CS 303 Logic and Digital System Design Assigned : 25/04/2023
Homework #04 Due : 02/05/2023

Digital has a rotary encoder under Components → IO → Mechanical. This input device produces the waveforms shown in Fig. 1 when rotated in either direction.

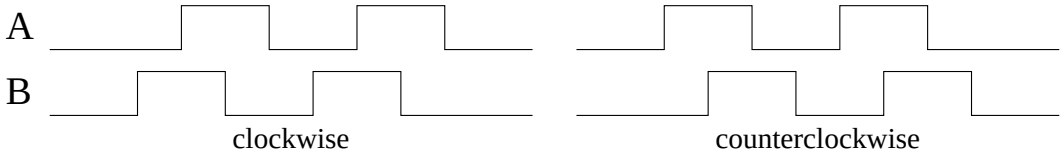

Fig. 1: Time waveforms generated by a rotary encoder.

You are asked to design a Mealy type finite-state machine (FSM) to detect the *clockwise* rotation of the encoder to increment a counter. You will be provided with a test bench as shown in Fig. 2, with the name *rotary_test.dig*. The circuit you design is to be placed in *state_machine.dig*.

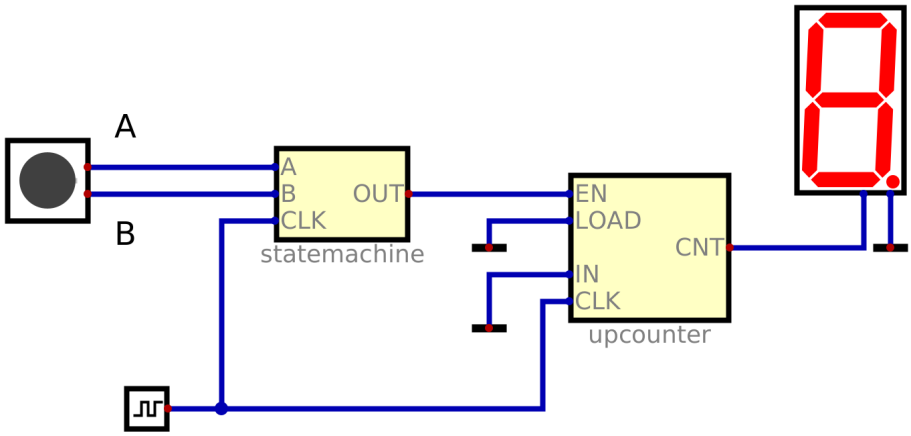

Fig. 2: Rotary encoder test template in *Digital*.

Design, implement, and test the FSM by

1. Drawing the state diagram indicating inputs, the output and state assignments.
2. Constructing the state (transition) table.
3. Simplifying the state equations using K-maps.
4. Drawing the resulting circuit in *Digital*.

Submit

1. Your state diagram, state table, K-maps and simplified state equations in a .pdf file.
2. The *state_machine.dig* you have designed.

Note: The video recording in *demo.mp4* demonstrates the expected behavior of the circuit.

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