Bidirectional shift registers using flip flops and basic gates using eSim

THEORY: Bidirectional Shift registers are the storage devices which are capable of shifting the data either right or left depending on the mode selected.

Design:

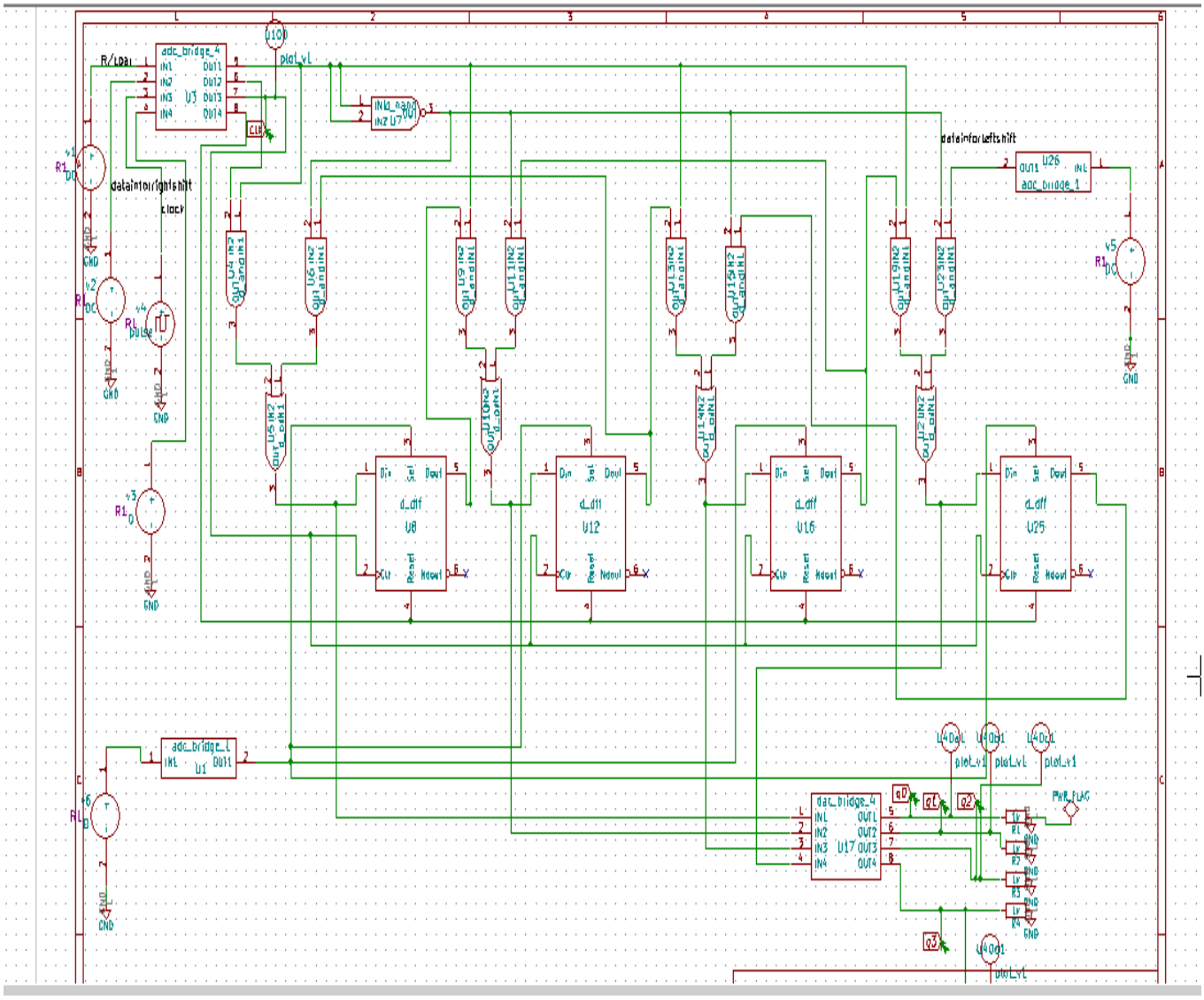
Eg: SET=0, RESET=0

v1(mode)=5(right shift operation)

v2(datainforright shift)=5

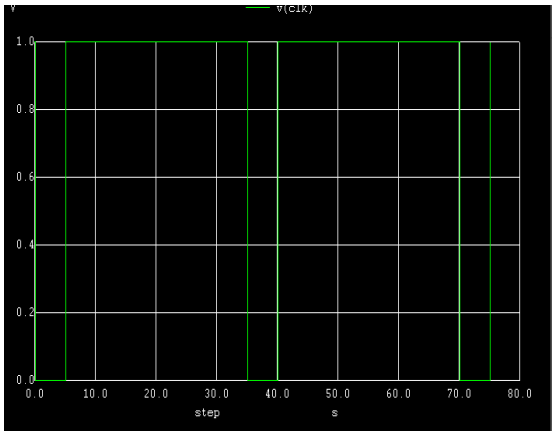
v5(datainforleft shift)=5

SCHEMATIC DIAGRAM:



NgSpice plots

LEFT SHIFT OPERATION:



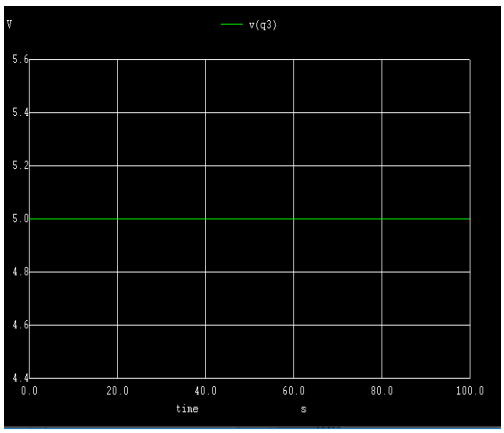
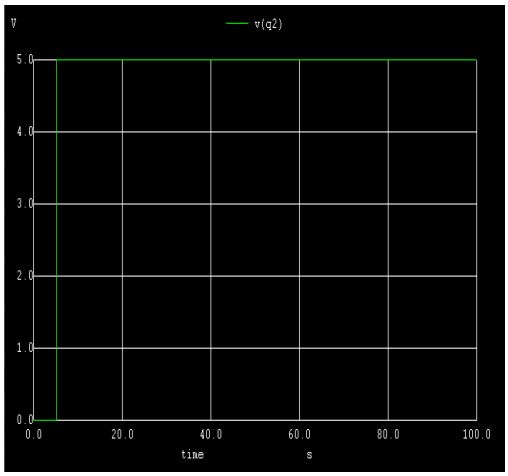


Fig1:clock

Fig2:q3 output plot



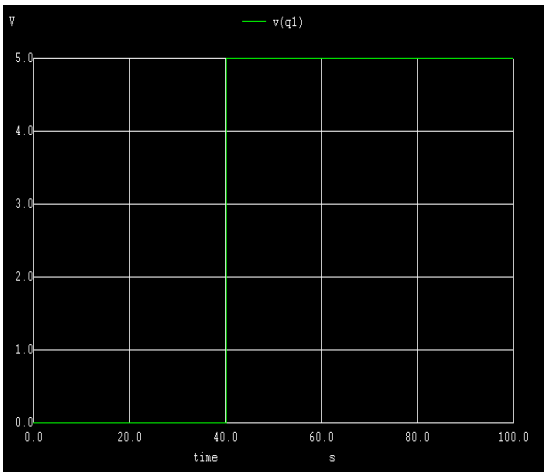


Fig3:q2 output plot

Fig4:q1 output plot

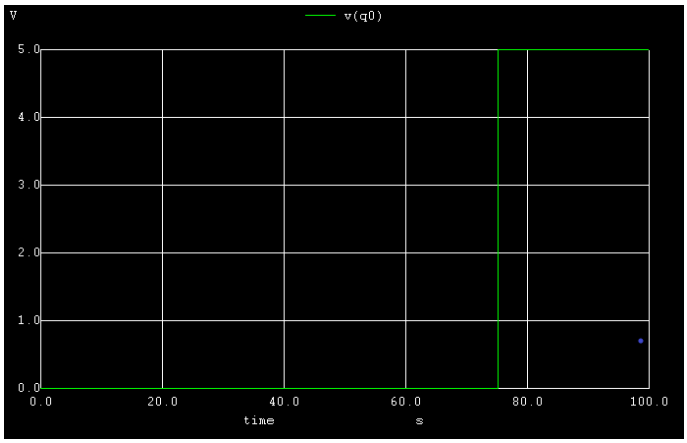


Fig5:q0 output plot

RIGHT SHIFT OPERATION

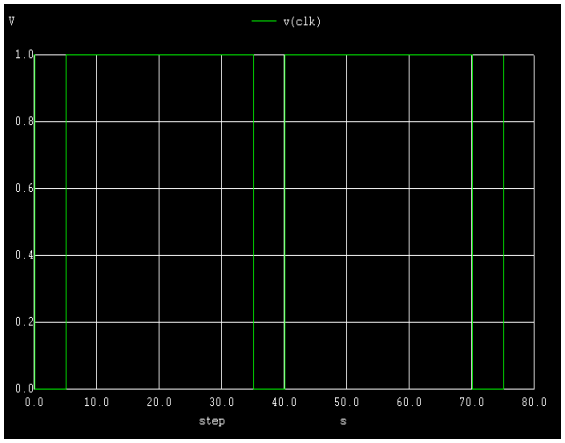


Fig6:clock

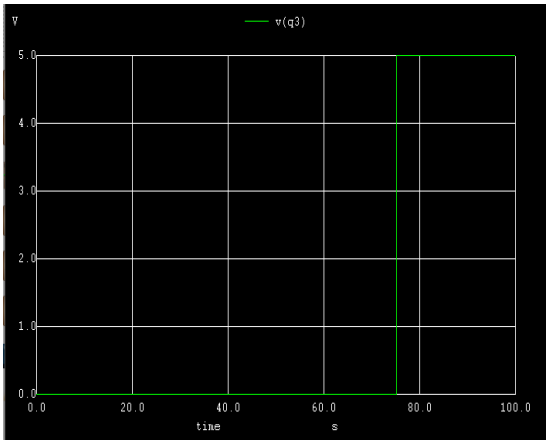


Fig7:q3 output plot

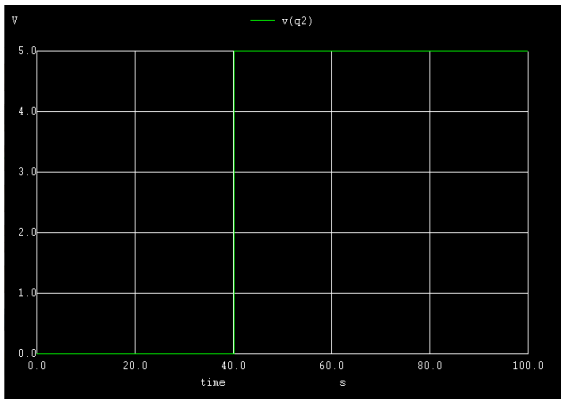


Fig7:q2 output plot

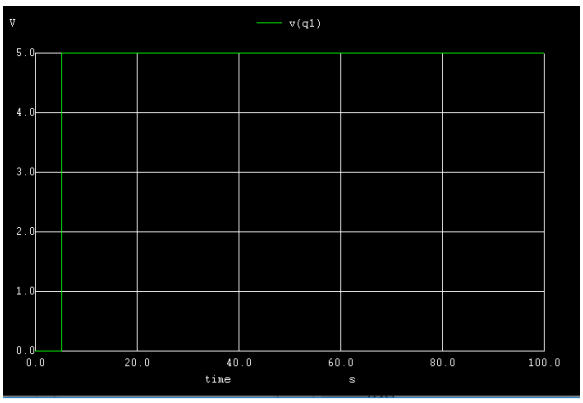


Fig8:q1 output plot

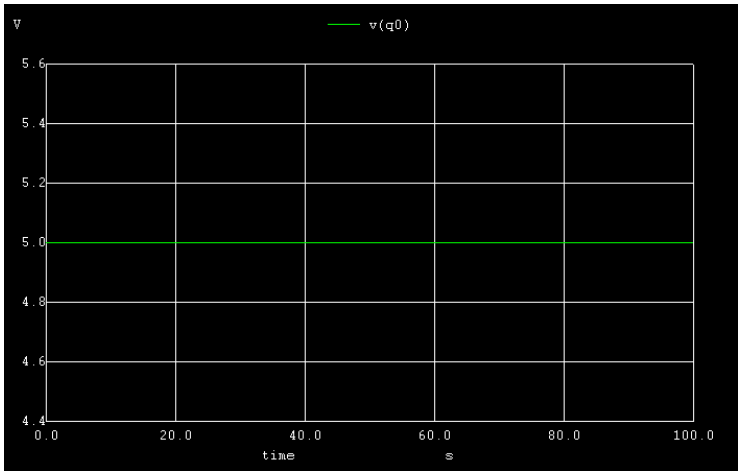


Fig9:q0 output plot

PYTHON PLOTS:

LEFT SHIFT OPERATION

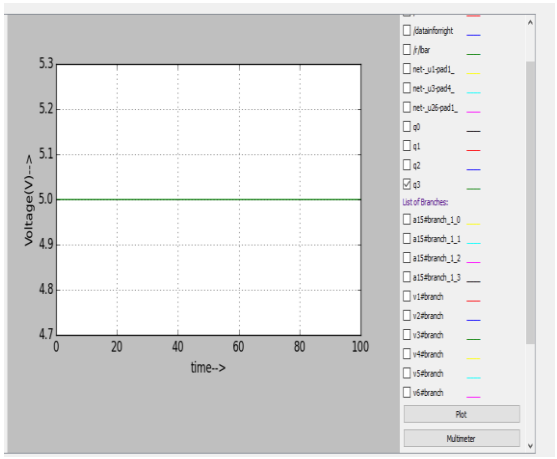


Fig1:q3 output plot

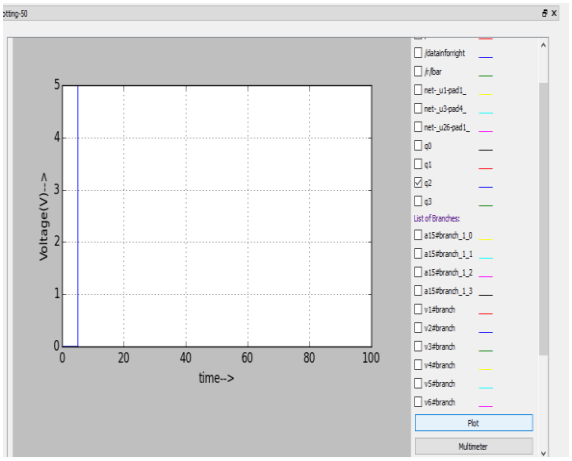


Fig2:q2 output plot

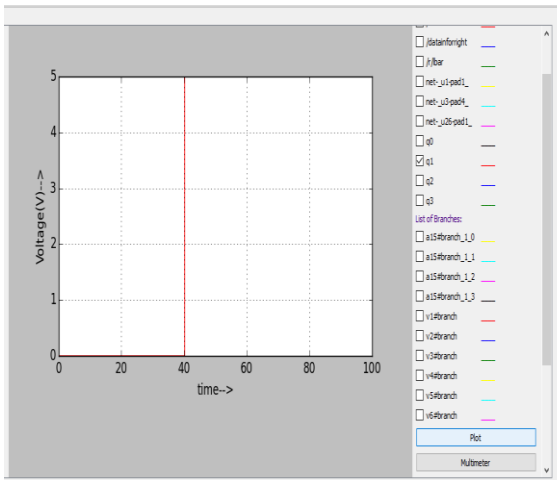


Fig3:q1 output plot

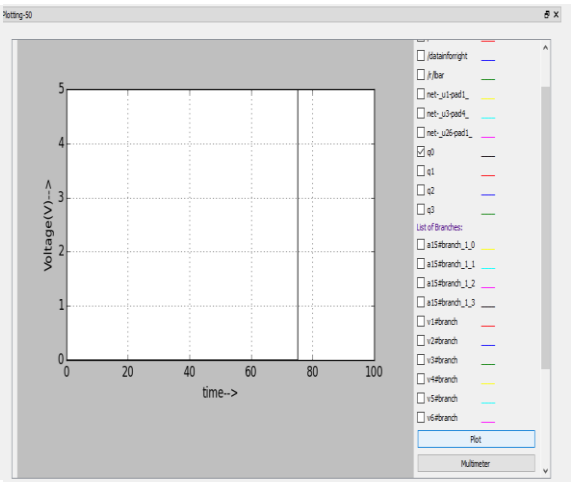


Fig4:q0 output plot

RIGHT SHIFT OPERATION

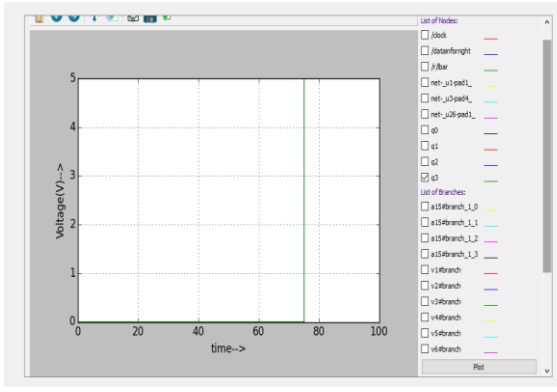


Fig5:q3 output plot

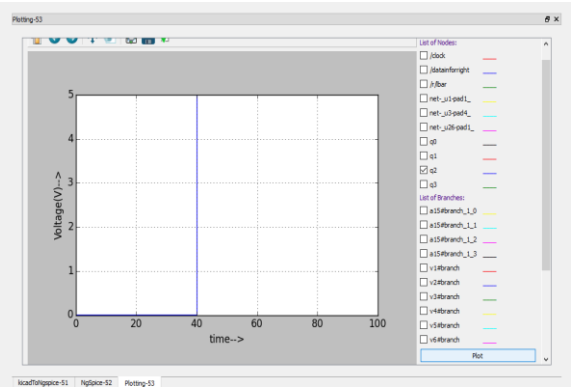


Fig6:q2 output plot

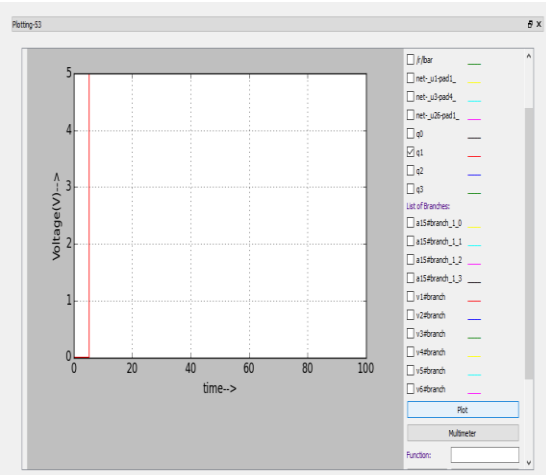


Fig7:q1 output plot

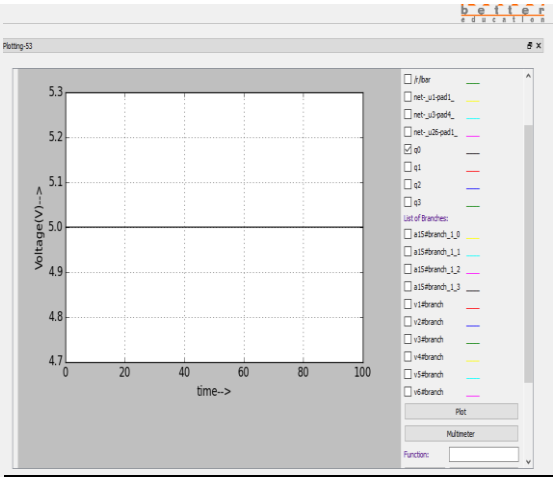


Fig8:q0 output plot

REFERENCES: https://www.electrical4u.com/bidirectional-shift-register/