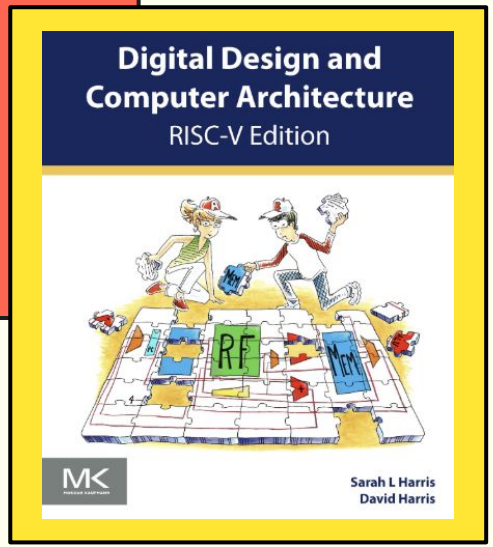
4/10/2025

Logic Forge Design Review

Joaquin, Felix, Isabella, Charlotte, Max



Overview

- Problem Statement
- Objectives
- Updated Metrics
- Past Prototypes
- Current Prototype (Demo!)
- Discussion

Revised Problem Statement

The client, Professor Harris, needs a tactile and portable Logic Gate Demo Board to visually represent logic gates that are being drawn and discussed in his E85: Digital Electronics and Computer Architecture class. The board should have two AND gates, two OR gates, two NOT gates, and an XOR gate. The board should enable students to build an XOR gate using the AND, OR, and NOT gates on the board. The board should be able to represent the inputs and outputs as 0 or 1.

Objectives

1. Maximize Visibility (Board Components)
2. Maximize Visibility (Outputs)
3. Minimize Time Needed to Transport
4. Minimize Weight
5. Maximize display similarity to E85 logic circuit drawings
6. Maximize Interactivity
7. Maximize Durability
8. Maximize Ease of Use
9. Maximize Aesthetics
10. Maximize Repairability
11. Minimize Cost

Updated Metrics

Durability	Type of scoring: Quantitative	
	Description: Additional weight (pounds) soldered wire can vertically hold compared to current design	Score
	W > 20	5
	20 > W >= 15	4
	15 > W >= 10	3
	10 > W >= 5	2
	W < 5	1

- Changed from drop test to solder connection strength test

Repairability	Type of scoring: Quantitative	
	Description: Percent of components that are replaceable.	Score
	p>=80	5
	60<=p<80	4
	40<=p<60	3
	20<=p<40	2
	p<20	1

- Changed from # of replaceable components to percentage

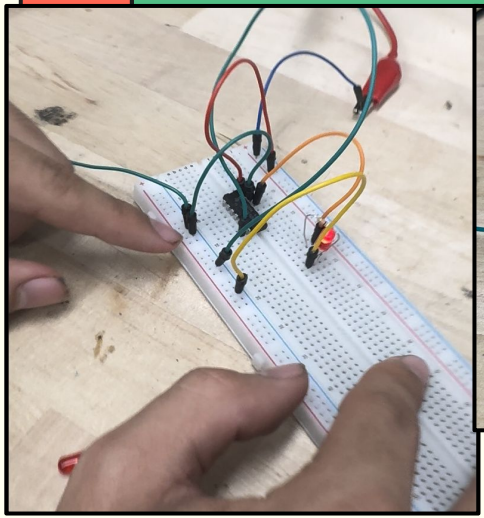
Updated Metrics

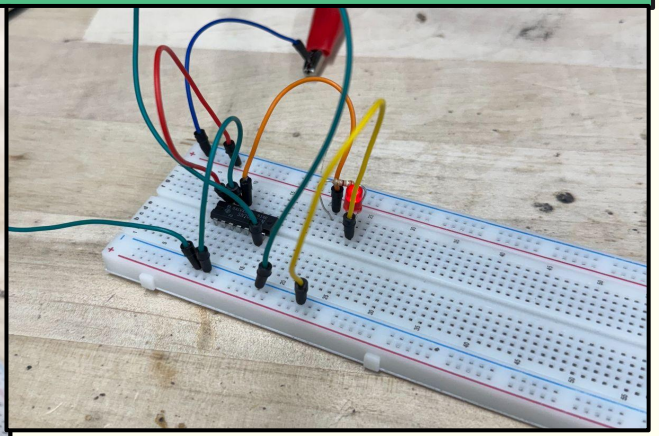
Time needed to transport	Type of scoring: Quantitative	
	Description: Additional time needed to transport board from office to classroom as compared to the control of 2 minutes and 34 seconds which is the time taken to walk to class without the board.	Score
	Transport Time <= 30 seconds longer	5
	30 seconds < Transport Time <= 1 min	4
	1 min < Transport Time <= 2 min	3
	2 min < Transport Time <= 3 min	2
	Transport Time > 3 min	1

- Updated time needed to transport with current time needed (2 min, 34 sec)
-

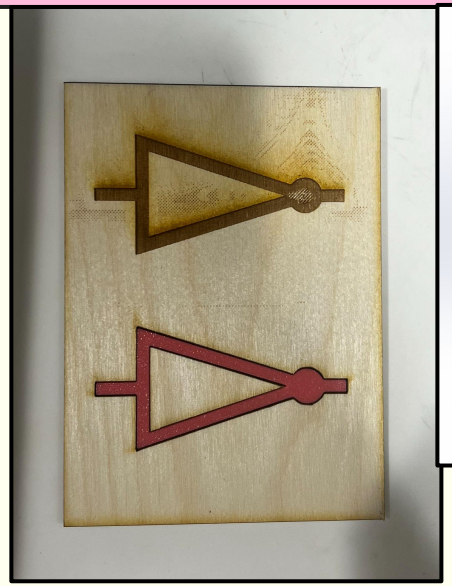
Past Prototypes

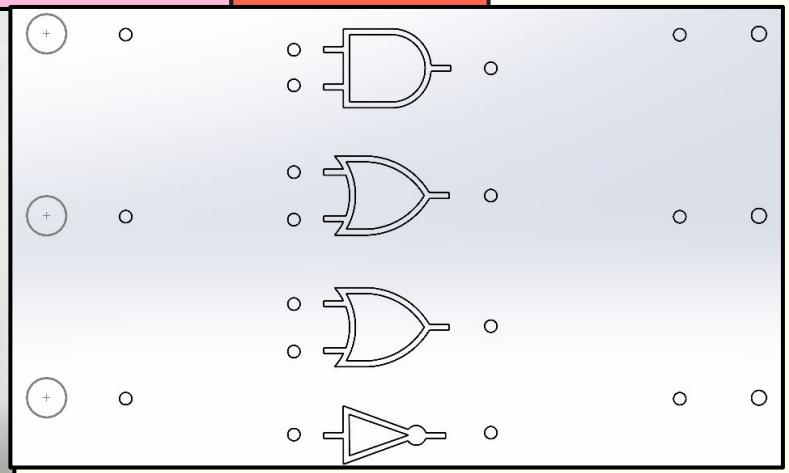
Electrical Prototype





Visual Representation Prototype





Prototype Demonstration

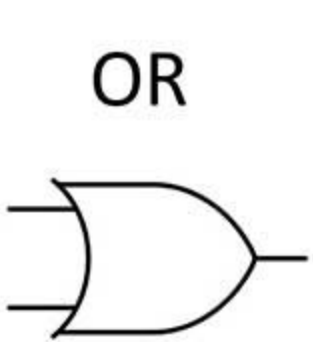
With THE
Max Conine

Welcome to E85

Digital Electronics and Computer Engineering

Professor Falcon

OR Gate



A	B	Output
0	0	0
1	0	1
0	1	1
1	1	1

Discussion Time

1) Were you able to clearly see when the inputs and outputs were on/off?

2) Were connections between components clear?

3) Do you have any better ways to represent the inputs and gate connections? (alternatives to the buttons and alligator clips)

Thank You!

Q&A?