Finite State Machine (FSM) Vending Machine — State Diagram

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Board: Digilent **Nexys A7** (Artix-7 100T, XC7A100T-1CSG324C)
Tools: Verilog HDL, Vivado Design Suite, draw.io / Visio (diagram)

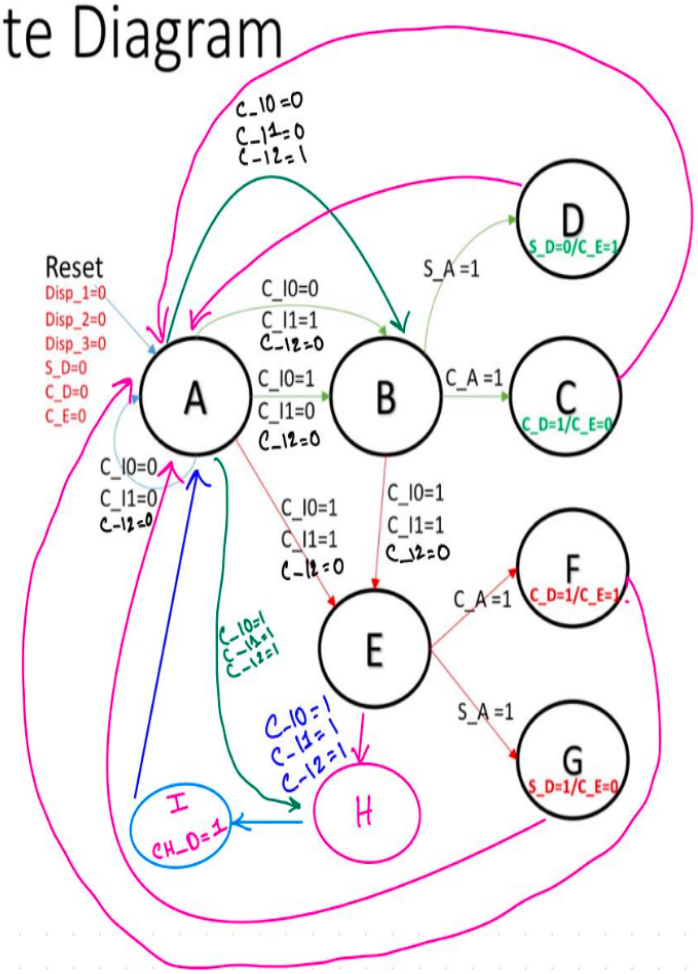
Highlights:

- Full FSM for coin-based vending: **$0.25 → $0.50 → $0.75**
- Products: 🍬 Candy ($0.25), 🥤 Soda ($0.50), 🍟 Chips ($0.75)
- **Combo switch** logic at $0.75
- Explicit **IDLE**, **credit accumulation**, **dispense**, and **reset** paths
- Hardware-verified on FPGA; timing confirmed via simulation

Diagram Notes

- Moore-style outputs for stable LED indications
- Transitions guarded by coin input / combo / reset
- Invalid inputs return to safe state

State Diagram



Inputs

- chip-assertion (CH_A)
- soda-assertion (S_A),
- candy-assertion (C_A),
- coin-insert (C_I0),
- coin-insert (C_I1).
- Coin_insert(C_I2)

Outputs:

- LED: soda-dispense (S_D),
- LED: candy-dispense (C_D),
- LED: coin ejection (C_E),
- 7-seg Display: price (S_P):candy price (C_P)/soda
  - Disp_1= amount 1st digit
  - Disp_2= amount 2nd digit
  - Disp_3= amount 3rd digit

  (Example: 0.25)
- LED: Chip-dispense (CH_D)