ECE 150 Digital Logic Design, Fall 2022
Project 3: Animated Drawing Canvas
Due December 14th 2022

In this project you will implement an Animated Drawing Canvas in which a user can draw an image on an LED array, save their drawing to memory, and loop through all of their saved drawings to display an animation. You may work in groups of up to 3. Once you've decided on your group, email me.

Students who have completed projects 1 and 2 on time may opt to implement a project of their own design. Design projects should be in a similar scope to the Animated Drawing Canvas and include significant user-interface and memory components. Proposals must be approved by me no later than November 18th.

Circuits will be demonstrated at the start of class on the due date. Circuits must be accompanied by a small poster-board description on the demo day. **The report will be due at midnight Wednesday December 21st**.

Circuit Requirements:

- An LED array of 4x4 or greater.
- At least 4 available canvases.
- No more than two 2114 SRAM ICs.
- A method to select and edit specific canvases.
- A method to automatically loop through the available canvases (loop mode).

Poster Requirements:

- Size: less than 15" x 20"
- A brief description of your project.
- A user guide.
- A functional block diagram of the circuit.

Report Requirements: adhere to the following outline,

1 **Introduction**:
- Restate the problem in your own words.
- Briefly introduce your approach and give an outline of the following sections.

2 **Design and Methods**:
Detail how you arrived at your implementation. You must include,
- An explanation of your approach and design choices.
- Functional block diagram(s).
- State-diagram(s) and state transition table(s).
- Truth-tables, boolean expressions, and logic diagrams.

3 **Implementation**:
Detail your circuit, including,

- An explanation of inputs/output interfaces, and how the circuit is used.
- A picture of your circuit with components labeled.

4 **Conclusion**:

- Summarize the problem and your implemented solution.
- Discuss the limitations of your design.
- Suggest how this work and its components may be used in a larger system/-circuit.

Grading:

- Circuit (50 pts)
  - The user can draw on a canvas (20 pts)
  - The user can save and load canvases to/from memory (20 pts)
  - The user enter a mode that loops through all canvases automatically (10 pts)
- Poster (10 pts)
- Report (40 pts)

Additional Considerations:

- Circuit
  - Neatness (color coding, right-angles only, no crossing wires)
  - Sensible design choices that favor user experience over convenience of implementation.
- Report
  - Consistent typesetting
  - Schematics and diagrams done in CAD (or hand-drawn EXTREMELY NEATLY)
  - Correct use of technical terms
  - All tables and figures referenced in the text and accompanied by a caption.
  - Technical writing voice.

Extra Credit (up to 20 pts towards final exam):

- Larger canvas: (8x4 or 4x8) (10 pts)
- More canvases: ≥ 8 canvases (5 pts), ≥ 16 canvases (10 pts)
- For design projects: 0-20 pts awarded on a per-project basis