TEAM CODELESS

ATP Controller
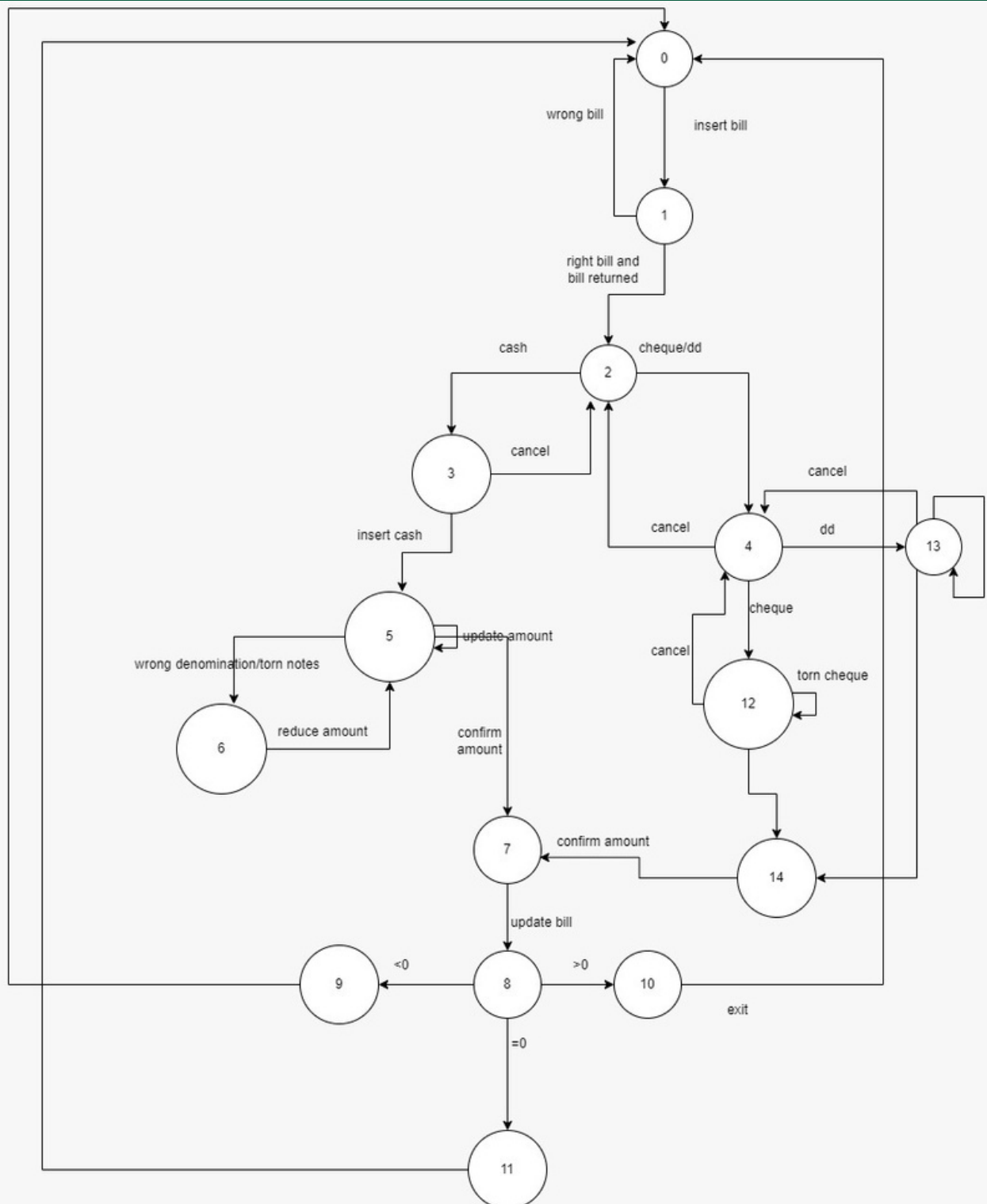
Any Time Electricity Bill Payment Machine

REPORT

———

PREPARED BY: Aravind JL   A P Vibin

FSM-Moore

start=0
scan bill=1
Display amount=2
3=cash selected
4=dd selected
5=display amount inserted
6=return wrong note
7=process bill
8=updated bill generated
9=update next bill cycle
10=give bill with remaining amount
11=give final receipt
12=request cheque
13=request dd
14=read amount

wrong bill
insert bill
right bill and bill returned
cash
cheque/dd
cancel
cancel
cancel
dd
cancel
insert cash
cheque
torn cheque
wrong denomination/torn notes
update amount
cancel
reduce amount
confirm amount
confirm amount
update bill
<0
>0
exit
=0

Inputs/Outputs

For this simulated ATP, the INPUTS are :
- cash
- cheque
- dd
- payment method
- cancel
- reset

Users can choose one of the three methods to pay their bill using payment method and cancel the process in between using cancel.
Cash, cheque and dd are the money user gives into the machine, confirm is used in between the processes.

The OUTPUTS are:
- payment
- receipt
- updated bill
- incorrect notes/cheque/dd
- the original bill

Payment receipt is an acknowledgement to the user that they paid their current bill.
Updated bill is given to the user if they paid excess amount or they have paid less amount. If they paid amount, they have to pay the bill with less amount as this cash is added to it.
In case they paid less, they get a bill saying they have to pay the remaining before deadline.

Inputs/Outputs

Payment receipt is an acknowledgement to the user that they paid their current bill. Updated bill is given to the user if they paid excess amount or they have paid less amount. If they paid amount, they have to pay the bill with less amount as this cash is added to it. In case they paid less, they get a bill saying they have to pay the remaining before deadline.
The registers used are:

- **Cash:-** It is a 3 bit register having six states - 000,001,010,011,100,101. It is used to hold notes of different denominations 10,20,50,100,200,500 respectively.
- **Payment method:-** It is a 2 bit register used to select between cash, cheque and dd.
- Cash - 000, Cheque - 010, DD - 010.

Prepaid amount, bill amount and input amount are 16 bit registers to store cash information.

Assumptions

- Bill has valid identification code or number
- User pays using the methods cash, cheque or DD.
- User uses notes only of the denomination 10, 20, 50, 100, 200, 500.
- Incorrect or outdated notes will be returned.
- Invalid cheque or DD will be returned.
- Torn notes/cheque/DD will not be used for payment.

TestBench

Cash(00):
- Bill amount - Rs 100
- Input : Rs 50(010)(Valid), Rs 5(010)(Valid), Rs 200(100)(Invalid), Rs 100(011)(Valid).

Cheque(01):
- Bill Amount : Rs 120
- Input : Rs 40(Valid)

DD(10):
- Bill Amount : Rs 220
- Input : Rs 40(Valid)

References

- https://www.youtube.com/@IntelFPGA
- https://www.javatpoint.com/verilog
- https://www.tutorialspoint.com/vlsi_design/vlsi_design_fpga_technology.htm