**Exercise 1**

We enter the state machine on a Reset trigger. In state “S0” the output if “Q” is 0. If, in state “S0,” A is true, then the FSM goes to state “S1.” The output of “S1” is 0 still for “Q.” If B is true during state “S1” then the state goes to “S2” where the output of “Q” is now 1. If B is not true, then the FSM returns to state “S0.” State “S2” immediately returns to state “S0” after Q is marked true. If during state “S0” A is not true, then the FSM stays at state “S0.”

|  |  |  |  |
| --- | --- | --- | --- |
| Current State | Input A | Input B | Next State |
| S0 | 0 | X | S0 |
| S0 | 1 | X | S1 |
| S1 | X | 0 | S0 |
| S1 | X | 1 | S2 |
| S2 | X | X | S0 |

Diagram, schematic

Description automatically generatedOutput Table

|  |  |
| --- | --- |
| State | Output (Q) |
| 00 | 0 |
| 01 | 0 |
| 10 | 1 |

State Encoding

|  |  |
| --- | --- |
| State | Encoding |
| S0 | 00 |
| S1 | 01 |
| S2 | 10 |

S’(0) = (A \* S0) + (B’ \* S1) + (S2)

S’(1) = (S0 \* A)

S’(2) = (S1 \* B)

**Exercise 2**