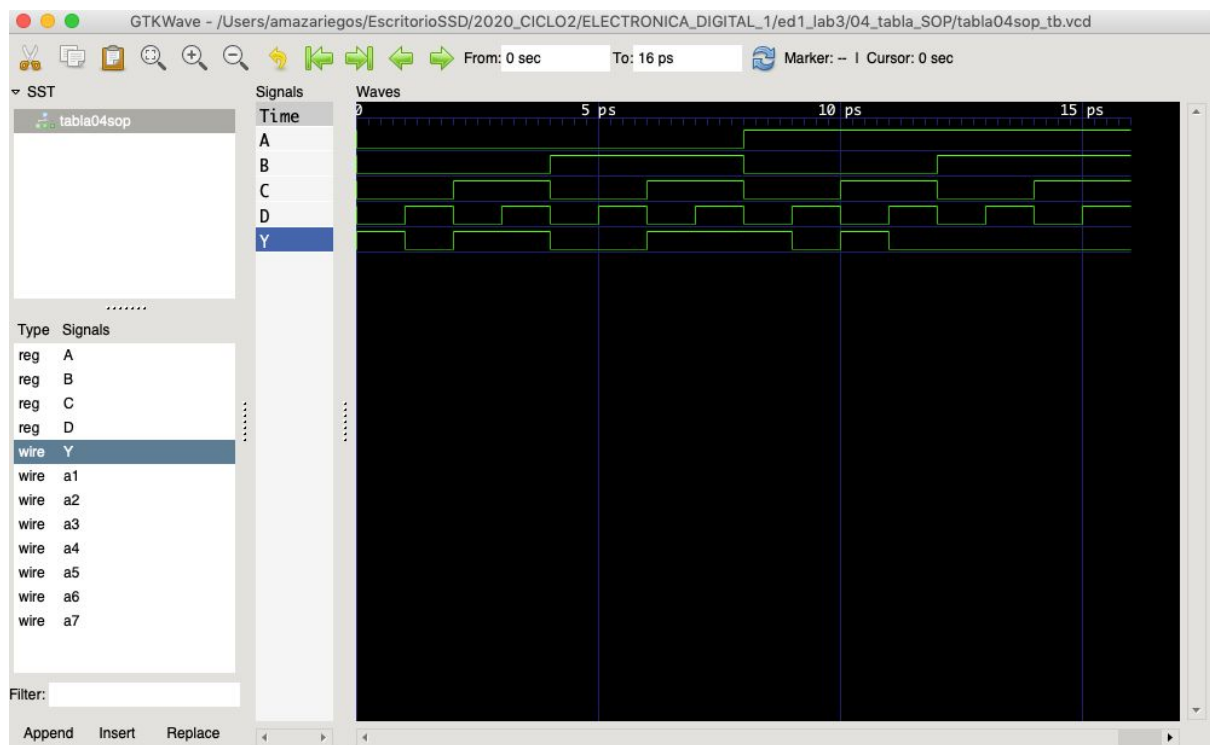
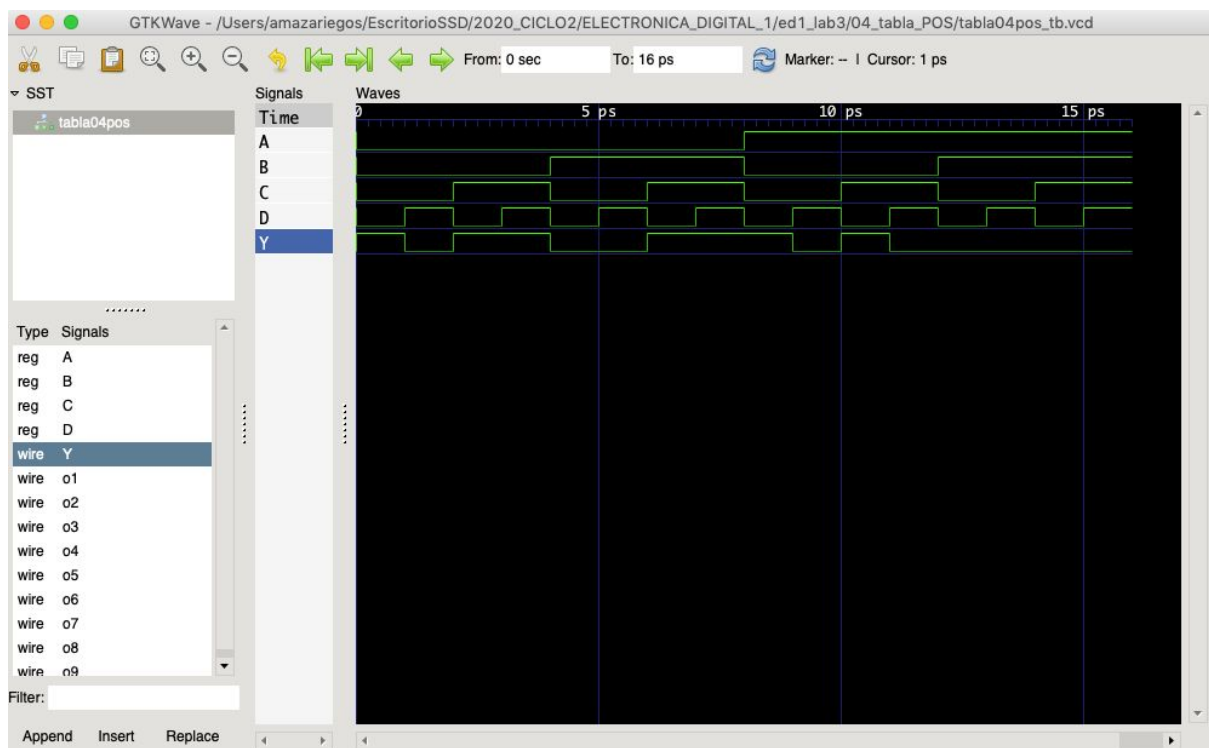


Tabla 04 POS

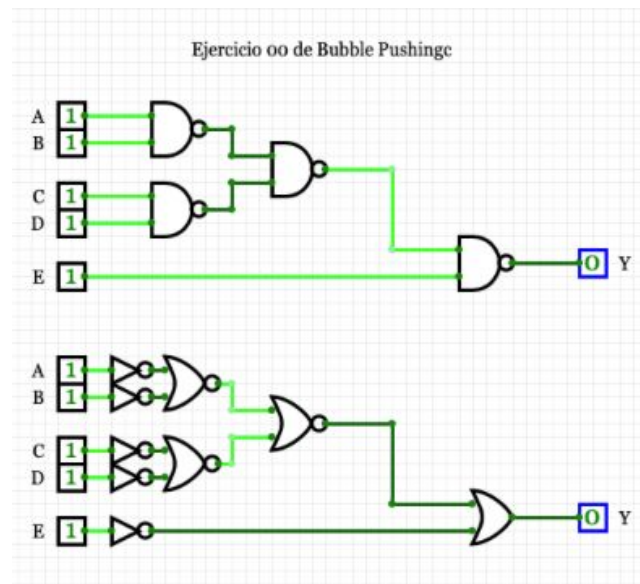
```
04_tabla_POS — -bash — 84x28

out
A B C D | Y
-----|
VCD info: dumpfile tabla04pos_tb.vcd opened for output.
0 0 0 0 | 1
0 0 0 1 | 0
0 0 1 0 | 1
0 0 1 1 | 1
0 1 0 0 | 0
0 1 0 1 | 0
0 1 1 0 | 1
0 1 1 1 | 1
1 0 0 0 | 1
1 0 0 1 | 0
1 0 1 0 | 1
1 0 1 1 | 0
1 1 0 0 | 0
1 1 0 1 | 0
1 1 1 0 | 0
1 1 1 1 | 0

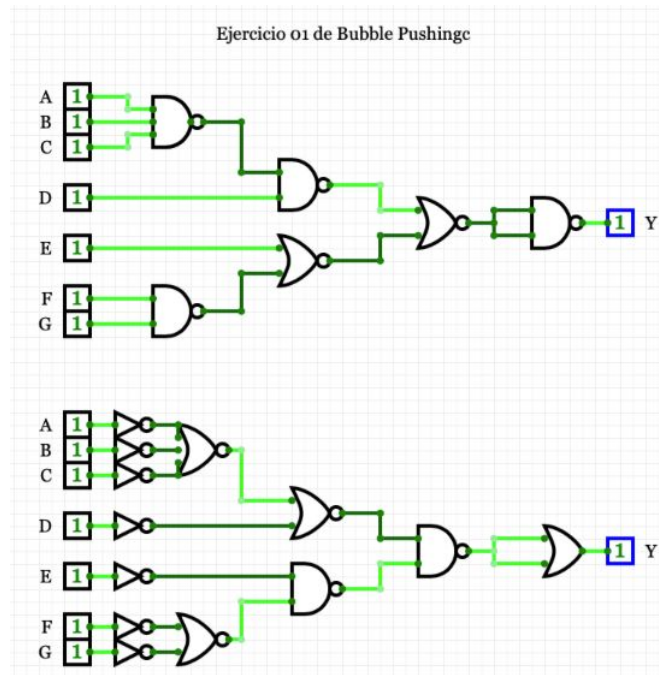
gtkwave tabla04pos_tb.vcd tabla04pos_tb.gtkw
/usr/local/bin/gtkwave: line 215: /usr/local/bin/../../../../Contents/Resources/bin/tab
la04pos_tb.vcd: No such file or directory
/usr/local/bin/gtkwave: line 215: exec: /usr/local/bin/../../../../Contents/Resources/b
in/tabla04pos_tb.vcd: cannot execute: No such file or directory
scons: *** [sim] Error 126
===== [ ERROR ] Took 0.64 seconds =====
MacBookPro13:04_tabla_POS amazariegos$
```



Ejercicio #04



$$Y = \overline{\overline{A + B} + \overline{C + D}} + \overline{E}$$



$$Y = \overline{\overline{\overline{A * B * C} + \overline{D}} * \overline{E} * \overline{F + G}}$$