Faculty of Engineering - Ain Shams University

Electronic Design Automation (CSE312)

Project (1)

ATM - based bank system

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1.0 INTRODUCTION:

The project aims at practicing the complete ASIC flow by implementing the core of the bank ATM design as well as verification environment.

And it should contain all auxiliary devices like card handling, money counting, and timers exist.

As well as account information like passwords, account numbers and balances exist locally with no need for database connection.

ATM System will contain the following auxiliaries:

- Card handling
- Language used
- Card password
- Operation (Deposit –Withdraw –Balance service)
- Balance exists
- Deposit value
- Withdraw value
- Another service wanted

2.0 FSM DESIGN:

Basically, FSM is a representation of the different transition taken place in a system. A state machine is an effective way to implement the control functions.

Initially the system is in the idle state which is **S0** and when it Is ready to operate, **S1** state is selected which represents the card verification , if the card is not verified to be correct the system will go back to S0 but if it was correct then we will move to choose a language state **(S2)** and if no language was chosen the system will remain in **S2.**

S3 state is the insert pin state, so if the pin was inserted the system will move to the verify pin state **(S4)**, if not it will remain in **(S3).**

In **S4** the system will move to the main menu **(S5)** if the bin was verified and if not, it will go back to **(S3)** to insert another pin.

In S5 the system has four options to four different states depending on the values of the input. if the input value was:

- **(00)** which means the operation is **Deposit** and the system will move to state **S6** to insert the money. If money inserted the system will move to checking its condition and incrementing balance in state **(S10)**.
  But if money wasn't inserted in **(S6)** the system will remain in the same state.

- **(01)** which means the operation is **Withdraw** and the system will move directly to state **(S7)** to insert the money amount and if money wasn't inserted it will remain in the same state.

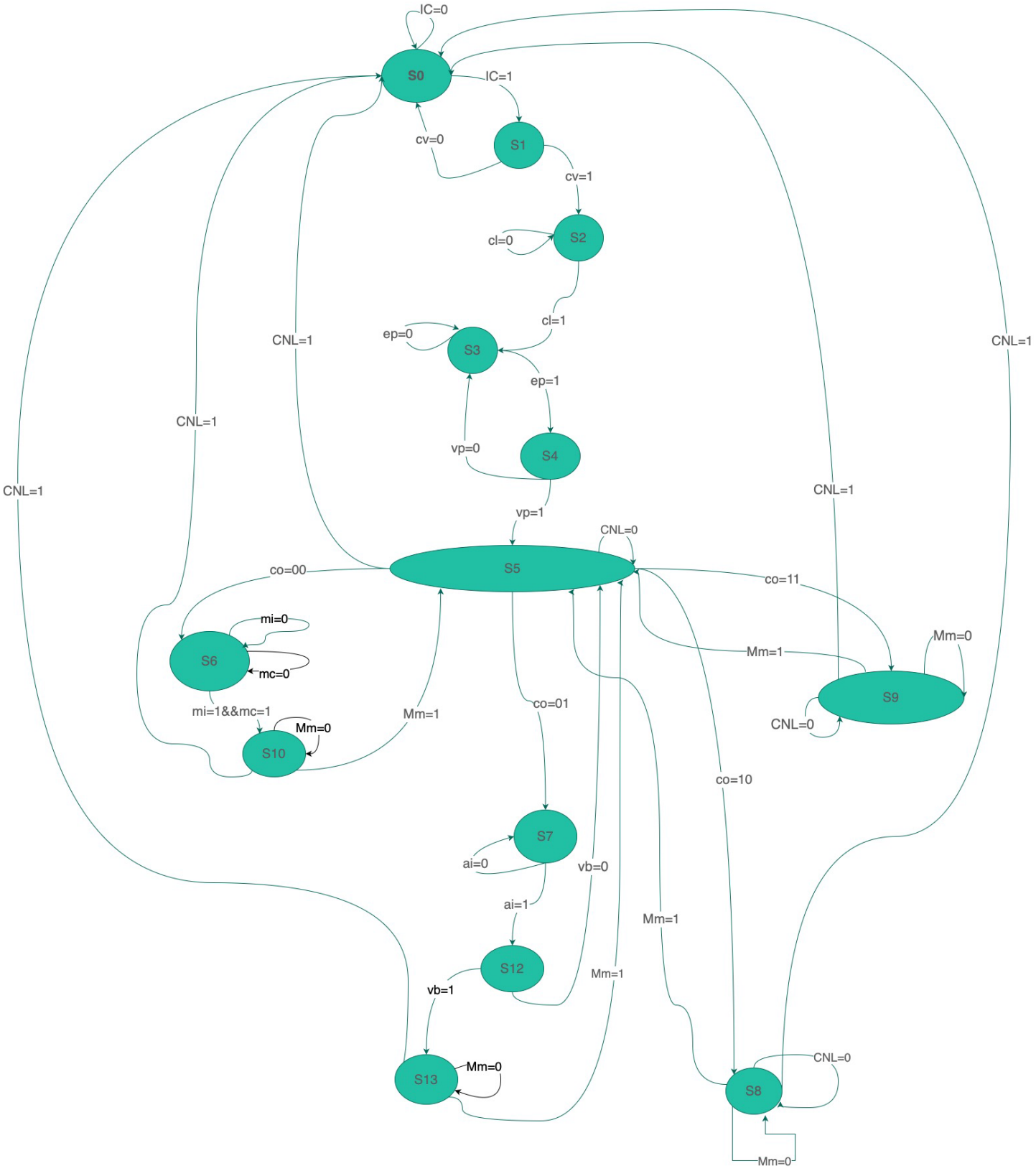
  But if inserted the system will move to next state **(S12)** to check if the current balance allows this amount of withdraw or not, if the balance was valid then the system will dispense the money and decrement it in state **(S13)**.

- **(10)** which means the operation is **balance services**, and the system goes to show balance in state **(S8).**

- **(11)** which means the operation is **other services**, the system will then go directly to the other services state **(S9)**.

and after each leaf state in the state diagram the system has two options either to cancel and go back to the **IDEAL (S0)** state or to go Back to the **Main menu (S5)**.

- **State Diagram:**

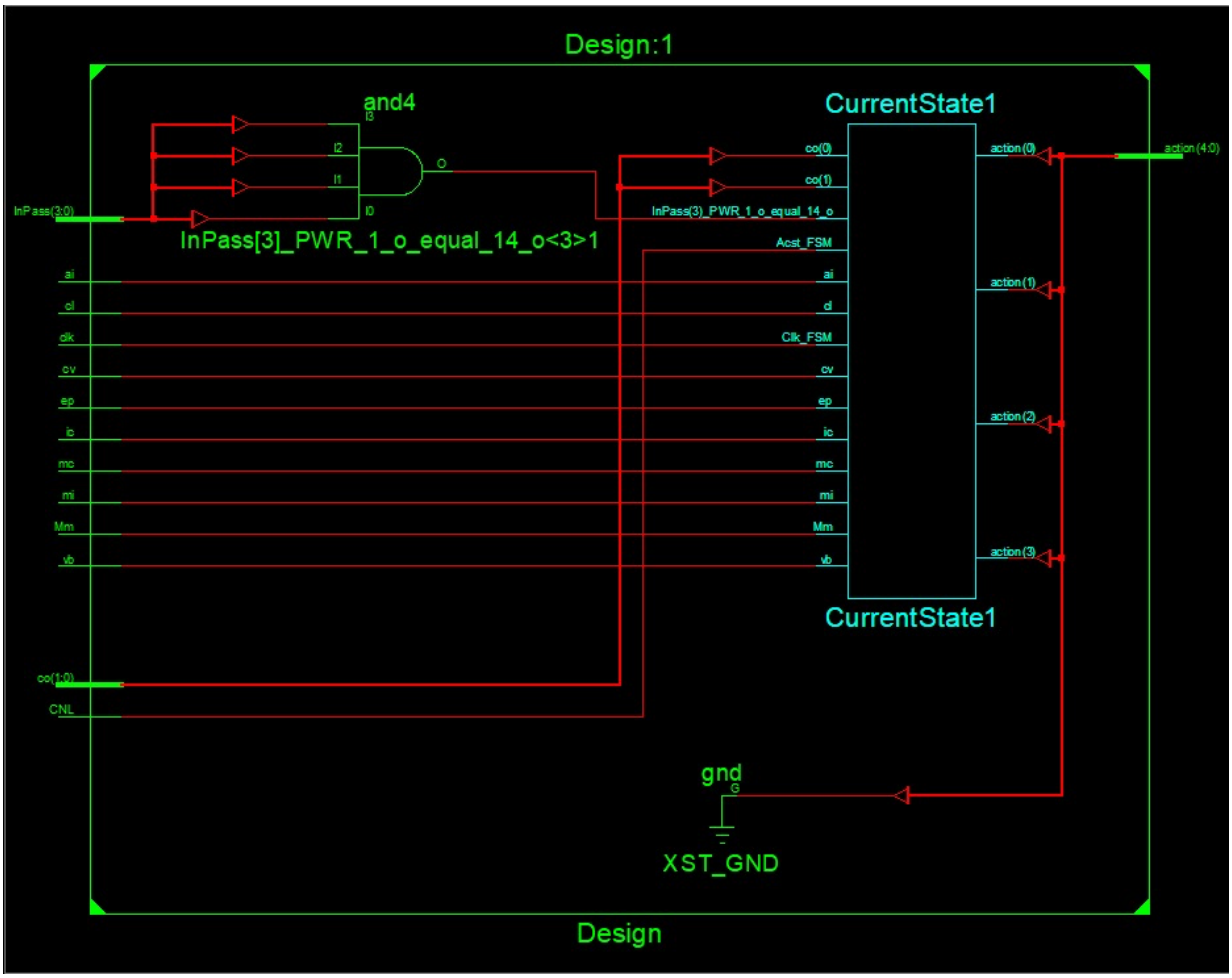


Keys:

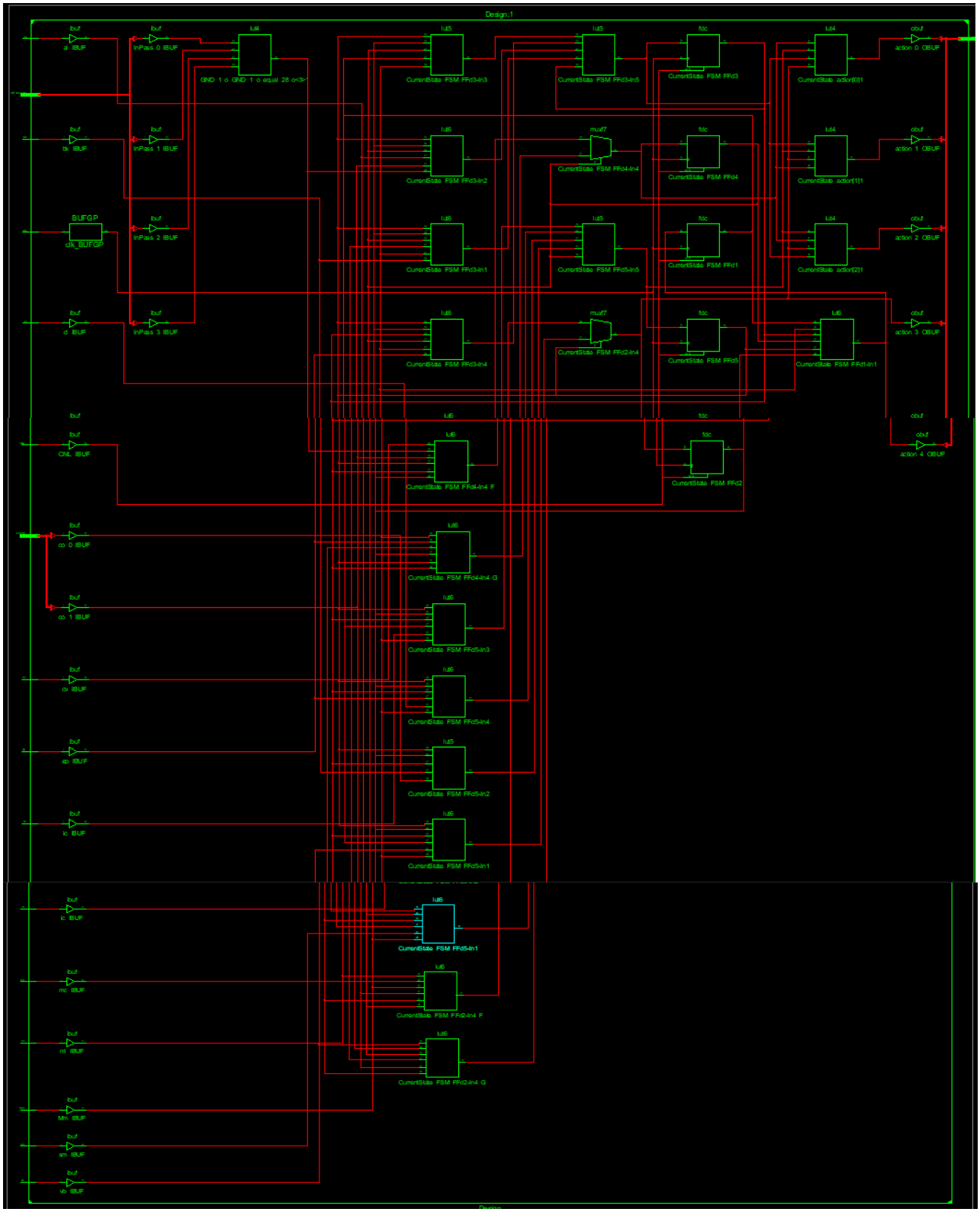
Variable name	Full name
ic (I/P)	Insert card
cv (I/P)	Card verified
cl (I/P)	Choose language
ep (I/P)	Enter password
InPass (4 bits) (I/P)	User's password
co (2 bits) (I/P)	00-> deposit 01-> withdraw 10-> balance services 11-> other services
mc (I/P)	Money condition
Mm (I/P)	Main menu
mi (I/P)	Money inserted
CNL (I/P)	Cancel
ai (I/P)	Amount inserted
vb (I/P)	Valid balance
action (O/P)	Next state's number
clk (I/P)	Clock
CurrentState	Current state
nextState	Next state
Password	Actual password
vp	Verify pin

State name	Full name
S0	IDLE
S1	Card verification
S2	Choose language
S3	Insert pin
S4	Pin verification
S5	Main menu
S6	Insert money
S7	Insert amount
S8	Show balance
S9	Other service
S10	Check money condition & Increment balance
S12	Balance exists
S13	Dispense money &Decrement balance

3.0 High Level RTL Design



4.0 Design Synthesis



5.0 SIMULAION: