Converting Between Forms

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- Truth tables, Boolean algebra, and combinational circuits all represent the same thing
- What does it mean for a particular truth table to be equivalent to a particular Boolean expression?

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

Matches:

A′ B + AB

B (A + A′)

B

Not matches:

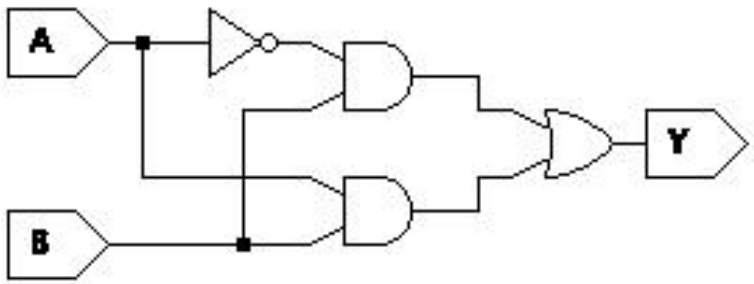
A′ B

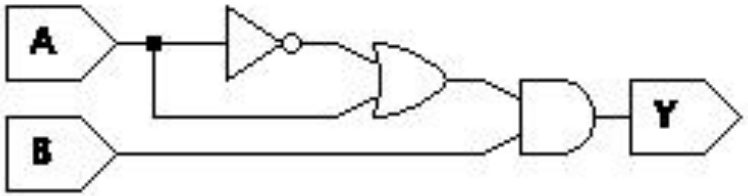
AB

B + (AB′)

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

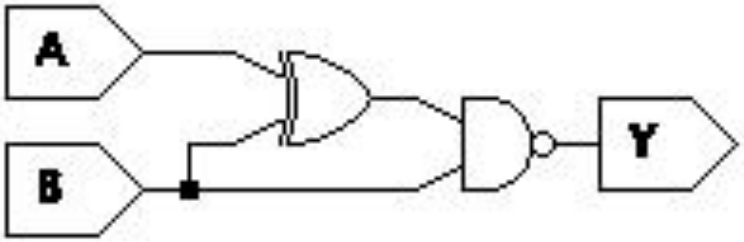
Matches:

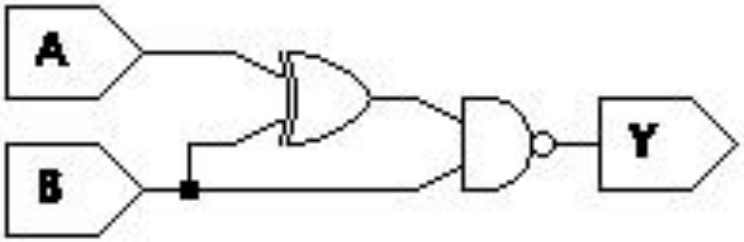




Converting Between Forms

- Converting to a truth table is "easy" – just plug in all inputs
  - Downside: there can be a lot of inputs
- What about converting between Boolean expressions and circuits?

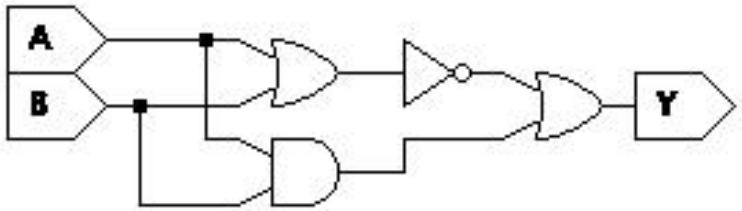

A
B
Y

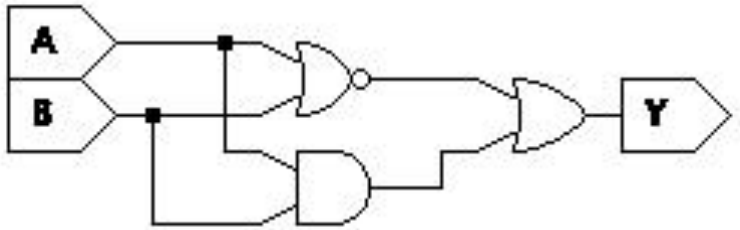


((A xor B) Y)′

$(A + B)' + AB$

$(A + B)' + AB$





Converting Between Forms

- What about converting between Boolean expressions and circuits?
  - Also straightforward, just ”reading them off”
  - Need to be careful about order of operations and groupings
  - Unlike converting to truth tables, there is no one correct answer