ENGR 3410 Final Project Proposal
Conway's Game of Life

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1 Description

Conway's Game of Life is a cellular automaton created by John Conway. The game consists of cells arranged in a grid. A cell becomes alive, stays alive, and dies depending on the condition of its neighbors according to certain rules. For classic Conway's Game of Life, the rules are:

- A living cell with one or no living neighbors dies.

- A living cell with four or more living neighbors dies.

- A living cell with two or three neighbors lives.

- A dead cell with exactly three living neighbors comes to life.

The structure of the Game of Life is uniquely suited for a state machine, and so our project is implementing these rules as a state machine and then using this in conjunction with an FPGA to drive an LED matrix. We plan to control the FPGA using Verilog. Additional steps include creating models in Logisim and Python before implementing the system in Verilog.

2 References

playgameoflife.com for testing/info
conwaylife.com for a wealth of information on Conway's GOL

3 Deliverables

3.1 Minimum

- State-machine based implementation of GOL

- functional Python implementation of Conway's GOL

- functional Verilog implementation of Conway's GOL

- FPGA-controlled blinking LED

3.2 Planned

- FPGA-driven LED matrix that display's Conway's GOL

3.3 Stretch

- different rule sets

- colors?

- modular GOL

4 Milestones

4.1 Week 1

- Python and State-machine based "Golden Model" implementations

- Multiple LEDs blinking with FPGA

- Decide specific screen we're using (Nokia, OLED, LED matrix)

4.2 Week 2

- Verilog Implementation

    Single State-machine Module

    Whole Board implementation

- Display on the specific LED screen/matrix we're using using FPGA

4.3 Week 3

- Non-visual FPGA Implementation

- Successfully load Verilog implementation onto FPGA

4.4 Week 4

- Finish Visual FPGA Implementation

- Test :)