

Warmup

Write a boolean equation in canonical form for this truth table:

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

Use ! for NOT, e.g., !(AB) or !A + !B

Respond at pollev.com/stevenbell699

ES 4: Boolean algebra

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By the end of class today, you should be able to:

- Use boolean algebra to manipulate equations, using theorems 1-12
- Use "bubble pushing" to manipulate the logic of a circuit
- Use the above manipulation techniques to implement a circuit with constraints (e.g., only NAND gates)

Key representations

Boolean equation

$$\overline{AB} + C$$

Boolean algebra

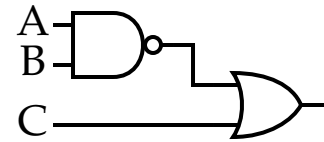
Truth table

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

Karnaugh maps

(Wednesday)

Logic diagram



Bubble pushing

Simplifying from canonical form

$$\overline{A}\overline{B}C + \overline{A}BC + ABC$$

Distributivity, what?

Unlike algebra, AND and OR commute over each other.

Practice

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

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

Submit your answer at pollev.com/stevenbell699

What do I need to remember?

The axioms

Theorems 1-8, and DeMorgan's theorem (12)

What do I need to ~~remember?~~

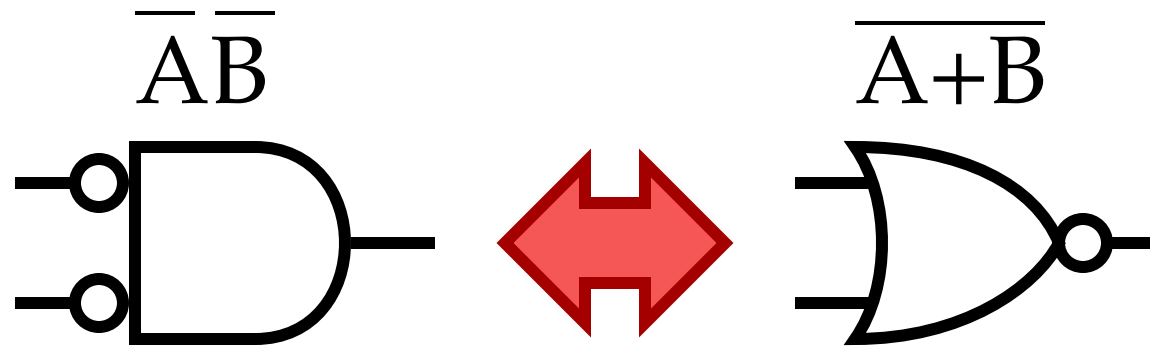
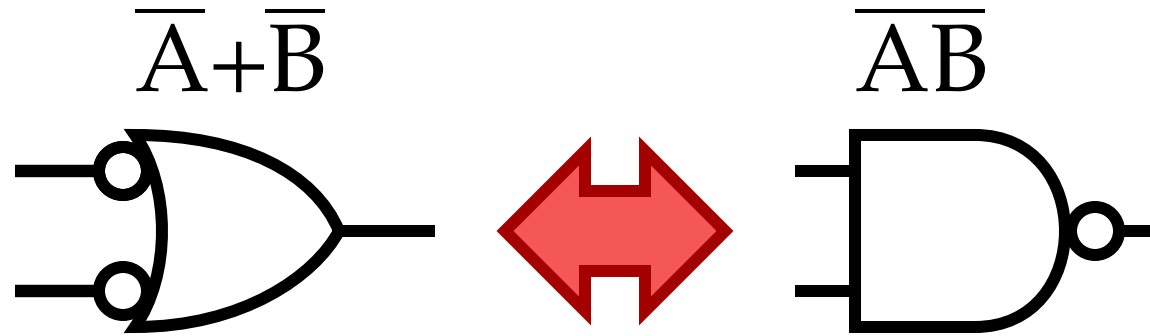
be able to use?

The axioms

Theorems 1-8, and DeMorgan's theorem (12)

DeMorgan's theorem

DeMorgan's theorem on a schematic



Bubble pushing

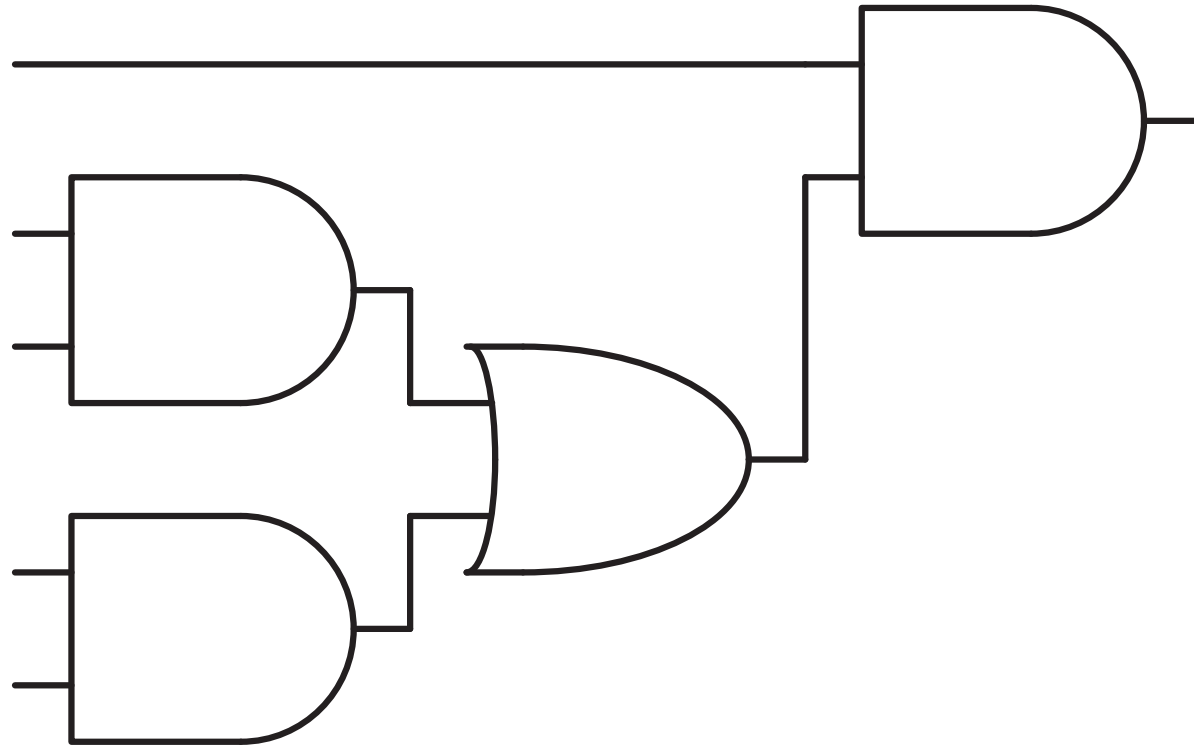


Figure 2.36 from the textbook

Exit poll

What is one question you have after today's class?

Respond at **pollev.com/stevenbell699**

For Wednesday

1. Read the book (2.5-2.7) and complete the pre-class quiz

www.ece.tufts.edu/es/4/

Quiz is due at **9AM** the day of class, so I can review it

```
cp /es/4/public_html/quizzes/quiz_03.txt ./
```

```
provide es4 q3 quiz_03.txt
```

2. Have fun in lab!

3. Homework 1 will be posted today; due next Monday