Circuit Simulation Project

https://esim.fossee.in/circuit-simulation-project

Name of the participant: Rishi Nair

Project guide: Dr. Maheswari. R

Title of the circuit: 3 Bit Asynchronous Down Counter Using D Flip Flops

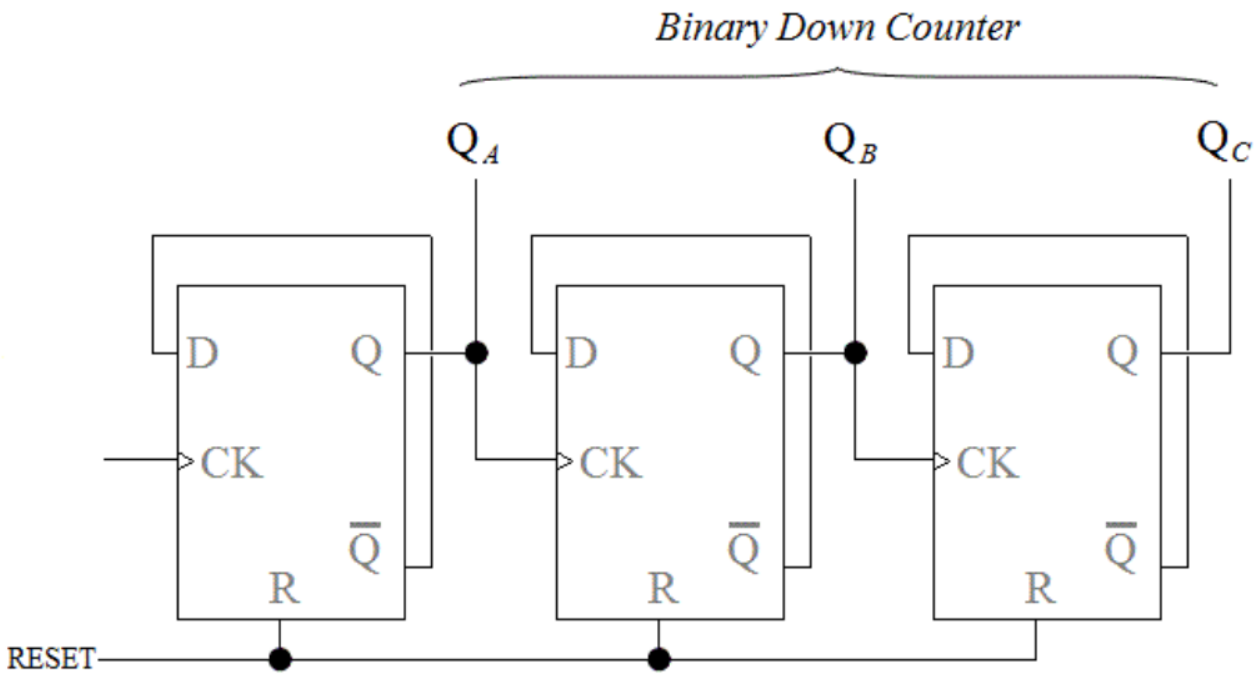
Theory/Description:

Counters are sequential circuits which change their pre-defined states with the help of clock pulses. They are constructed with flip flops. A 3-bit binary down counter with d-flip flops has only three D-type flip-flops.

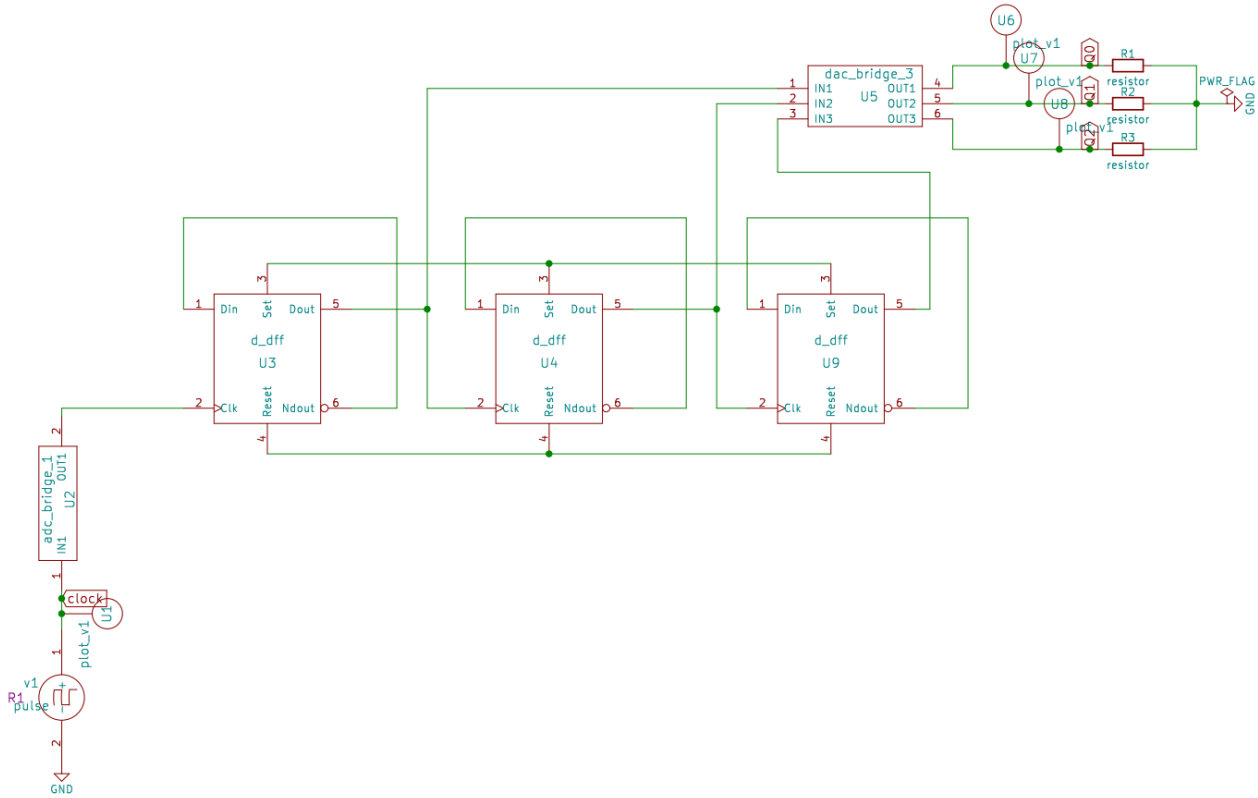
In the asynchronous counter, an external clock pulse is provided for only the first flip flop, thereafter the output of the 1st FF acts as a clock pulse for the second FF and so on.

In addition, the inverted output of a flip flop feeds the data input (D). For the 3 bit counter, we require 3 flip flops and we can generate 2^3 = 8 state and count(111 110 ... 000).

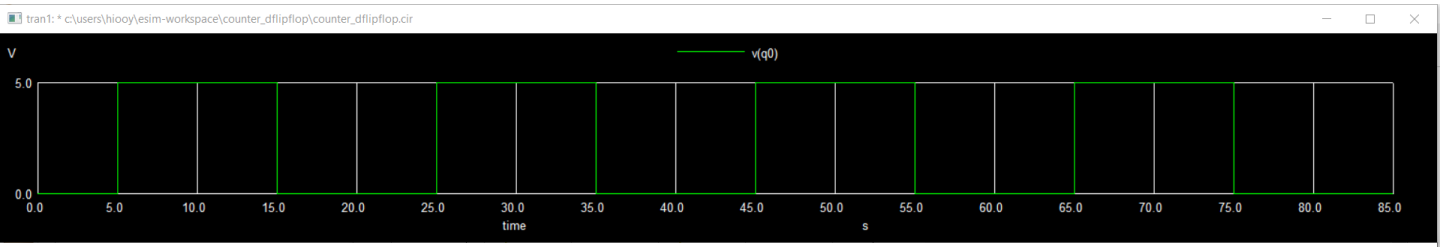
Circuit Diagram:

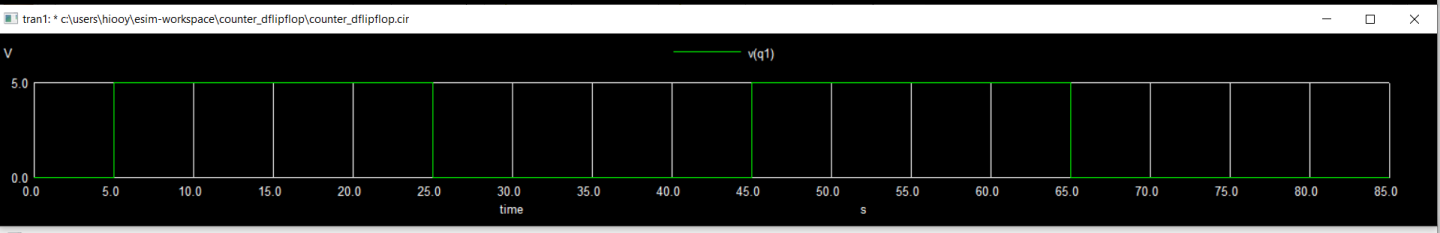


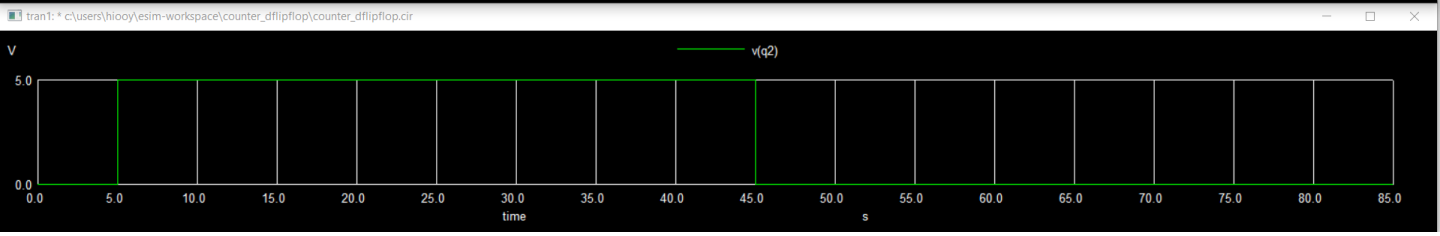
ESIM Circuit Design:



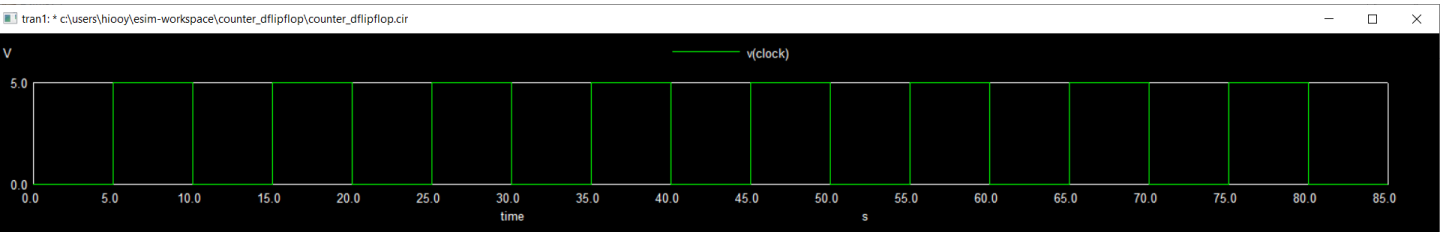
Output (Ngspice):







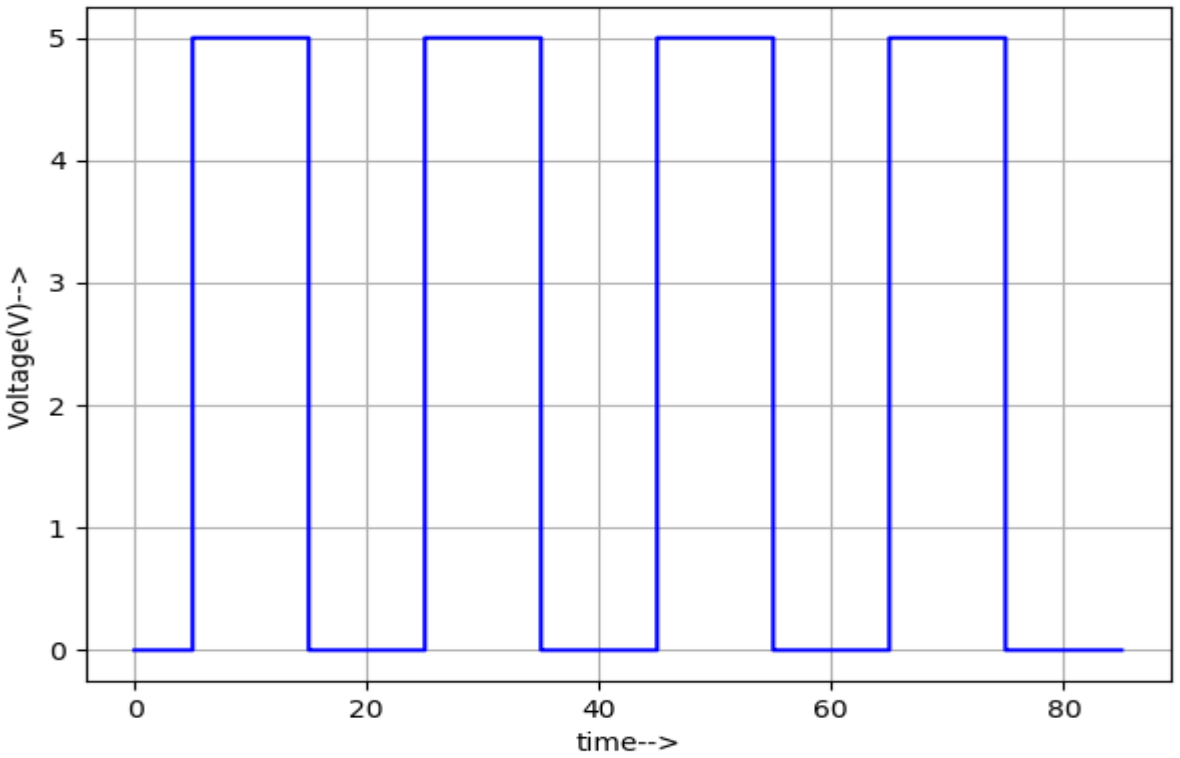
LSB :- Q0
MSB :- Q2



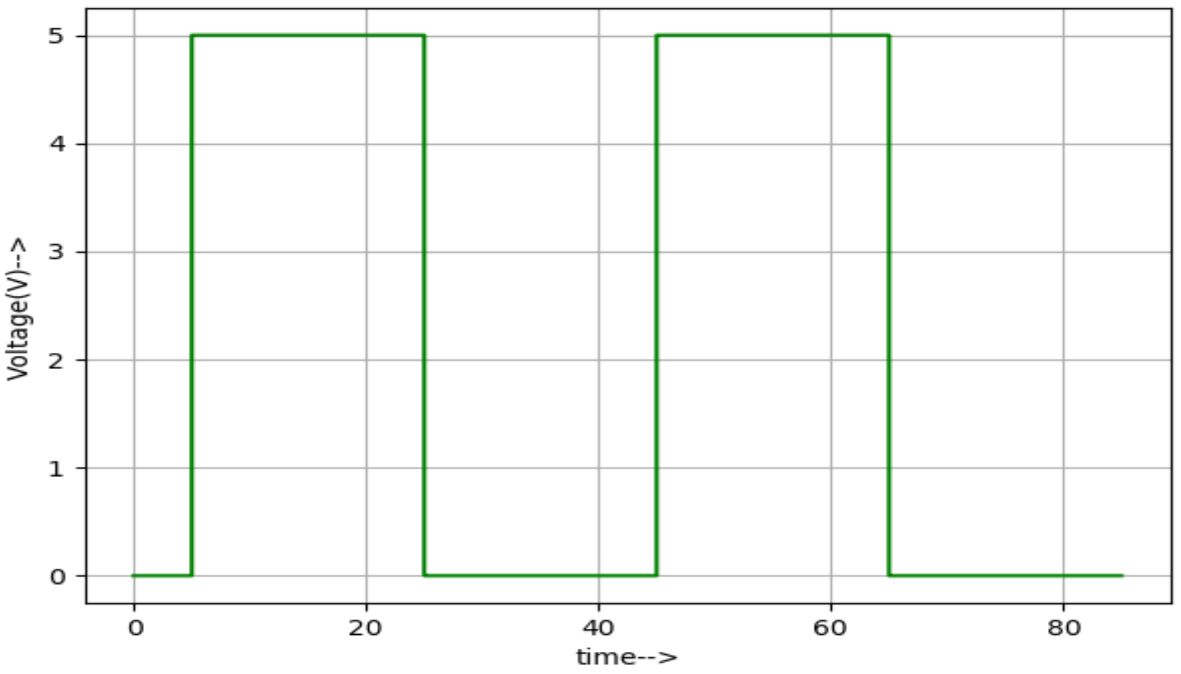
Clock

Output (Python):

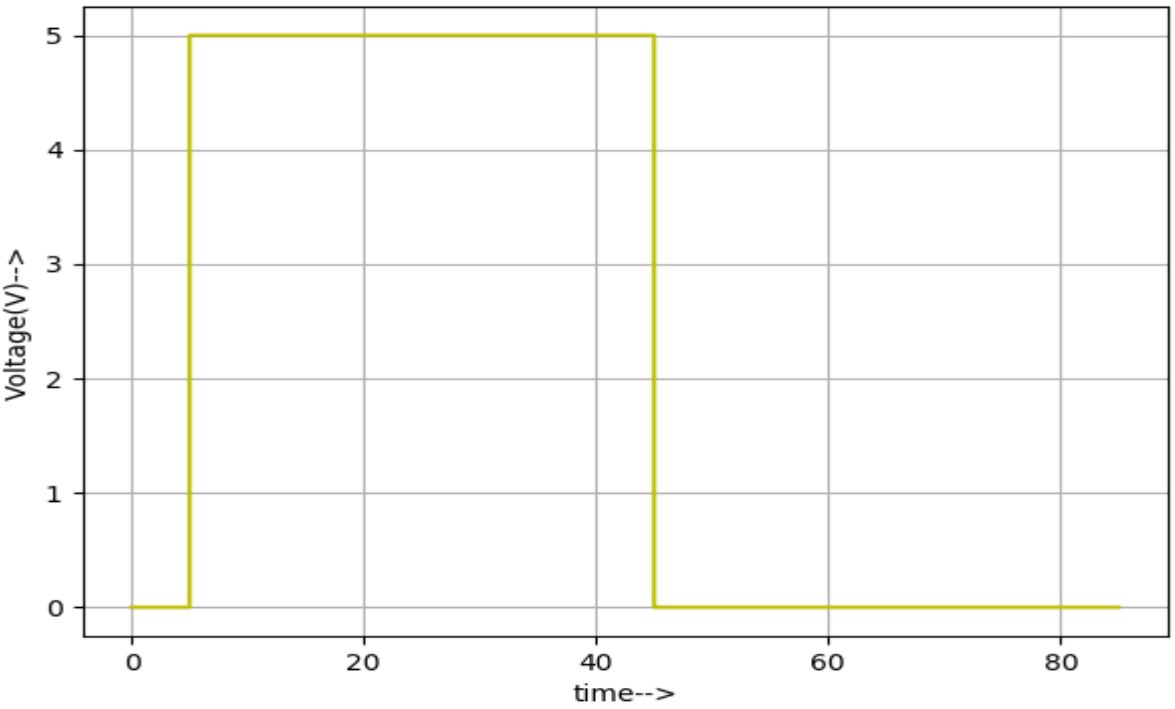
Q0 :-



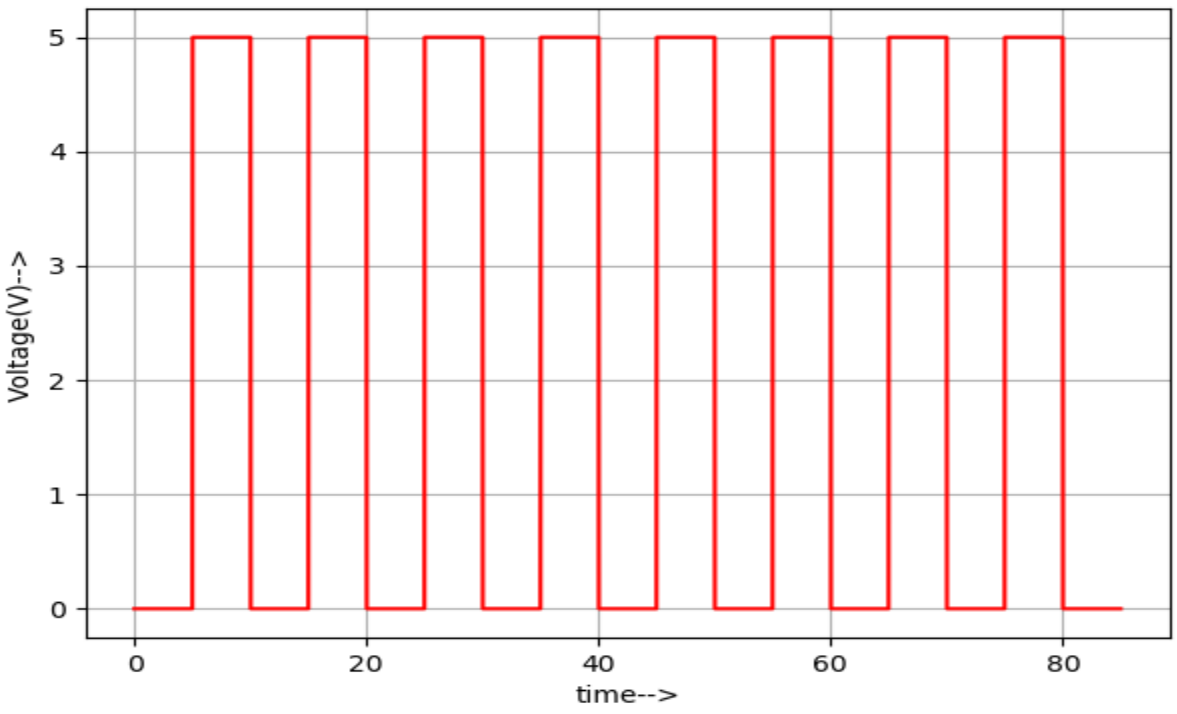
Q1 :-



Q2 :-


5
4
3
2
1
0
Voltage(V)-->
0
20
40
60
80
time-->

Clock :-


5
4
3
2
1
0
Voltage(V)-->
0
20
40
60
80
time-->

References:

https://www.petervis.com/dictionary-of-digital-terms/3-bit-down-counter/3-bit-binary-down-counter.html