WE5.1

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Calculator

1.7 + 1.7 + 1.6 [ ] 5.0

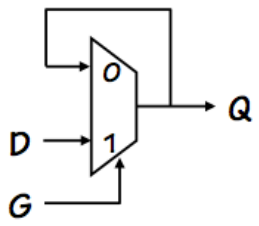
Calculator Instructions

Latch Implementation

3/3 points (ungraded)

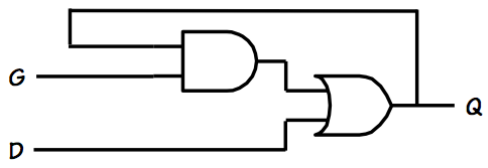
Untel, Inc is a startup exploring a new gate technology that has hired you as a consultant. They have learned how to make reliable, lenient AND gates, OR gates, and inverters, but don't yet have a cell library offering devices like multiplexors. Their current crisis, for which they need your help, is the design of a reliable latch.

The Untel engineers vaguely remember a 6.004 lecture showing how to make a latch using a lenient multiplexor (as shown below), and reason that they can make a latch at least as good starting from AND/OR/inverter logic.

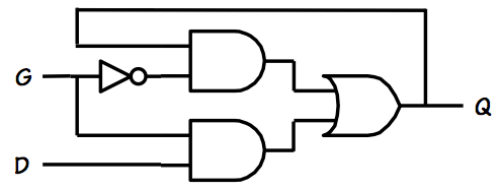


There are three different proposals being considered:

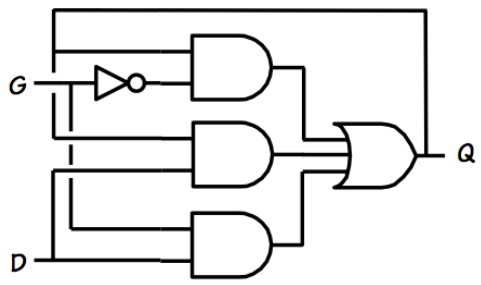
Proposal A



Proposal B



Proposal C



The Untel CTO shows you the diagrams, and asks you characterize each as

- BAD, meaning it doesn't work reliably;
- GOOD, meaning that it works reliably (given appropriate dynamic discipline rules); or
- OBESE, meaning that it works but uses more gates than necessary

Characterize each of the above proposals.

Proposal A

- (•) BAD
- ( ) GOOD
- ( ) OBESE

✔

Proposal B

- (•) BAD
- ( ) GOOD

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OBESE

✔

Proposal C

BAD

GOOD

OBESE

✔

Explanation
A design is good if it is a lenient multiplexer (mux).

- The boolean logic of proposal A is not a equivalent to that of a mux, so proposal A is BAD.
- Proposal B is a mux but isn't lenient, so it is BAD.
- Proposal C is a lenient mux, so it is GOOD.

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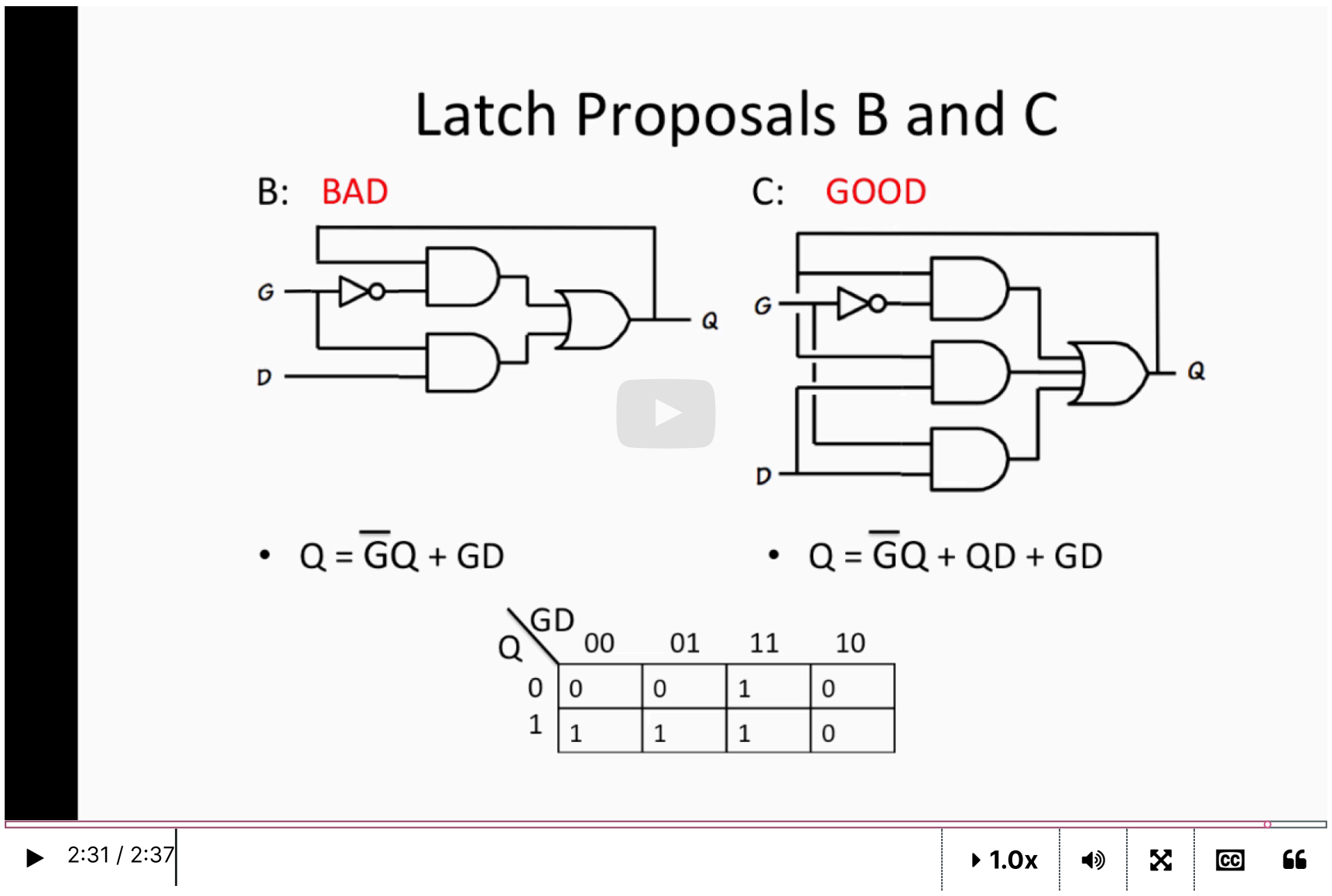
Answers are displayed within the problem

Latch Implementation



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method to come up with lenient circuit?

question posted 8 years ago by **sajedula**

Unfortunately, the video does not explain why proposal B is not lenient, but simply states so. My understanding was that the minimal logic from K-map always gives a lenient circuit, but apparently that's not the case. In any case is there a methodical way to to come up with Proposal C, which is lenient?

This post is visible to everyone.

silvinahw (Staff)
8 years ago - marked as answer 8 years ago by **silvinahw** (Staff)

Take a look at this lecture video at time 10:45 for an explanation of how to ensure that your circuit is lenient.

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