

Automatic Vending Machine Using FSM

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Abstract—This paper describes the design of an automatic vending machine using FSM that describes a system that accepts payment in the appropriate denominations, returns any leftover change, and then provides the appropriate item or product. Only the 1 and 2 rupee currencies are accepted. Any other inappropriate denomination will not work. The layout also enables a trigger for any created balancing signal. A money receiver and a vending machine are the two entities involved in this FSM. This vending machine offers accurate and efficient functionality.

Keywords—Automatic Vending Machine, Finite State Machine

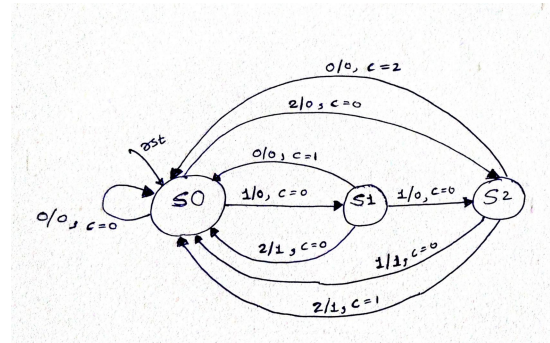


Fig. 1. State diagram for Automatic Vending Machine

I. DESCRIPTION

Finite state machines (FSM), or simply a state machine, is a mathematical model used to design computer programs and sequential logic circuits. A practical example of FSM is a vending machine. The machine can take only two types of coins of denominations 1 and 2 in any order. It delivers only one product priced at Rs. 3. On receiving Rs. 3, the product is delivered by asserting an output $X=1$ which otherwise remains 0. If it gets Rs. 4, the product is delivered by asserting X and also, a coin return mechanism is activated by output $C=1$ to return an Rs. 1 coin. If Rs. 1 or Rs. 2 coins are received, the machine returns $C=1$ or $C=2$ after no coin is inserted.

II. STATE DIAGRAM

Figure 1 shows the state diagram of the desired system. The design is done by using Mealy FSM. Three states are used to track Rs. 0, Rs. 1 and Rs. 2 received. The initial state is S_0 which indicates an idle state or Rs. 0 states. The current state switches to S_1 (Rs. 1 received) if the Rs. 1 is added and switches to S_2 if the Rs. 2 is added (Rs. 2 received). The input vector is a 2-bit number 00 represents Rs. 0, 01 represents Rs. 1 and 10 represents Rs. 2. output has two vectors one is for item X , which is 1 bit, and the other is the 2-bit number representing change.

III. WAVEFORM

Figure 2 depicts a sample of the design in Figure 1 functioning.

One Rs. 1 coin and one Rs. 2 coin results in Item X . Also, two Rs. 2 coins result in item X and a change of Rs. 1.

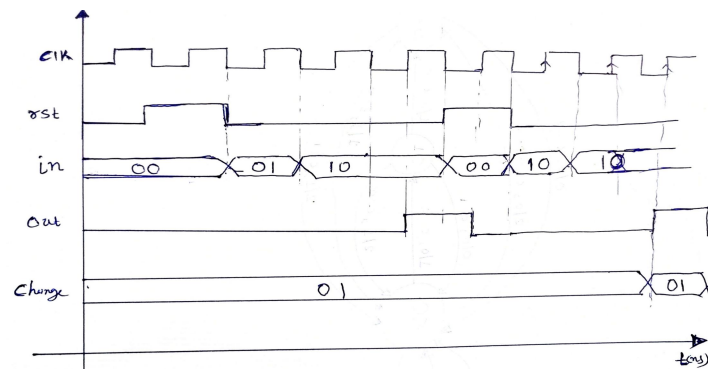


Fig. 2. Waveform of Automatic Vending

REFERENCES

- [1] <https://github.com/Yash-Goklani/Vending-Machine>