MITx 6.004.1x Ţ <u>Help</u> **Computation Structures 1: Digital Circuits** <u>Progress</u> <u>Dates</u> **Discussion Course Notes** <u>Course</u> ☆ Course / 3. CMOS / Worked Examples **(** < Previous</pre> Next > **WE3.1** \square Bookmark this page

■ Calculator

Video explanation of solution is provided below the problem.

CMOS Functions

1/1 point (ungraded)

A single CMOS gate, consisting of an output node connected to a single pullup circuit containing zero or more PFETs and a single pulldown circuit containing zero or more NFETs, computes F(A, B, C, D). It is observed that F(1,0,1,1) = 1. What can you say about the value of F(1,0,0,0)?

Explanation

We know that this CMOS gate outputs 1 when the second input is connected to a 0 and all other inputs are connected to 1s. 0 inputs dictate which PFETs are on and make the output 1, and 1 inputs dictate which NFETs are on and make the output 0. If we change some inputs from 1 to 0, we know that we are turning some NFETs off and some PFETs on. Since we already get 1 as an output with just the second input connected to 0, changing even more inputs to 0 can only mean that our output will remain a 1.

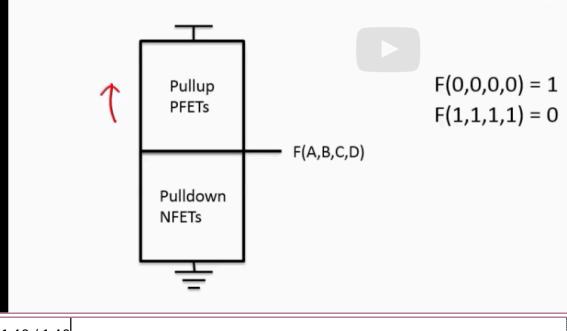
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1 Answers are displayed within the problem

CMOS Functions

Functions Implemented by CMOS Circuits

- CMOS gate has F(1,0,1,1) = 1
- What can you say about F(1,0,0,0)? = 1



1:46 / 1:46

Video

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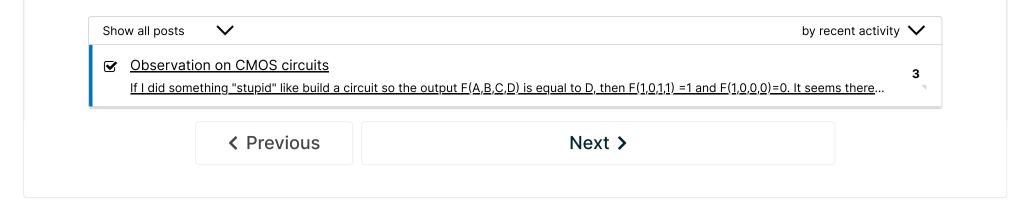
Discussion

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