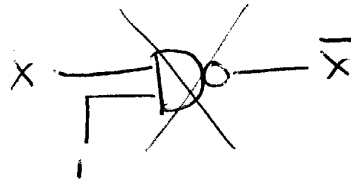
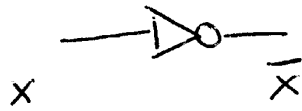


9/3/2002,
Lecture
#5

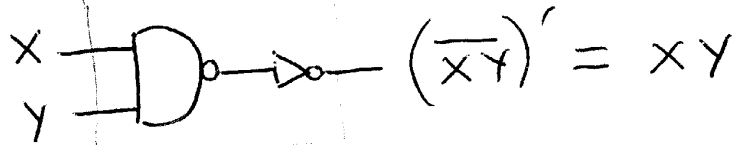
Not/And/or from NAND

Better do these there

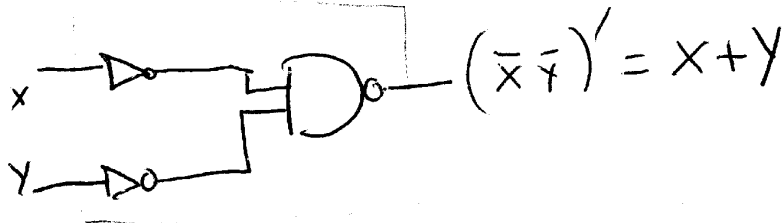
NOT



AND
using NAND

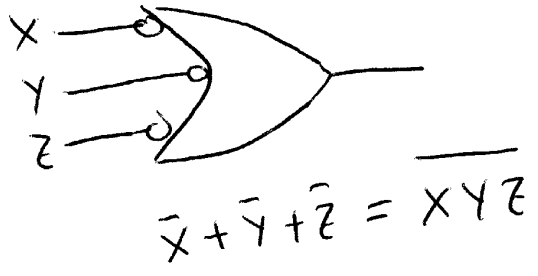
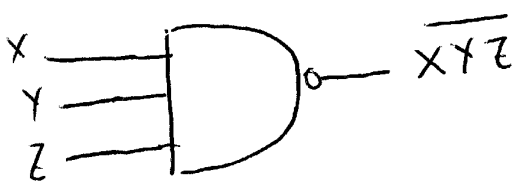


OR
using NAND

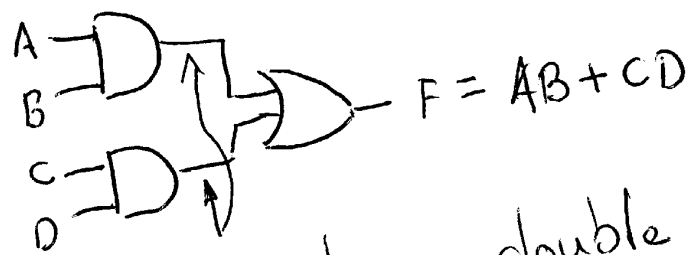


NAND		
x	y	\overline{xy}
0	0	1
0	1	1
1	0	1
1	1	0

Nand Gate Forms:

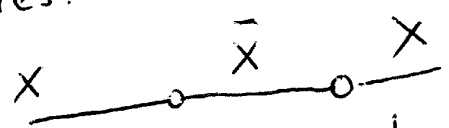


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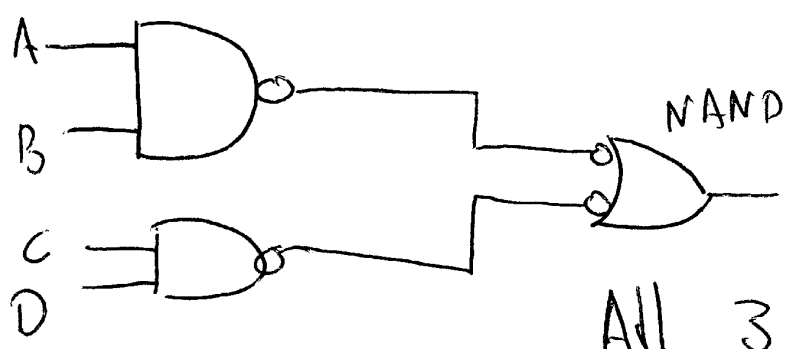


Introduce double negation in

these wires:

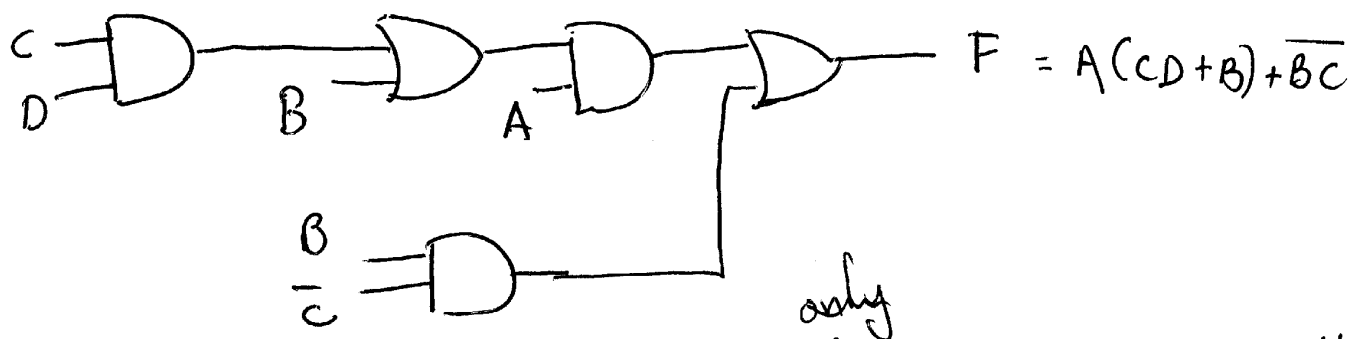


and move left
bubble to the left,
right bubble to
the right.



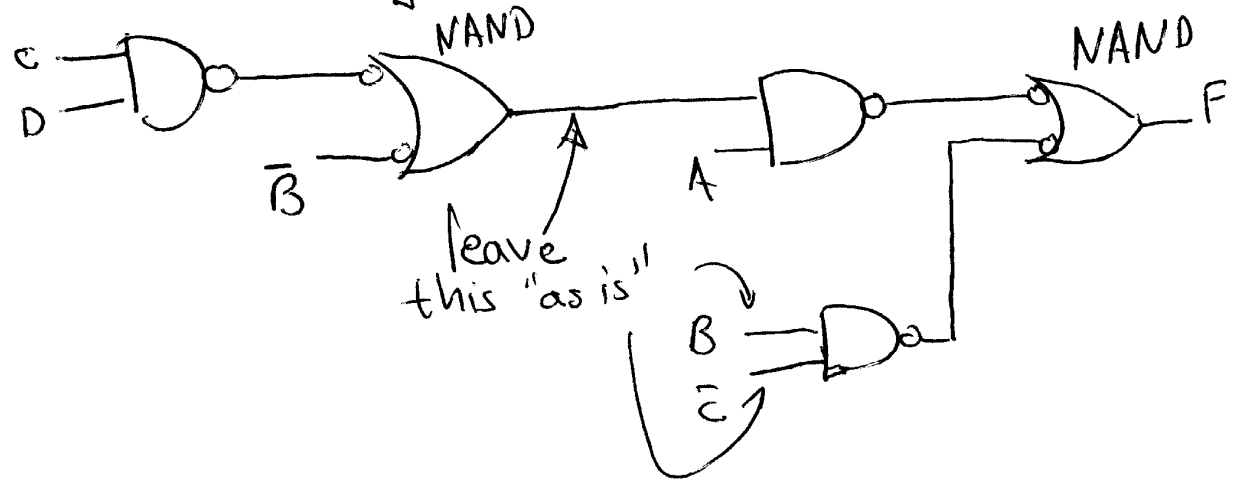
All 3 are now NAND gates.

A more complex circuit (pg 8)



$$F = A(CD + B) + BC$$


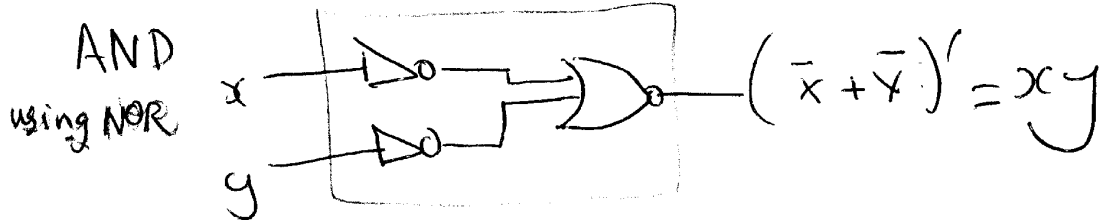
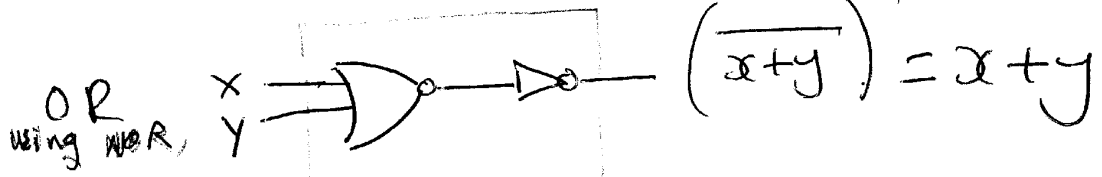
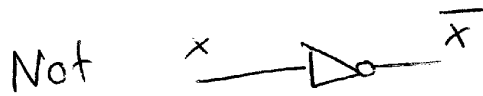
... replace ~~each~~ ^{some} every other set of gates with ^{only} $\overline{\overline{\quad}}$ ^{double negation}



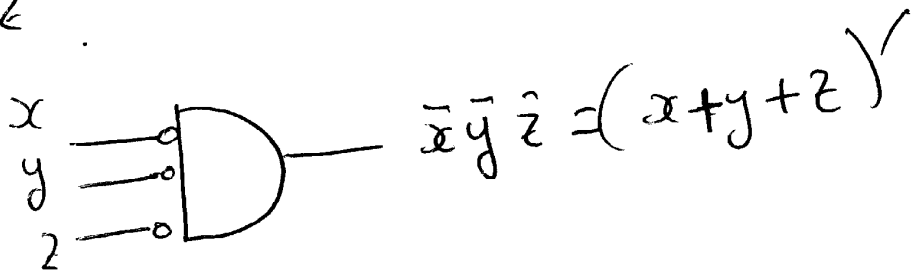
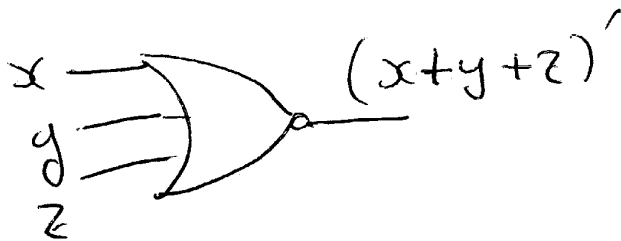
NOR Gater

NOR

x	y	$\overline{x+y}$
0	0	1
0	1	0
1	0	0
1	1	0

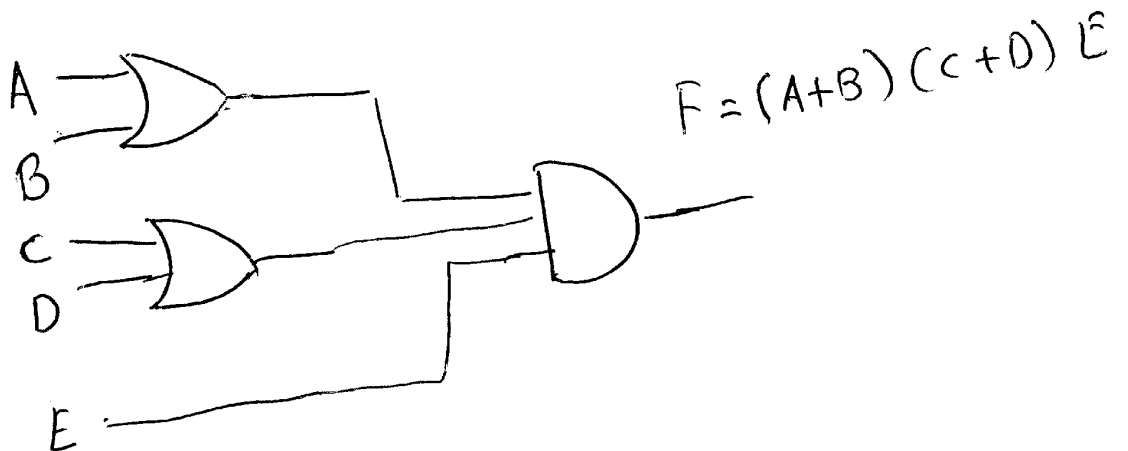



NOR Gate forms

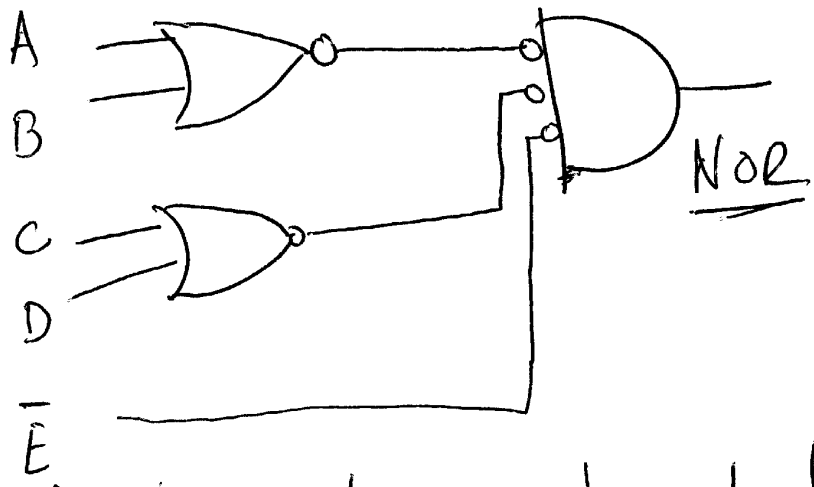


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Fig



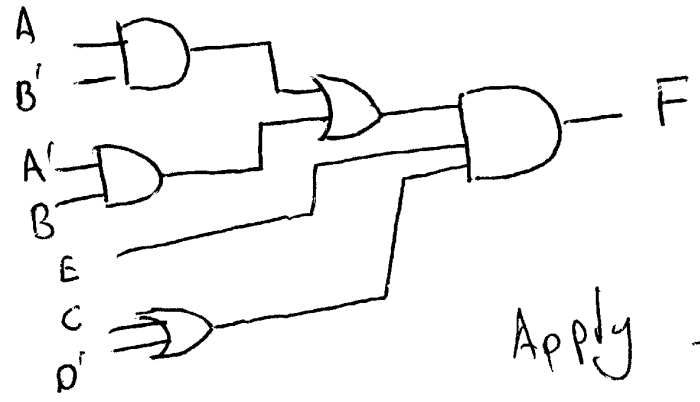
Apply ~~o o~~ for each wire to And: 4



↑ This gets complemented

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$$F = (A\bar{B} + \bar{A}B)E(C + \bar{D})$$



Apply ~~o o~~

