EE-334
Digital System Design

Discussion for Exercise 4
Key Lock FSM

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FSM for Key Lock: Considerations

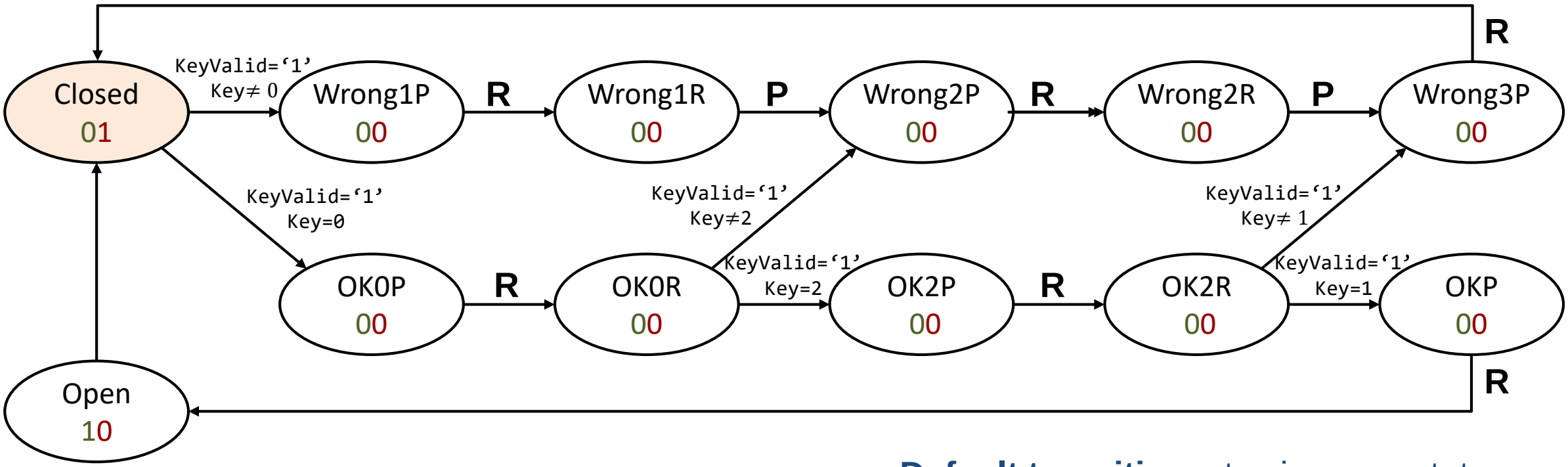
- Initial state: door closed (RLED on, GLED off)
- Once any key is pressed, both LEDs go off
- Each key need to be pressed and released
- Key combination 0,2,1 leads to an open door (1 cycle, GLED on) before returning to door closed
- Any other key combination still requires 3 key strokes to return to door closed

- Which states do we need?
  - Door closed
  - Door open
  - Track history of key presses & press/release
    - 2 states for each correct key (press and release, except last one where release is Open)
    - 2 states for incorrect keys (press and release, except last one where release is Closed)

FSM for Key Lock with Moore FSM

```
KeyValid ∈ {‘0’, ‘1’}      GLED ∈ {‘0’, ‘1’}
Key      ∈ {0,1,2,3}       RLED ∈ {‘0’, ‘1’}
```

	KeyValid	Key
P	‘1’	-
R	‘0’	-



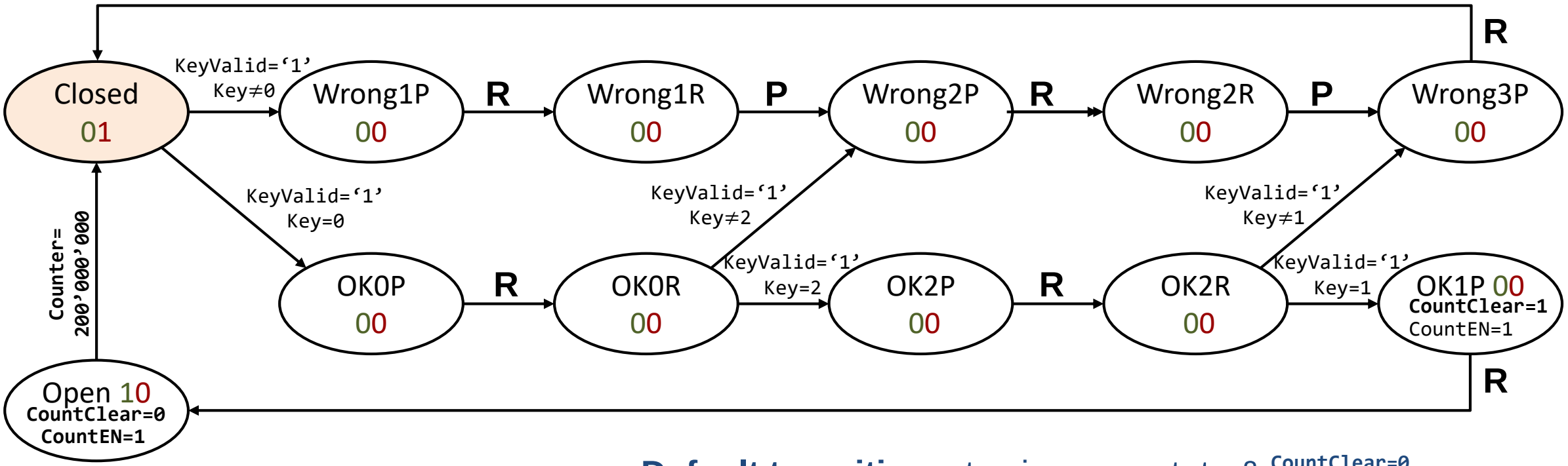
Default transition: stay in same state

FSM for Key Lock with Moore FSM

```
KeyValid ∈ {‘0’, ‘1’}      GLED ∈ {‘0’, ‘1’}
Key      ∈ {0,1,2,3}       RLED ∈ {‘0’, ‘1’}
                           Counter

CountEN    ∈ {‘0’, ‘1’}
CountClear ∈ {‘0’, ‘1’}
```

	KeyValid	Key
P	‘1’	-
R	‘0’	-



Default transition: stay in same state & `CountClear=0` `CountEN=0`