

LOGICAL COMPLETENESS: IMPLEMENTING ANY TRUTH TABLE

7:21 / 7:21

1.0x

Download transcript

.txt

Show Discussion

New Post

A function F is a 1 when **only one of the three** inputs (A, B, and C) is a 0 and is a 0 otherwise.

1 A. CHECK YOUR UNDERSTANDING (1/2 points)

Fill in the truth table values for F.

A	B	C	F	
0	0	0	<div>1</div>	Answer: 0
0	0	1	<div>1</div>	Answer: 0

Help

0	1	0	<input type="text" value="1"/>	Answer: 0
0	1	1	<input type="text" value="1"/>	Answer: 1
1	0	0	<input type="text" value="1"/>	Answer: 0
1	0	1	<input type="text" value="1"/>	Answer: 1
1	1	0	<input type="text" value="1"/>	Answer: 1
1	1	1	<input type="text" value="0"/>	Answer: 0

SOLUTION OR EXPLANATION HEADING

F is a 1 for every row of the truth table that has a single 0 for the inputs.

Hide Answer

You have used 1 of 1 submissions

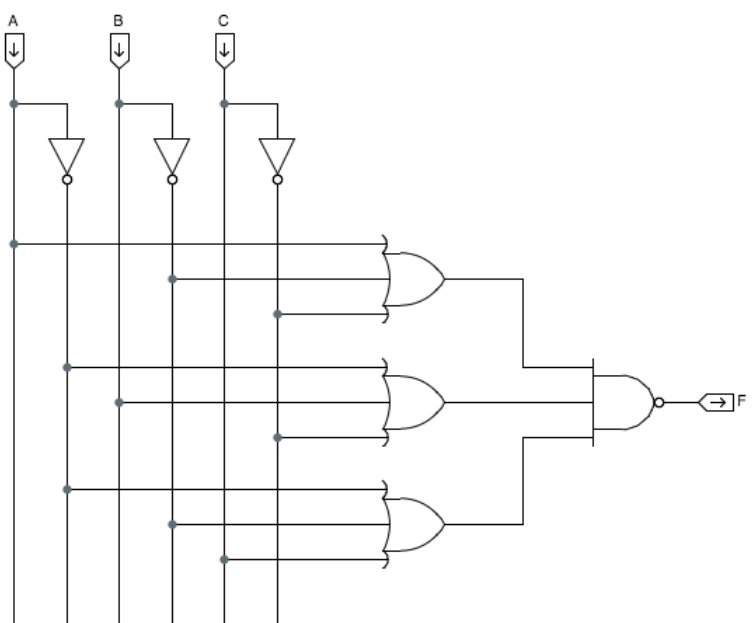
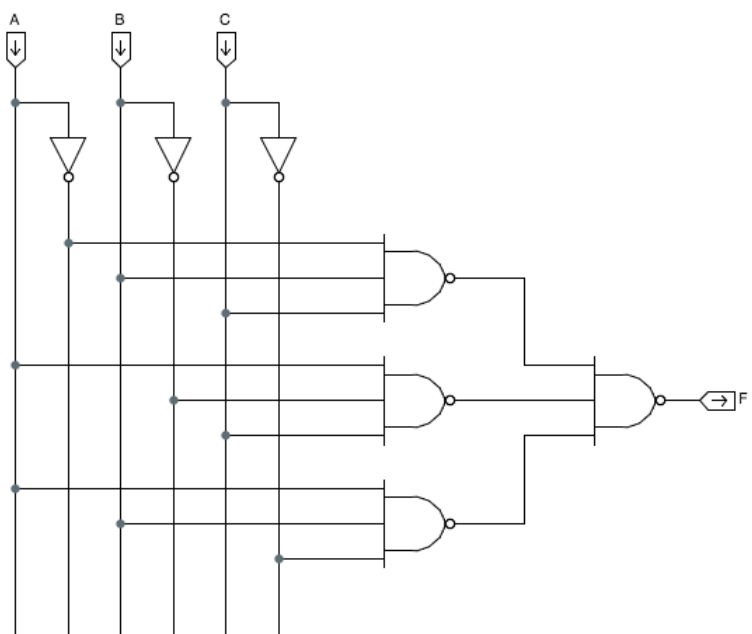
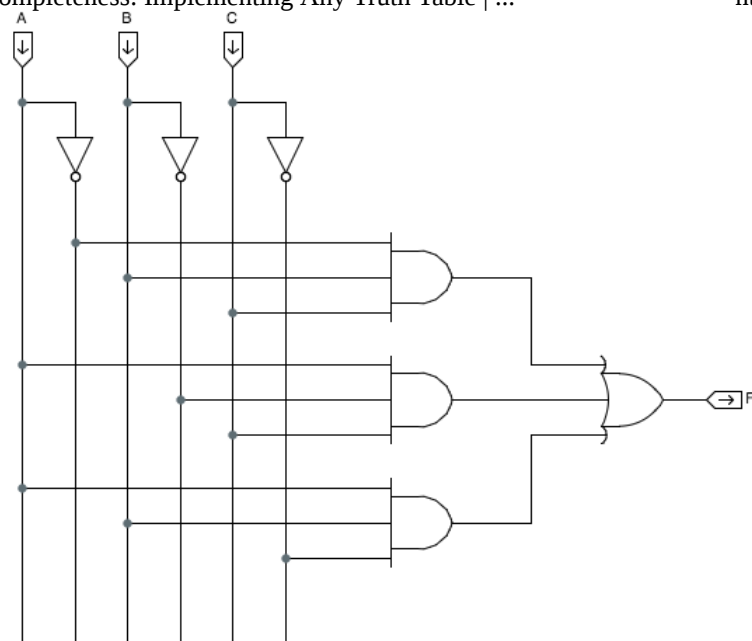
Show Discussion

 New Post

1 B. CHECK YOUR UNDERSTANDING (1/1 point)

Which of the following circuits implements F? [Check all that apply]

Help



EXPLANATION

All the circuits shown implement F.

The first circuit uses a 3-input AND gate to generate each of the 3 cases F is true (011,101,110), and ORs the cases together

The second circuit is the same as the first; use DeMorgan's Theorem to see that two nested levels of NAND gates here are functionally equivalent to a layer of AND gates which are then combined with an OR gate.

The third circuit uses 3-input OR gates to generate the combinations when F is true. Note that the inputs to the 3-input OR gates are the inverted versions of A, B, and C, that the other two circuits use. If you apply DeMorgan's theorem, you will see that the OR gates can be transformed into AND gates with inverters at the inputs, which explains why you would connect the OR gates to the inverted senses of A, B, and C that are used by the other two circuits.

[Hide Answer](#)

You have used 2 of 2 submissions

[Show Discussion](#)
[New Post](#)


EdX offers interactive online classes and MOOCs from the world's best universities. Online courses from MITx, HarvardX, BerkeleyX, UTx and many other universities. Topics include biology, business, chemistry, computer science, economics, finance, electronics, engineering, food and nutrition, history, humanities, law, literature, math, medicine, music, philosophy, physics, science, statistics and more. EdX is a non-profit online initiative created by founding partners Harvard and MIT.

© 2015 edX Inc.

EdX, Open edX, and the edX and Open edX logos are registered trademarks or trademarks of edX Inc.

[Terms of Service and Honor Code](#)

[Privacy Policy \(Revised 10/22/2014\)](#)

**About edX**

[About](#)

[News](#)

[Contact](#)

[FAQ](#)

[edX Blog](#)

[Donate to edX](#)

[Jobs at edX](#)

Follow Us

[Facebook](#)

[Twitter](#)

[LinkedIn](#)

[Google+](#)

[Tumblr](#)

[Meetup](#)

[Reddit](#)

[Youtube](#)