Sistemas Digitais - Sinta 06 - 27/02/2023

1- Somador/Subtrator

0 (+) 1 (-)

* subtração

0 - 0 = 0

1 - 0 = 1

1 - 1 = 0

0 - 1 $\overset{1}{=}$ 1

* Soma

0 + 0 = 0

0 + 1 = 1

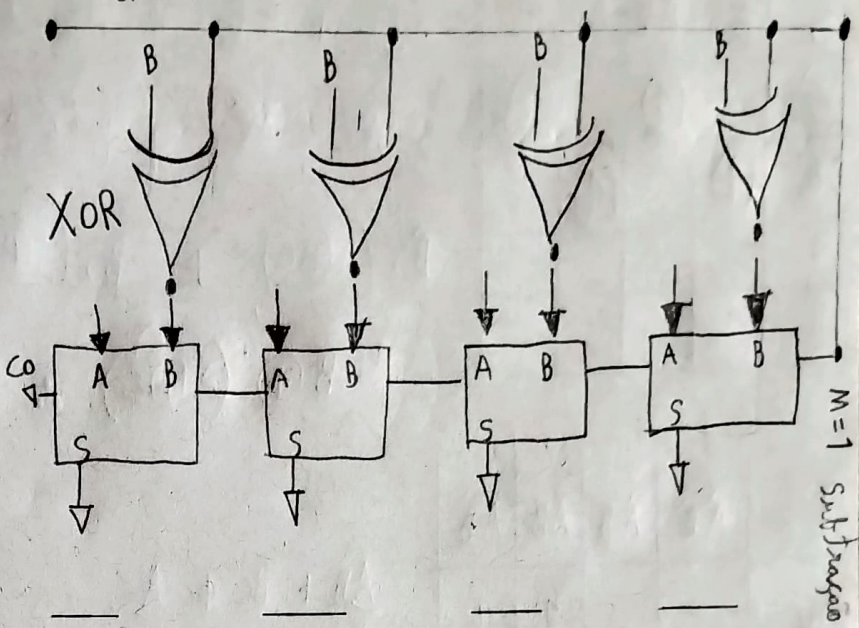
1 + 0 = 1

1 + 1 = 0 (vai 1)

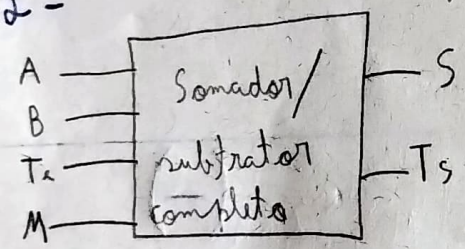
* Exemplo

$$\begin{array}{r} 1\,1\,0\,1\,0 \\ -\,1\,1\,1 \\ \hline 0\,0\,1\,1 \end{array}$$

circuito



2-



[Tabela Verdade]

carry in → T_E (C)

carry out (T_S) (vai 1)

M	A	B	T_E (C)	S	T_S
0	0	0	0	0	0
0	0	0	1	1	0
0	0	1	0	1	0
0	0	1	1	0	1
0	1	0	0	1	0
0	1	0	1	0	1
0	1	1	0	0	1
0	1	1	1	1	1
1	0	0	0	0	0
1	0	0	1	1	1
1	0	1	0	1	1
1	0	1	1	0	1
1	1	0	0	1	0
1	1	0	1	0	0
1	1	1	0	0	0
1	1	1	1	1	1

Soma (M=0)

Subtração (M=1)

[mapa de Karnaugh]

(+)

S	$\bar{A}\bar{B}$	$\bar{A}B$	AB	$A\bar{B}$
$\bar{C}$		(1)		(1)
C	(1)		(1)	

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

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

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

$B \oplus (A \oplus C) \therefore A \oplus B \oplus C$

Ts	$\bar{A}\bar{B}$	$\bar{A}B$	AB	$A\bar{B}$
$\bar{C}$			1	
C		1	1	1

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

$A(B+C) + BC$

S	$\bar{A}\bar{B}$	$\bar{A}B$	AB	$A\bar{B}$
$\bar{C}$		(1)		(1)
C	(1)		(1)	

$A \oplus B \oplus C$

Ts	$\bar{A}\bar{B}$	$\bar{A}B$	AB	$A\bar{B}$
$\bar{C}$		1		
C	(1)	(1)	(1)	

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

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

(−)

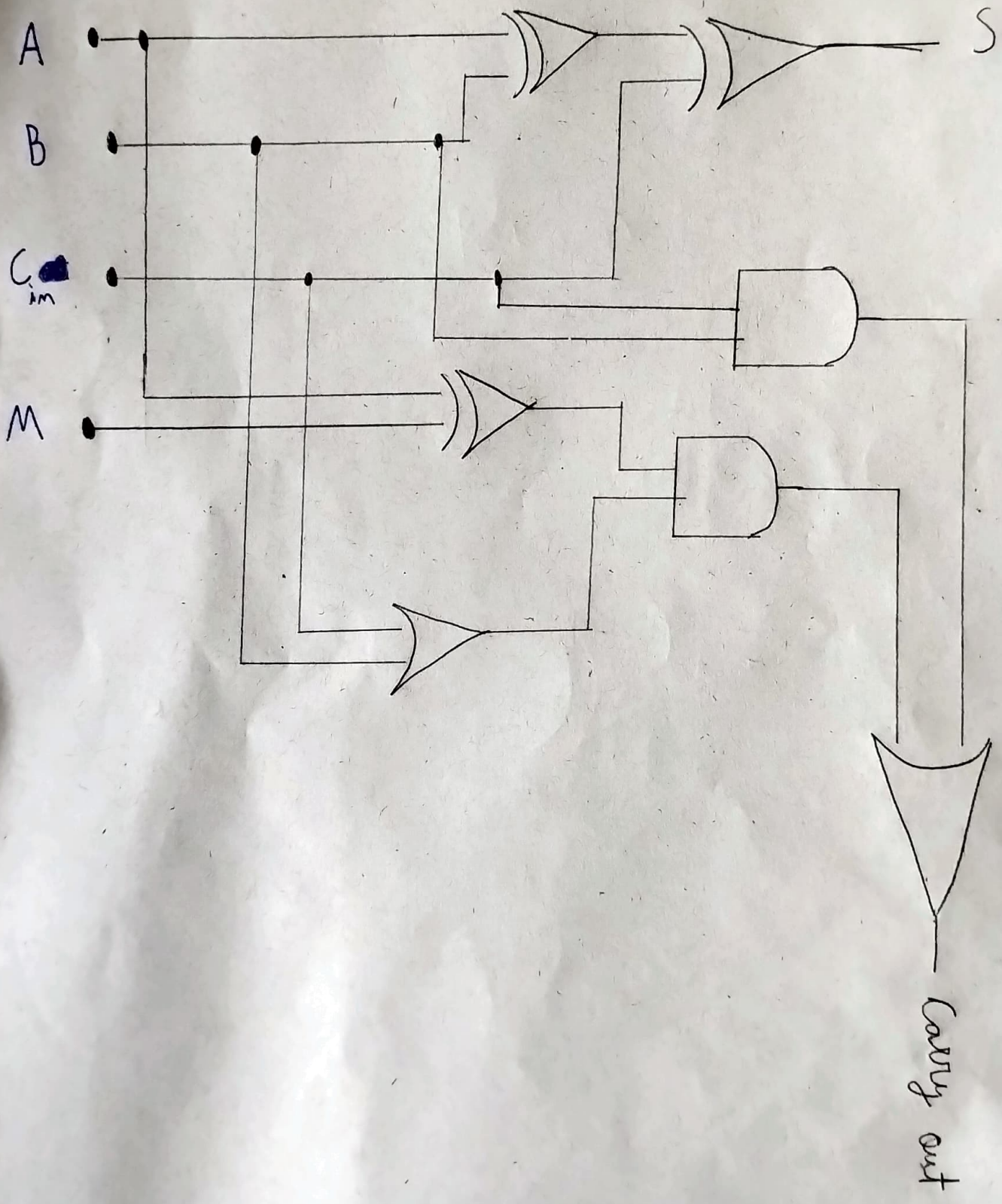
A	M	A xor M
0	0	0
0	1	1
1	0	1
1	1	0

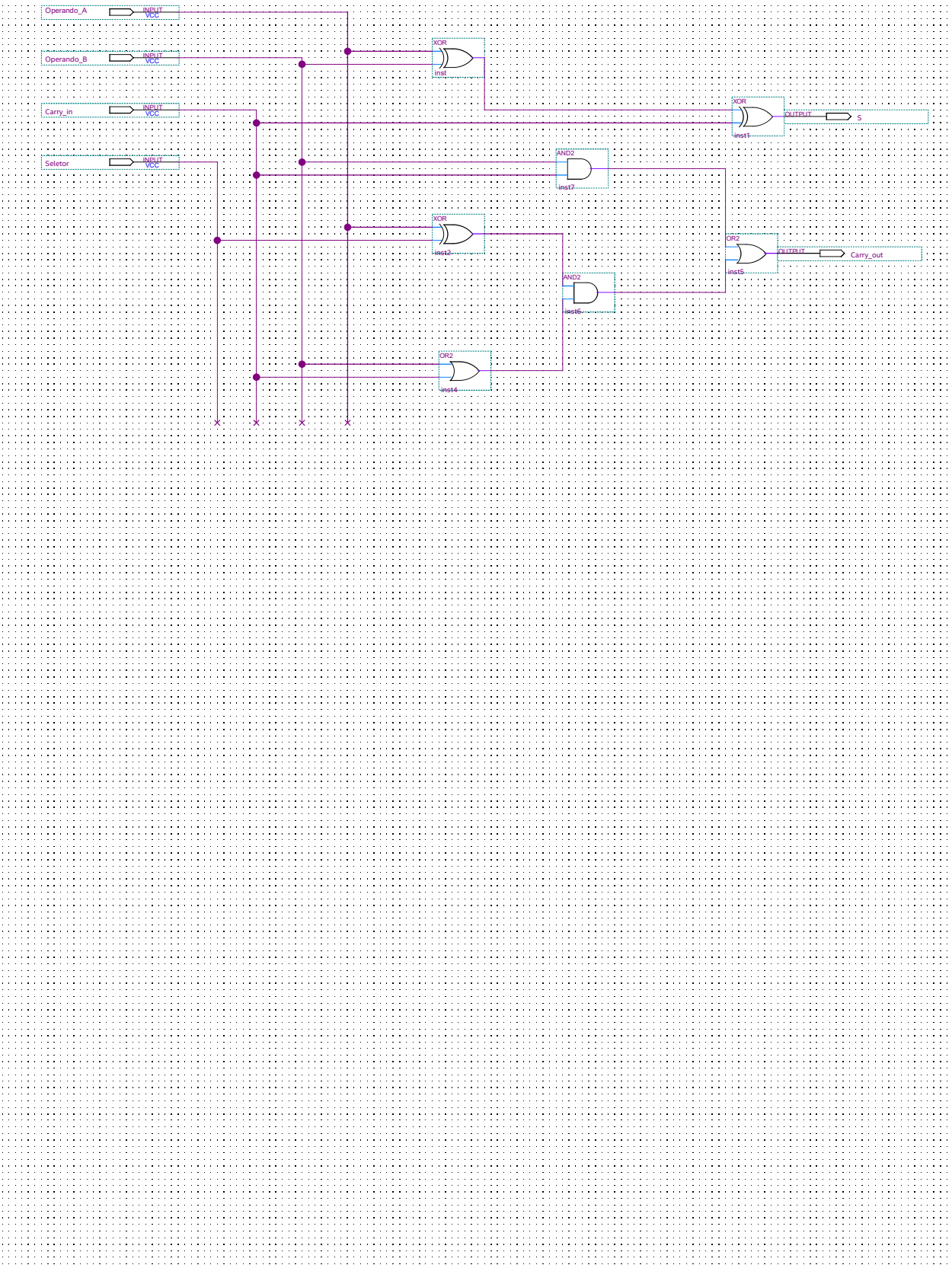
$Ts = (A \oplus M)(B + C) + BC$

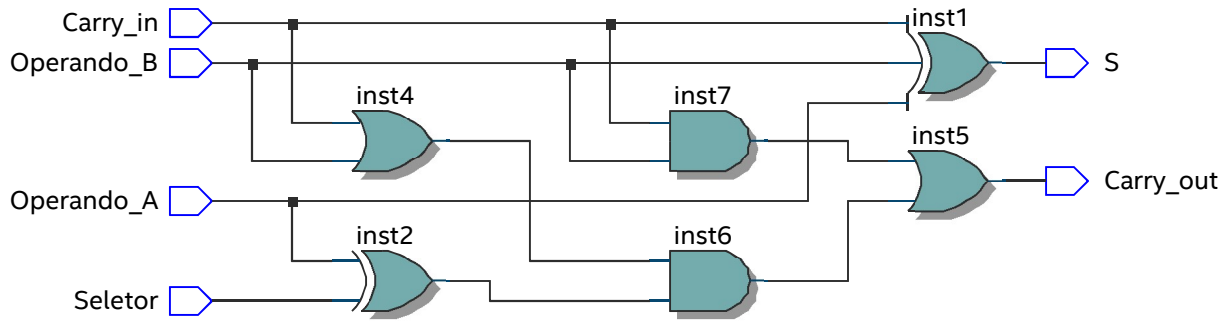
$A \oplus 0 = A$ Somador

$A \oplus 1 = \bar{A}$ Subtrator

• Circuito Eletrônico - Somador Subtrator Completo




Operando_A
INPUT
VCC
Operando_B
INPUT
VCC
Carry_in
INPUT
VCC
Seletor
INPUT
VCC
XOR
inst
XOR
inst1
OUTPUT
S
AND2
inst7
XOR
inst2
OR2
inst5
OUTPUT
Carry_out
AND2
inst6
OR2
inst4


Carry_in
Operando_B
Operando_A
Seletor
inst4
inst7
inst2
inst6
inst1
inst5
S
Carry_out

Simulation Waveform Editor - C:/Users/kevin/Documents/FPGA/FPGA - FPGA - [FPGA_20240803100520.sim.vwf (Read-Only)]

File Edit View Simulation Help

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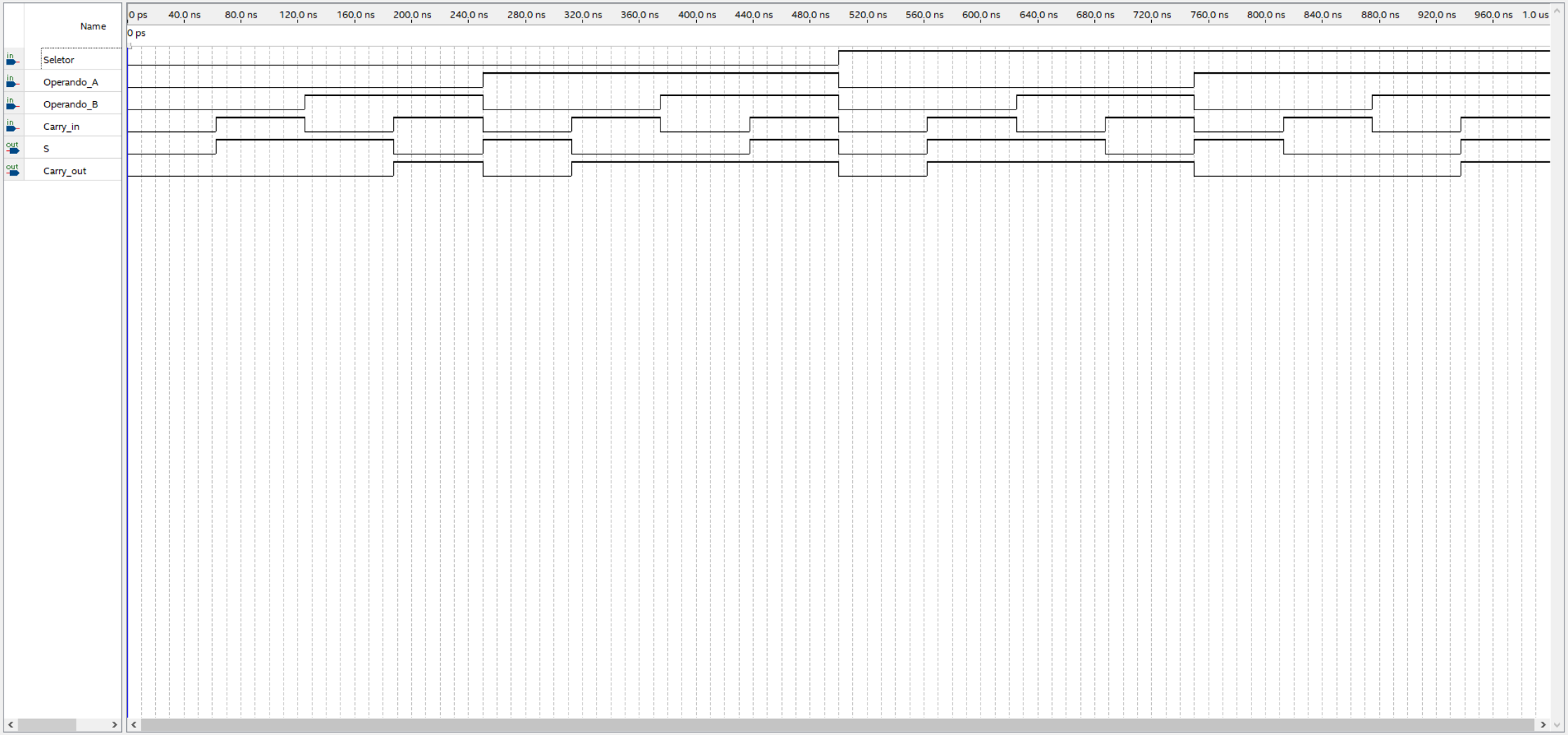
Master Time Bar: 0 ps Pointer: 930.12 ns Interval: 930.12 ns Start: End:



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