ECS326 (Digital Circuits)
Assessment -3
Report Date: 09th April 2022

ATM Machine Modelling Using VeriLog HDL

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OBJECTIVE

Here we consider different parameters and conditions to build a VeriLog based ATM machine model. Also, we run the model in a specific testbench to get its output performance.

DESCRIPTION

The conditions and features of the ATM machine are,

- Flashes a green light when cash is available and the machine is ready.
- Flashes a red light when cash is not available or there is a machine defect.
- When a card is inserted, asks for pin if the card is legal or undamaged, else returns a
- message asking for resubmission.
- If a wrong pin is entered, asks for re-entry of pin at the first instant, when the second
- entry is also wrong, takes the card in, raises an alarm and goes back to the rest state.
- If the pin is right, prompts for amount to be dispensed.
- If the amount is more than in store, gives sign of not enough cash and goes to reset
- state.
- If the amount is less than in store, dispense the amount and get back to the reset state.
- In your answer clearly define input and output variables and whether you are using a
- Moore or a Mealy machine.

PARAMETERS

INPUT

State transition Variables	Meaning	As taken in the code
D	Machine defective	def
M	Cash available	cash
C	Card inserted	card
L	Legal Card	legal
Q	Correct Pin	pin
S	System is ready	system
N	Enough cash available	balance

OUTPUT

State transition Variables	Meaning	As taken in the code
G	Green Light ON	green
R	Red Light ON	red
P	Enter Pin required	repin
W	Enter Cash required	recash
O	Submit card again	again
T	Take the card in	cardin
E	Eject cash	collect
A	Raise alarm	alarm
B	Bad luck not enough cash available	bluck

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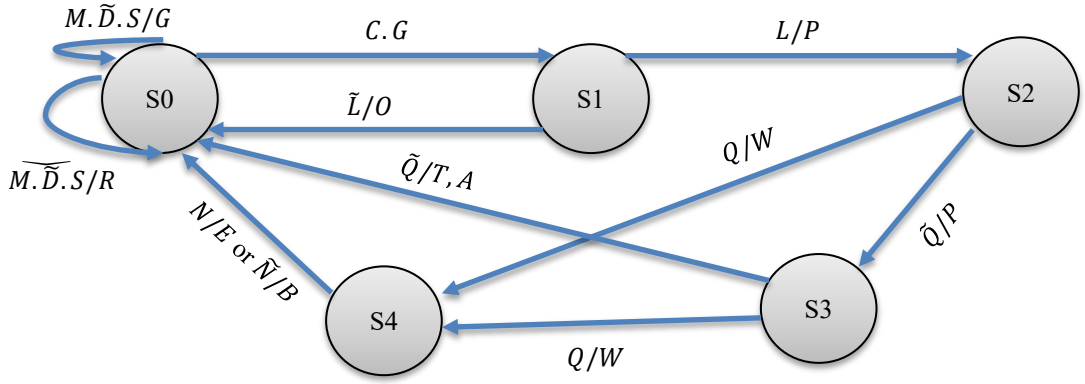
STATE TRANSITION DIAGRAM



Here we have considered a mealy machine where in each state the output depends upon the inputs. We enter at state S0 and at stage S4, we get our money from the ATM. The testbench is set as to satisfy all the features in the first run.

CALCULATIONS

Last digit of my roll number = 9;
So,

$$\boldsymbol{Frequency = 4 * 9\,KHz = 36\,KHz;}$$

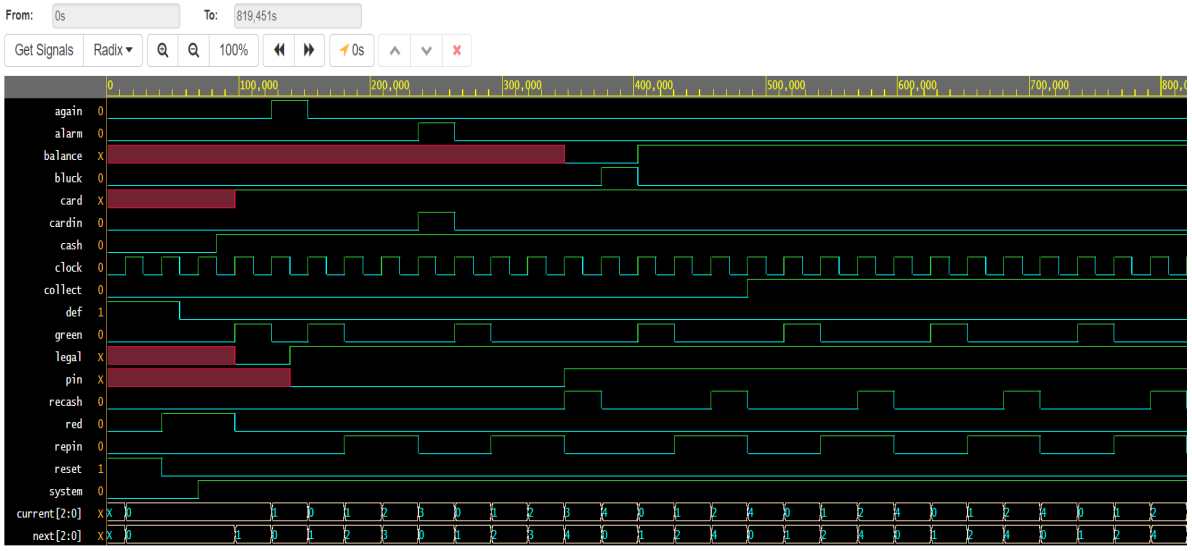
So,

$$\boldsymbol{Timeperiod = \frac{1}{36} KHz = 27778\,ns;}$$

So,

$$\boldsymbol{Clock\,T_{ON} = \frac{Timeperiod}{2} = 13889\,ns;}$$

WAVE OUTPUT DIAGRAM



Note: To revert to EPWave opening in a new browser window, set that option on your user page.

EDA Playground link (https://www.edaplayground.com/x/VEMu)