ESD - Elettronica dei Sistemi Digitali

Exercises on Logic Gates and Circuits

Prof. Riccardo Berta

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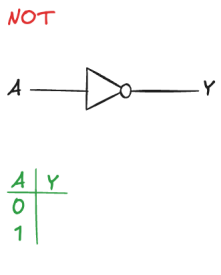
1 Logic gates and circuits Exercises

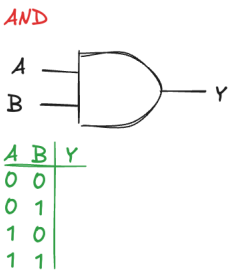
1.0.1 Exercise 1

Complete the truth tables of the following gates and use the DEEDS simulator to verify their correctness:

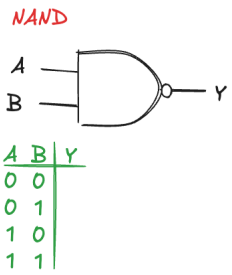
1.0.2 (a) NOT, AND, NAND



A	Y
0	
1	

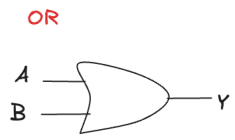


A	B	Y
0	0	
0	1	
1	0	
1	1	

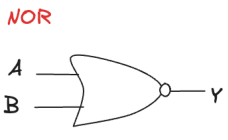


A	B	Y
0	0	
0	1	
1	0	
1	1	

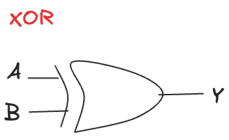
1.0.3 (b) OR, NOR, XOR



A	B	Y
0	0	
0	1	
1	0	
1	1	



A	B	Y
0	0	
0	1	
1	0	
1	1	

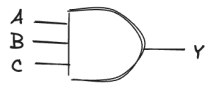


A	B	Y
0	0	
0	1	
1	0	
1	1	

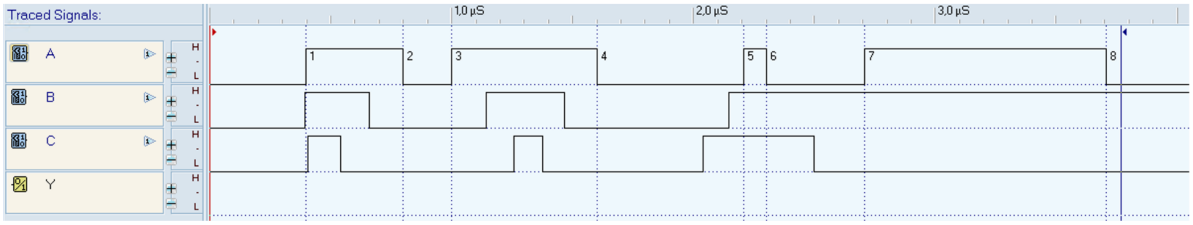
1.1 Exercise 2

Complete the truth table and the timing diagram of the following 3-inputs digital circuits, and use the DEEDS simulator to verify their correctness:

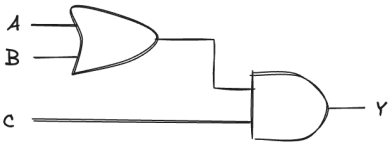
1.1.1 (a)



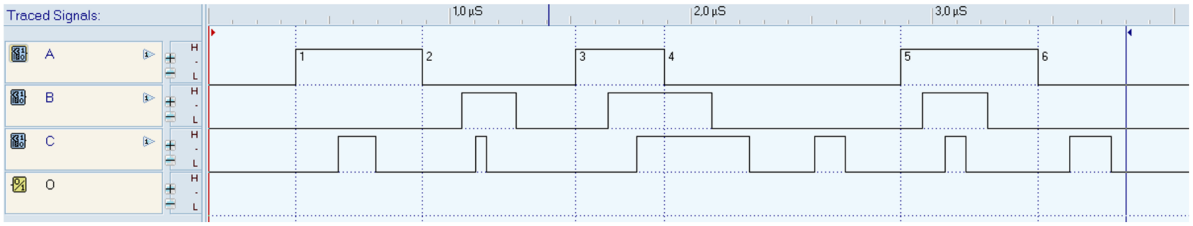
A	B	C	Y
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	



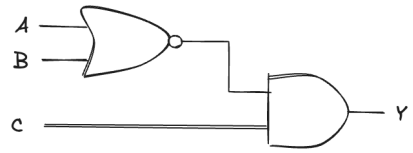
1.1.2 (b)



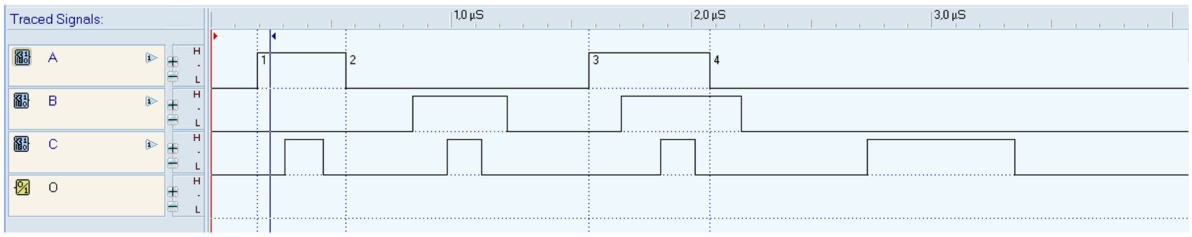
A	B	C	Y
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	



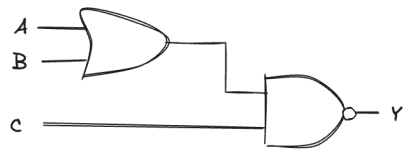
1.1.3 (c)



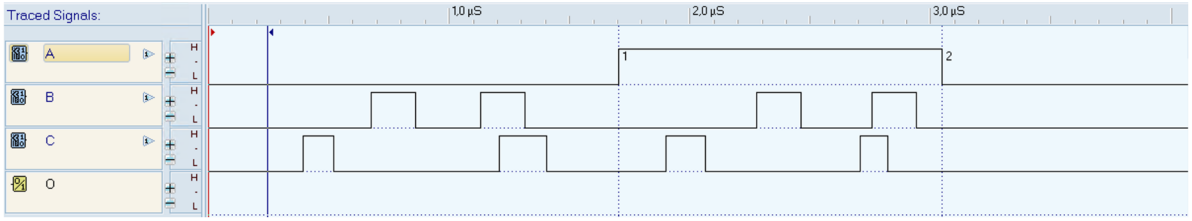
A	B	C	Y
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	



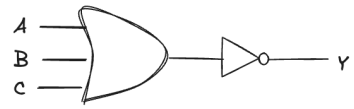
1.1.4 (d)



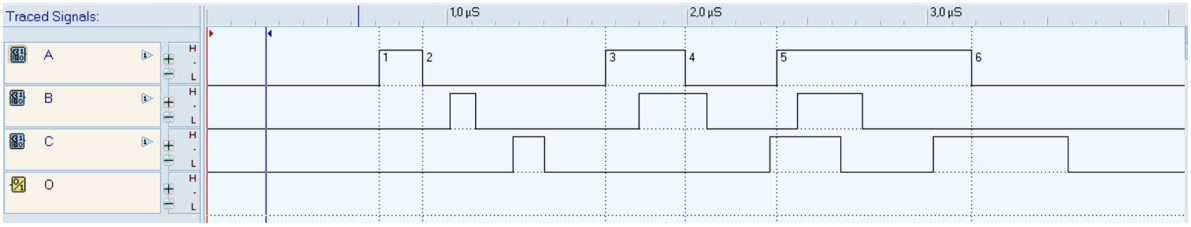
A	B	C	Y
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	



1.1.5 (e)



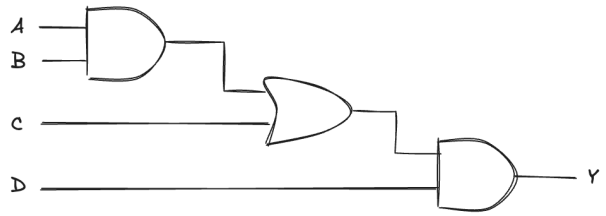
A	B	C	Y
0	0	0	
0	0	1	
0	1	0	
0	1	1	
1	0	0	
1	0	1	
1	1	0	
1	1	1	



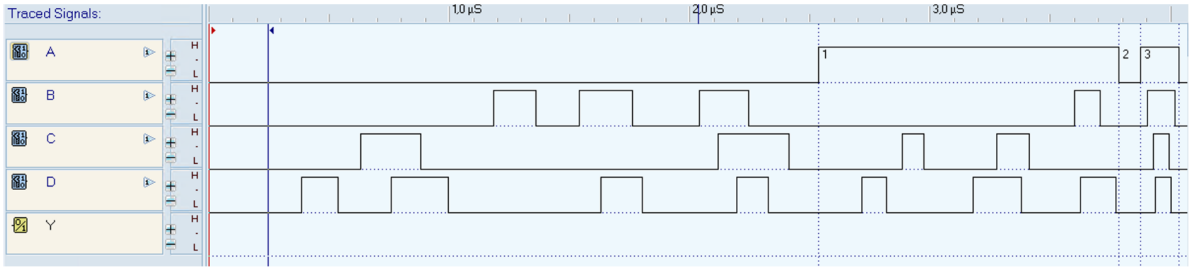
1.2 Exercise 3

Complete the truth table and the timing diagram of the following 4-inputs digital circuits, and use the DEEDS simulator to verify their correctness:

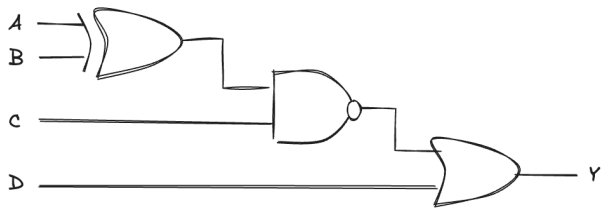
1.2.1 (a)



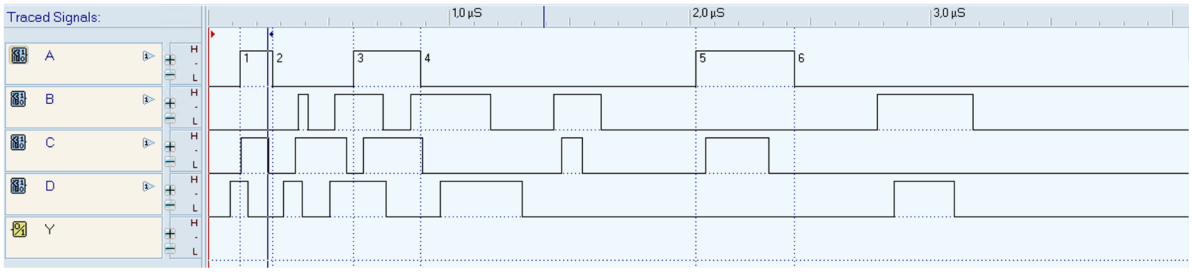
A	B	C	D	Y
0	0	0	0	
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	



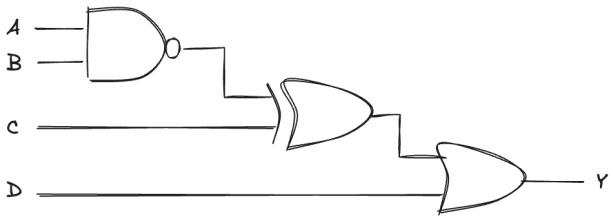
1.2.2 (b)



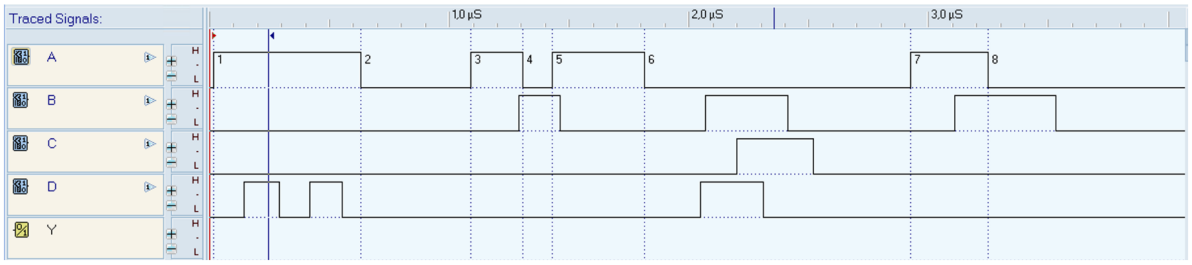
A	B	C	D	Y
0	0	0	0	
0	0	0	1	
0	0	1	0	
0	0	1	1	
0	1	0	0	
0	1	0	1	
0	1	1	0	
0	1	1	1	
1	0	0	0	
1	0	0	1	
1	0	1	0	
1	0	1	1	
1	1	0	0	
1	1	0	1	
1	1	1	0	
1	1	1	1	



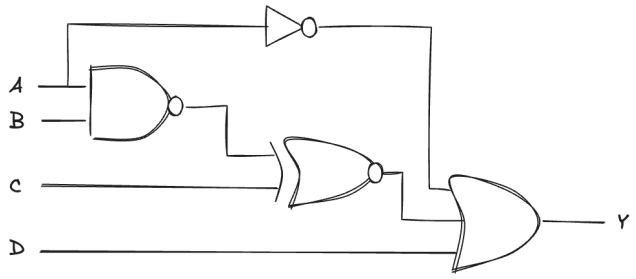
1.2.3 (c)



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



1.2.4 (d)



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