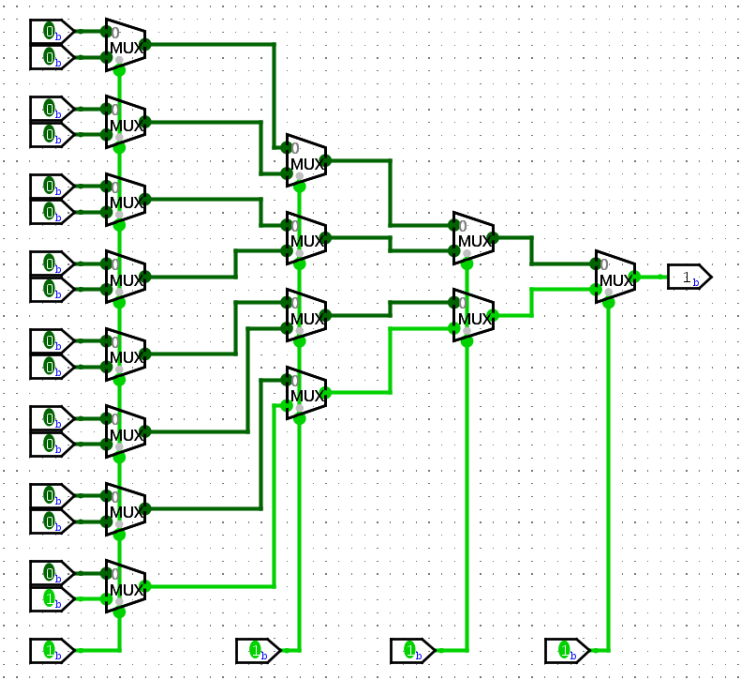
DAY 5-111 DAYS VERIFICATION CHALLENGE

Topic: Multiplexers, Demultiplexers

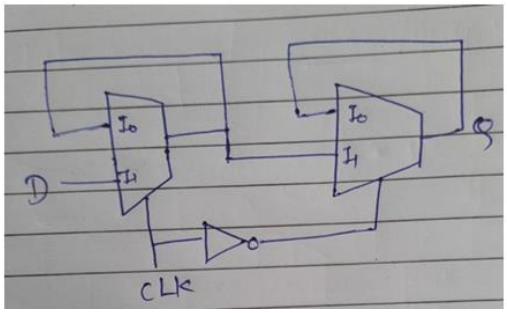
Skill: Digital Electronics

DAY 5 CHALLENGE:

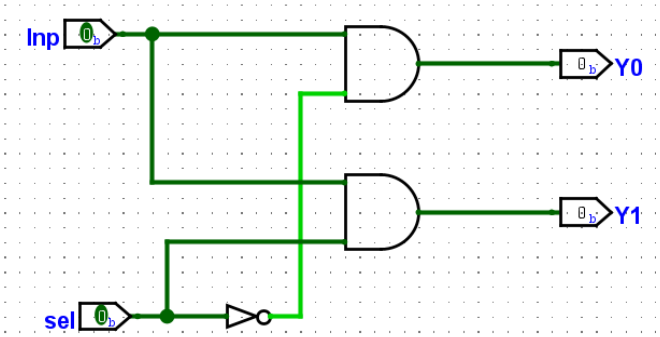
1. Design 16:1 MUX using 2:1 MUX



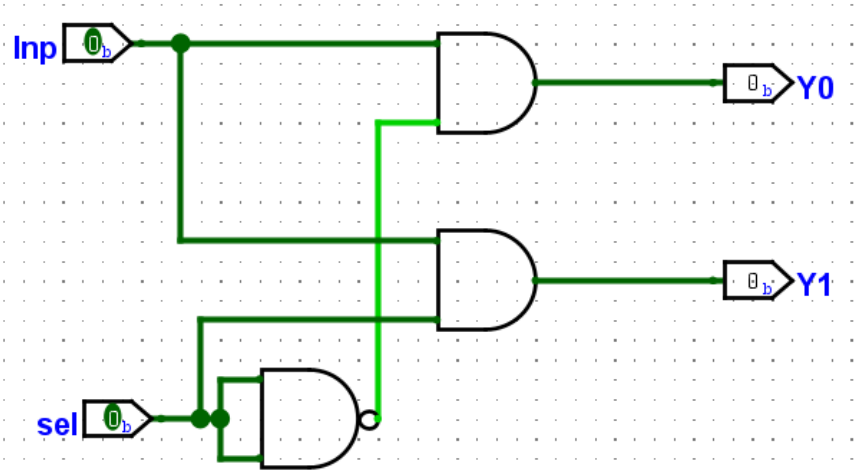
2. Design D-FF using MUX



3. Design a 1:2 DEMUX that can be used as an inverter & also as a buffer.



4. Design NAND Gate using 1:2 DEMUX



5. What is the difference between Decoder & DEMUX?

A decoder converts binary inputs to one-hot outputs with n inputs and 2^n outputs, while a DEMUX routes one data input to one of 2^n outputs based on n select lines**.**

6. If D0 input of a 2:1 MUX is connected to ground, what is the output ?

Sel	D0	D1	Y
0	Gnd	0	0
1	Gnd	0	0
0	Gnd	1	0
1	Gnd	1	1

7. If D1 input of 2:1 MUX is connected to 1, what is the output?

Sel	D0	D1	Y
0	0	Constant 1	1
1	0	Constant 1	0
0	1	Constant 1	1
1	1	Constant 1	1

8. List the applications of:

a. Multiplexer

- **Data Routing**: Directs multiple data sources to a single destination.
- **Communication Systems**: Combines multiple signals for transmission over one line.
- **Digital Circuits**: Selects data inputs in CPUs and memory.

- **Signal Processing**: Chooses between different signal channels.
- **Embedded Systems**: Selects inputs from multiple sensors.

b. Demultiplexer

- **Data Distribution**: Directs a single data input to multiple outputs.
- **Communication Systems**: Splits a single signal into multiple channels.
- **Digital Circuits**: Routes data to various parts of a system.
- **Display Systems**: Controls display segments.
- **Testing and Debugging**: Routes test signals to different circuit areas.