(30 pts) Approx. 3 days

The final part of the unit asks you to use what you've learned to design, simulate, and build a circuit to address the following situation:

A Board of Directors consists of a president, vice president, secretary, and treasurer. When they need to make a decision, they take a vote. If one side of the vote gets a simple majority (3 or 4 in agreement), then that side clearly wins. In the occasions where there is a tie in the voting (2-2), then the president's tie breaks the vote. As an example, if the president and treasurer both vote 'no' while the vice president and secretary both vote 'yes', then the tie is broken in favor of the president's 'no' vote.

The board would like a digital voting system with switches and lights because switches and lights are cool.

1. Create a truth table of the "Majority Vote" situation.
2. Use your truth table to make an unsimplified logic expression.
3. Use Boolean Algebra to simplify your logic expression.
4. *HAVE MR. BENSHOOF CONFIRM YOUR SIMPLIFIED LOGIC EXPRESSION BEFORE CONTINUING!*
5. Create an AOI circuit of your simplified logic expression.
6. Simulate your circuit in Multisim and confirm that it works as intended.
7. Build your circuit on your breadboard using the built-in switches and LEDs. Confirm that it works as intended.
8. Write/Draw a flow chart in your engineering notebook that describes this circuit design process. Include a few details about each step to summarize the work that goes in to creating a complete working digital circuit.

Part 3: Tasks	*5 points*	*4-3 points*	*2-1-0 points*
Truth Table	+ Your truth table includes all necessary inputs/outputs + Your truth table is correct	- Your truth table is not correct	- Your truth table is missing
Logic Expressions	+You created an unsimplified logic expression + You showed your work to simplify your logic expression with algebra	- One of your expressions is missing - You did not show your simplifying work	- Both your expressions are missing - Your expressions are wrong
AOI Circuit	+ Your AOI Circuit only uses 2-input gates + Your AOI Circuit accurately represents your logic expression	- Your circuit does not use only 2-input gates - Your circuit is wrong	- Your circuit is missing
Multisim	+ Your Multisim circuit works correctly	- Your Multisim circuit does not work correctly	- Your Multisim circuit is missing
Breadboarding	+ You completely breadboarded your working circuit. + You used the built in switches and LEDs	- You did not finish breadboarding - Your circuit did not work as intended	- Your breadboarded circuit is not started
Flow Chart & Notes	+ Your created a circuit design flow chart that describes the process + You included additional details to describe the process more	- Your flow chart is missing important parts	- You did not make a flow chart or notes on the process

Achievement: Recreate your circuit (up through the Multisim simulation – no breadboarding) in which there are 5 board members, the president's vote is worth 2 votes, and the president's vote breaks ties.