LED Matching Game

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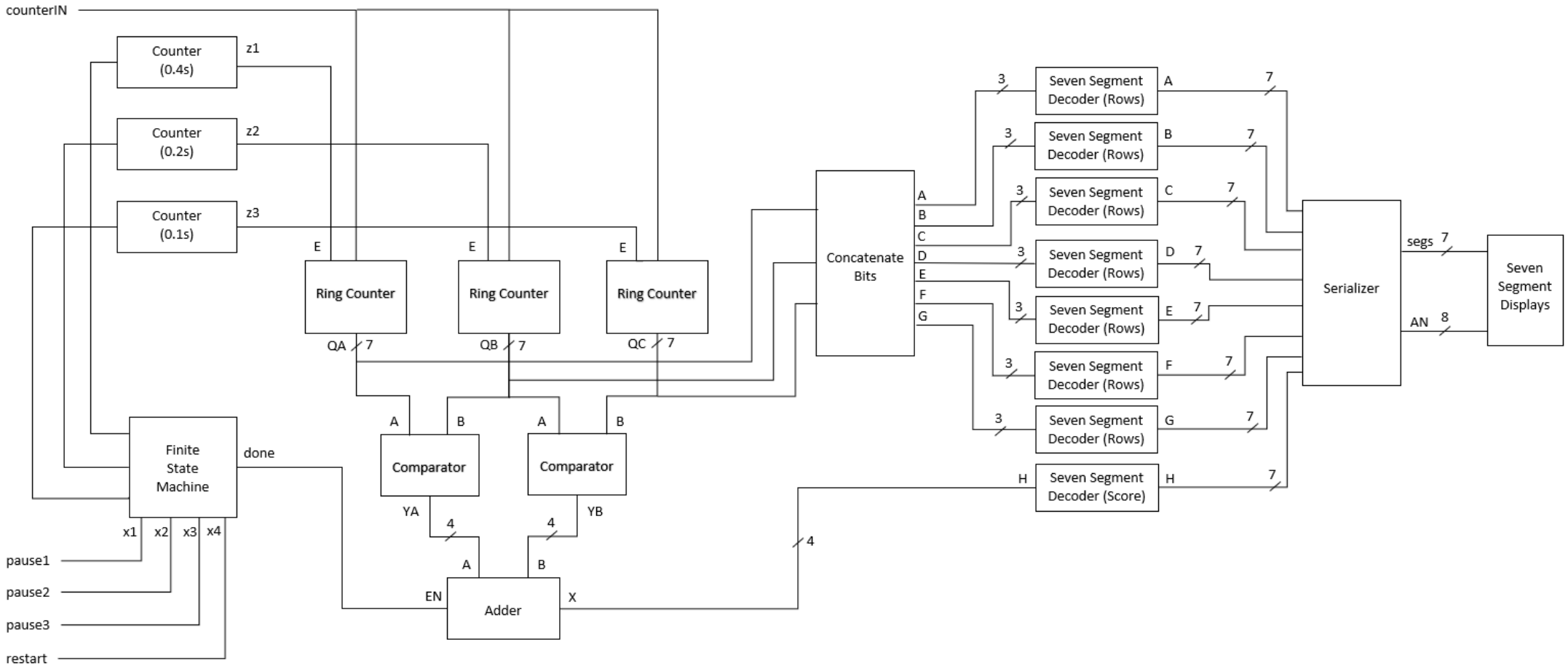
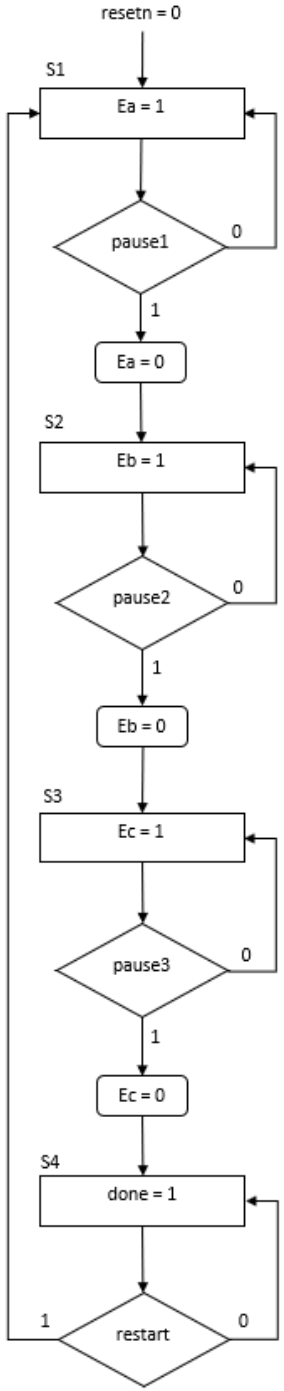
Circuit Functions

- Three rows of LEDs on 7 seven segment displays are lit up from left to right and wrap back around.
- These rows are individually paused using three buttons.
- The objective is to line up the LEDs in these rows, when the LEDs are lined up points are scored.
- The score is displayed on the eighth seven segment display at the end of the game.

Block Diagram



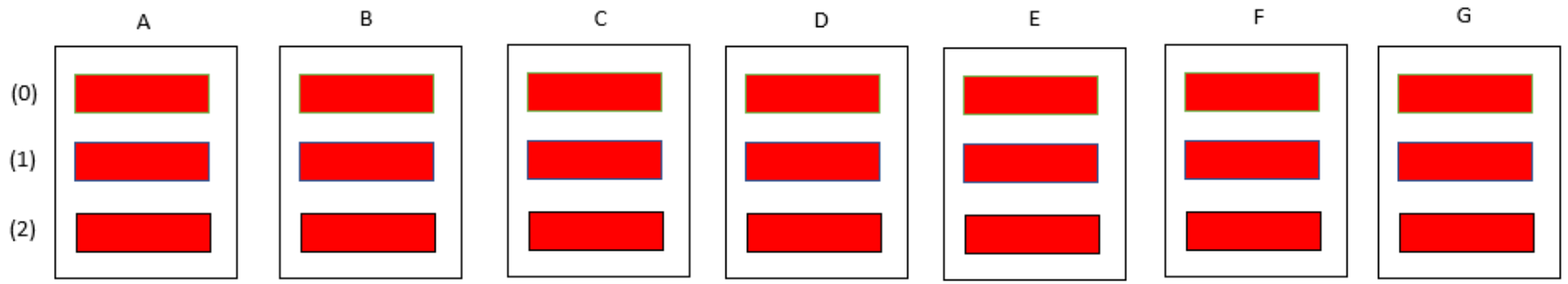


Finite State Machine

- Controls the enable of the three counters connected to the ring counters.
- Controls the enable of the adder that determines the score.

Concatenating Bits

- QA, QB, and QC are the 7-bit outputs of the ring counters.
- They are concatenated into the signals A-G to be decoded.



A = QA(0) & QB (0) & QC (0)

B = QA(1) & QB (1) & QC (1)

C = QA(2) & QB (2) & QC (2)

D = QA(3) & QB (3) & QC (3)

E = QA(4) & QB (4) & QC (4)

F = QA(5) & QB (5) & QC (5)

G = QA(6) & QB (6) & QC (6)

Serializer

- The serializer is mostly the same as the one shown in class but there was a major change to the decoder.
- The decoding had to be done before the multiplexor.
- This is because the decoders for the LED rows had to be specialized and separate from the score decoder.

Video Demonstration

https://youtube.com/shorts/3KeSnldMaz0