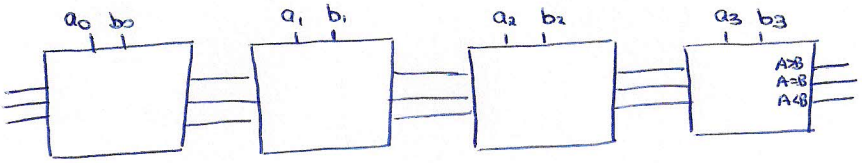
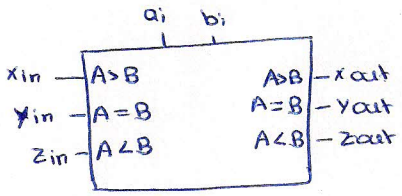
ISD - Guião 7

① Comparador para 2 palavras A, B de n bits
Solução do tipo iterativo





Entradas → xin, yin, zin, a_i, b_i
Saídas → xout, yout, zout

A entrada yin é tratada separadamente

bit i	bit i+1
$a_i = b_i$	se: $a_{i+1} > b_{i+1} \rightarrow A>B$; $a_{i+1} = b_{i+1} \rightarrow A=B$; $a_{i+1} < b_{i+1} \rightarrow A<B$
$a_i > b_i$	se: $a_{i+1} > b_{i+1} \rightarrow A>B$; $a_{i+1} = b_{i+1} \rightarrow A>B$; $a_{i+1} < b_{i+1} \rightarrow A<B$
$a_i < b_i$	se: $a_{i+1} > b_{i+1} \rightarrow A>B$; $a_{i+1} = b_{i+1} \rightarrow A<B$; $a_{i+1} < b_{i+1} \rightarrow A<B$

yout → A=B

yin	a_i	b_i	yout
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

Quando yin = 0, significa que os bits menos significativos são diferentes é
a_i e b_i = 0 não iguais
↳ yout = 0

Quando yin = 1, significa que os bits menos significativos são iguais e a_i e b_i = 0
↳ yout = 1

$yout = yin\, a_i' b_i' + yin\, a_i b_i$
$= yin\,(a_i' b_i' + a_i b_i)$
$= yin\,(a_i \oplus b_i)'$

a b	$(a \oplus b)$	$(a \oplus b)'$
0 0	0	1
0 1	1	0
1 0	1	0
1 1	0	1

xin	zin	a_i	b_i	xout	zout
0	0	0	0	0	0
0	0	0	1	0	1
0	0	1	0	1	0
0	0	1	1	0	0
0	1	0	0	0	1
0	1	0	1	0	1
0	1	1	0	1	0
0	1	1	1	0	1
1	0	0	0	1	0
1	0	0	1	0	1
1	0	1	0	1	0
1	0	1	1	1	0
1	1	0	0	x	x
1	1	0	1	x	x
1	1	1	0	x	x
1	1	1	1	x	x

Nunca ocorre

Mapas de Karnaugh

xin a_i b_i \ zin	00	01	11	10
00	0	0	x	1
01	0	0	x	0
11	0	1	x	1
10	1	1	x	1

$xout = xin\, b_i' + a_i b_i' + xin\, a_i$

xin a_i b_i \ zin	00	01	11	10
00	0	1	x	0
01	1	1	x	1
11	0	1	x	0
10	0	0	x	0

$zout = a_i' b_i + zin\, a_i' + zin\, b_i$

xin = 1 → A>B
zin = 1 → A<B

xin	zin	
0	0	A=B
0	1	A<B
1	0	A>B
1	1	x