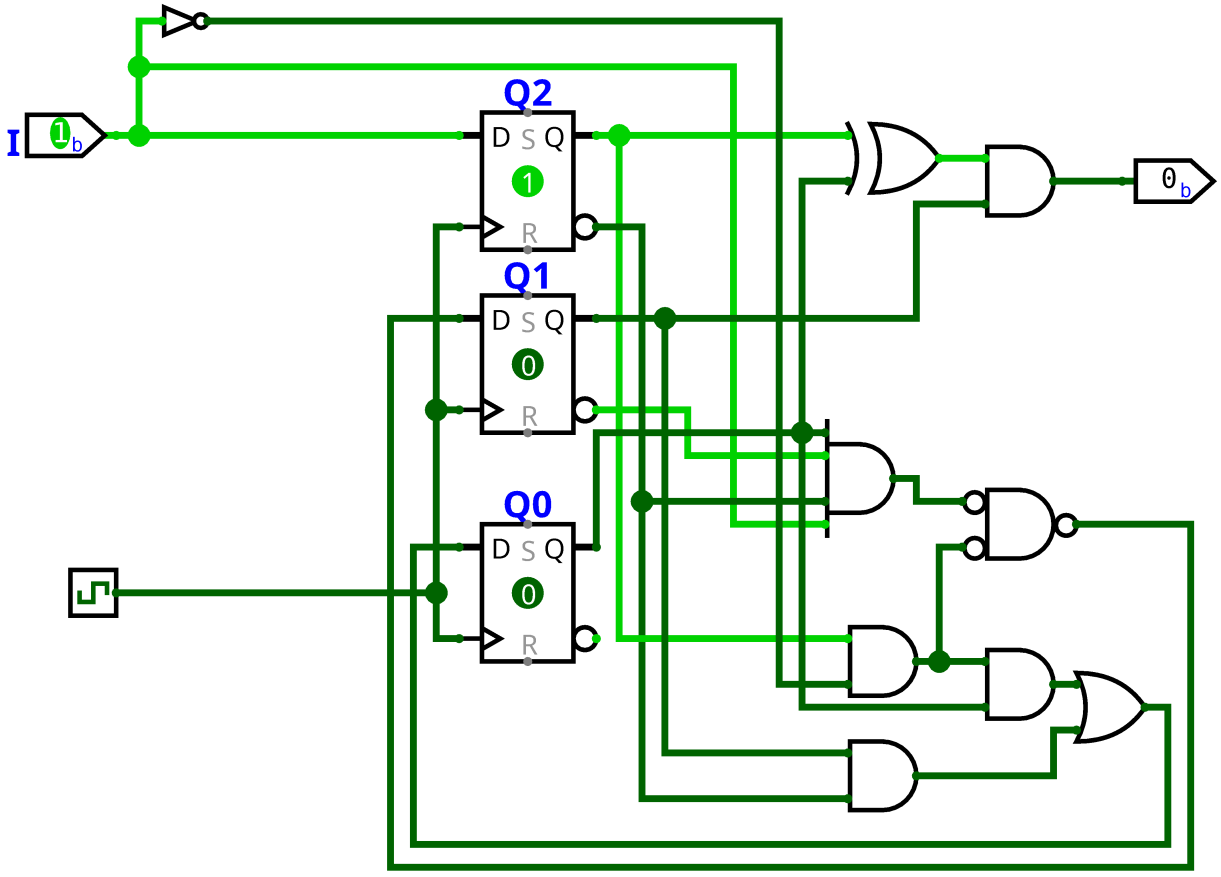
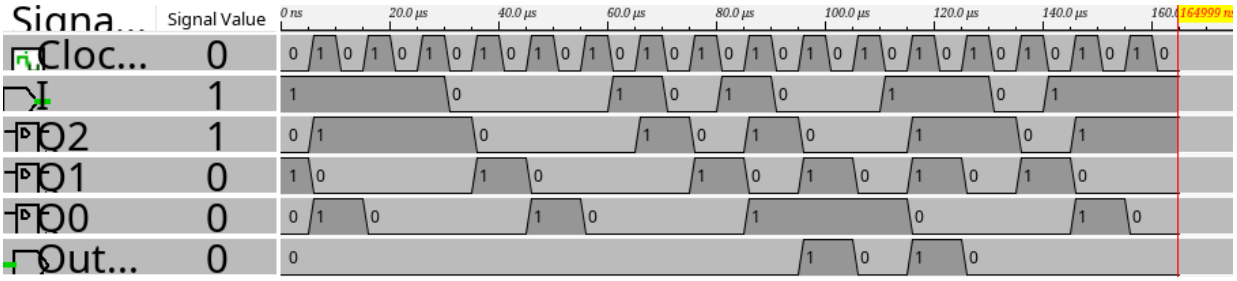
Lab 7 - More Sequential Circuit Analysis & Design

- Objective:
  - Design and simulate a sequential logic circuit using flip-flops
  - Analyze the logic diagram of a sequence detector and determine:
    - Mealy or Moore device
    - What is the code sequence
    - What are the timing characteristics
  - Design & implement a sequence detector that detects two sequences
    - UNLOCK should be asserted for whenever the last four inputs are either:
      - 1101
      - 1010
    - Include:
      - State diagram
      - State table
      - Boolean equations
      - Labeled logic diagram
    - Design the circuit as both a Moore and Mealy device
    - Analyze advantages/disadvantages of each device:
      - Hardware requirements
      - Memory
      - Timing
      - Security
      - Ease of design
- Figure #1 Circuit Diagram Analysis

- Circuit Diagram:

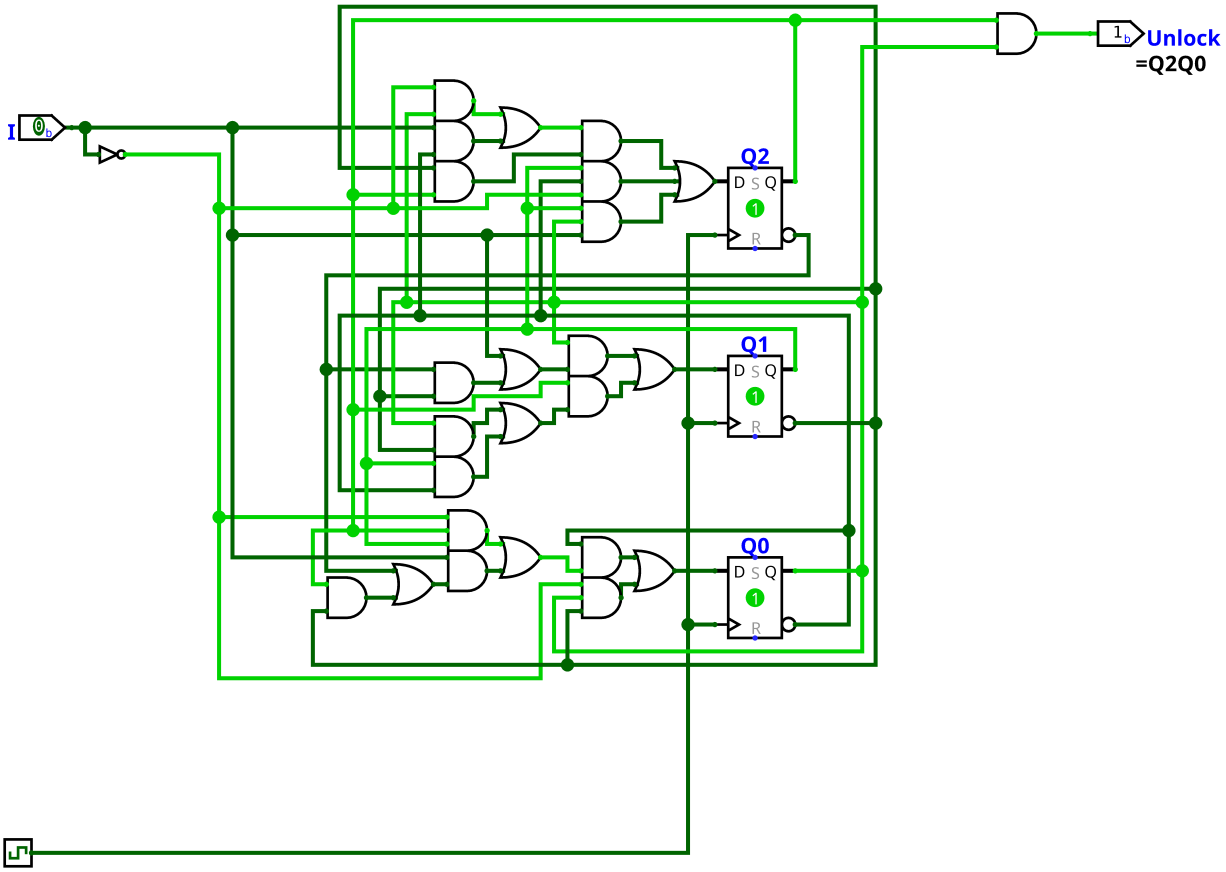


- This circuit is a Moore device, as the input does not directly affect the status of the output
- The code sequence for unlocking this circuit appears to be 1010
- Timing characteristics:

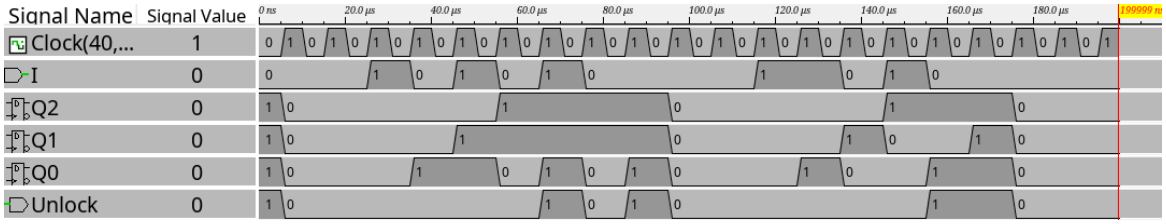


- Sequence detector:

- Moore Implementation:



- See attached PDF of hand notes
  - Timing Diagram:



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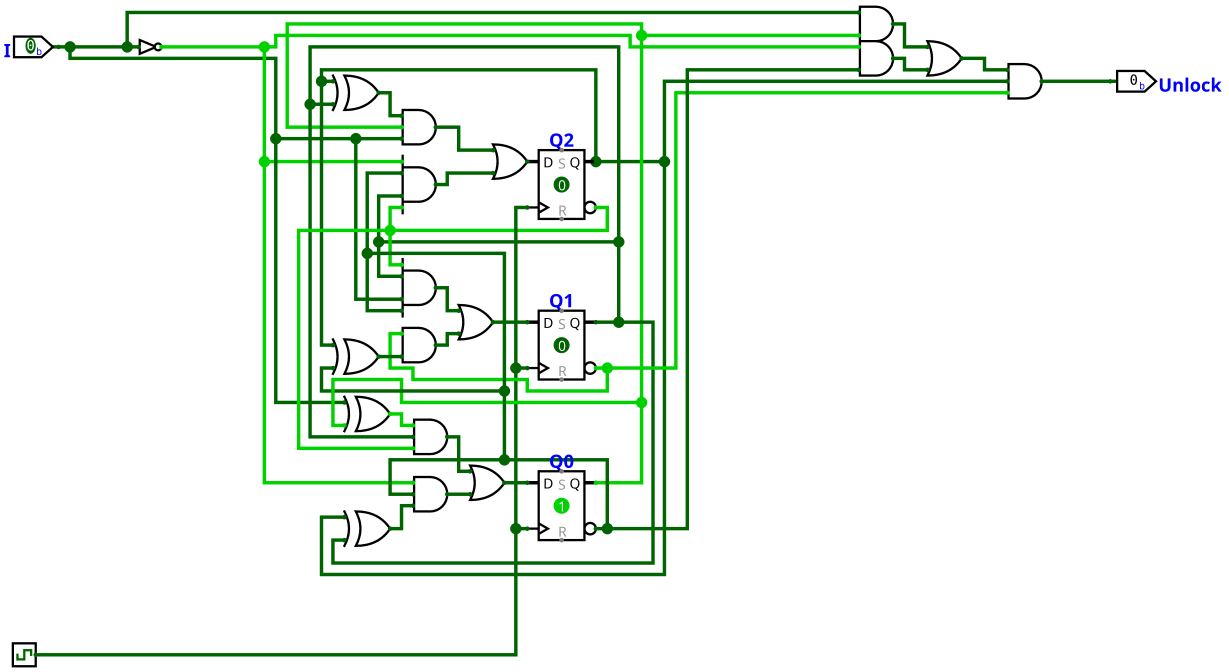
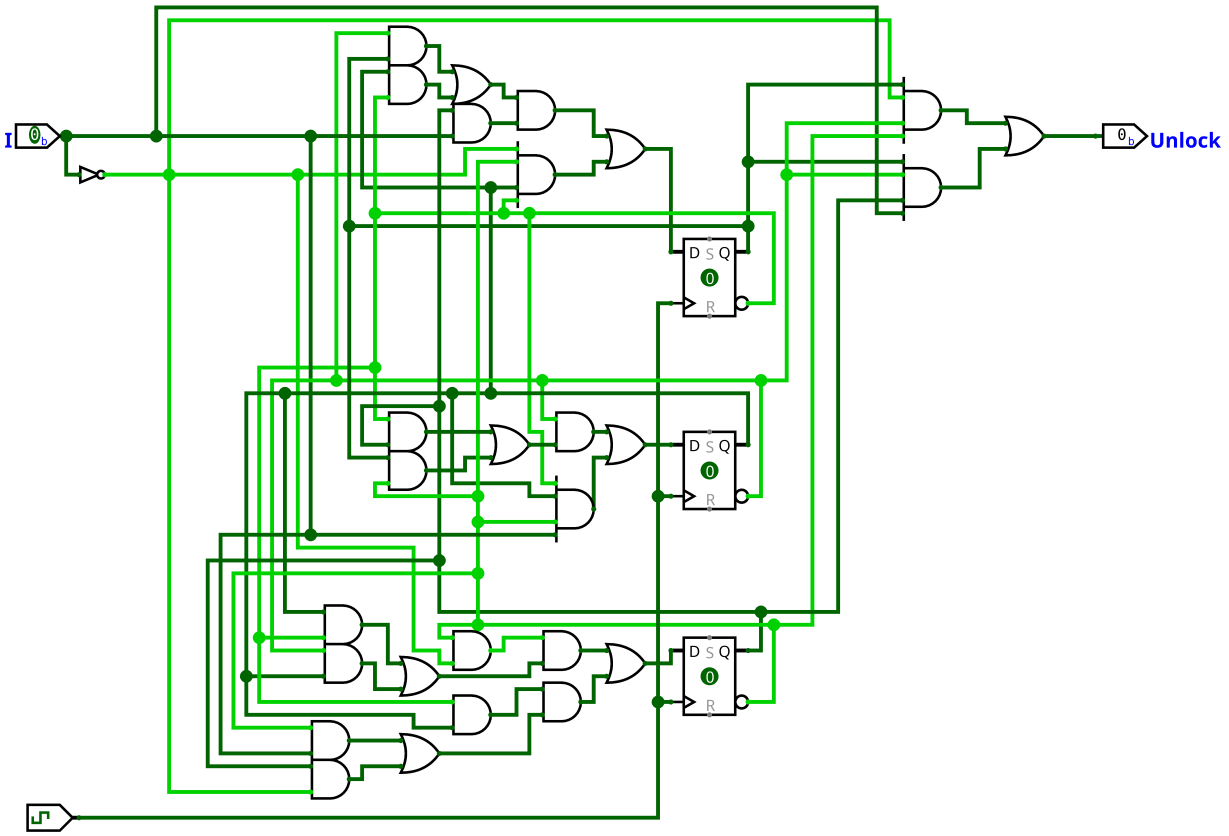
- Mealy Implementation:
- See attached

- Version 1:



- Version 2:



- Timing Diagram for version 1 implementation: