CIRCUIT SIMULATION PROJECT

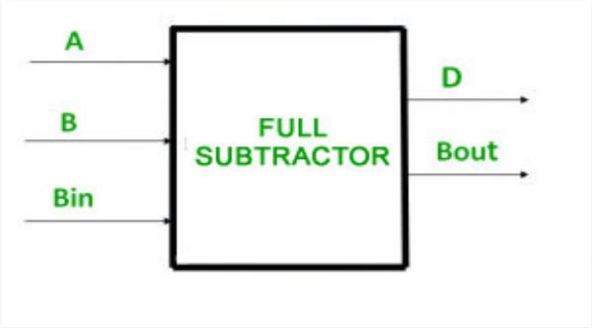
https://esim.fossee.in/circuit-simulation-project

Name of Participant: Ajith Suresh
Project Guide: Dr. Maheswari R

FULL SUBTRACTOR USING 3:8 DECODER

Theory:

A full subtractor is **a combinational circuit that performs subtraction of two bits**, one is minuend and other is subtrahend, taking into account borrow of the previous adjacent lower minuend bit. ... The three inputs A, B and Bin, denote the minuend, subtrahend, and previous borrow, respectively.

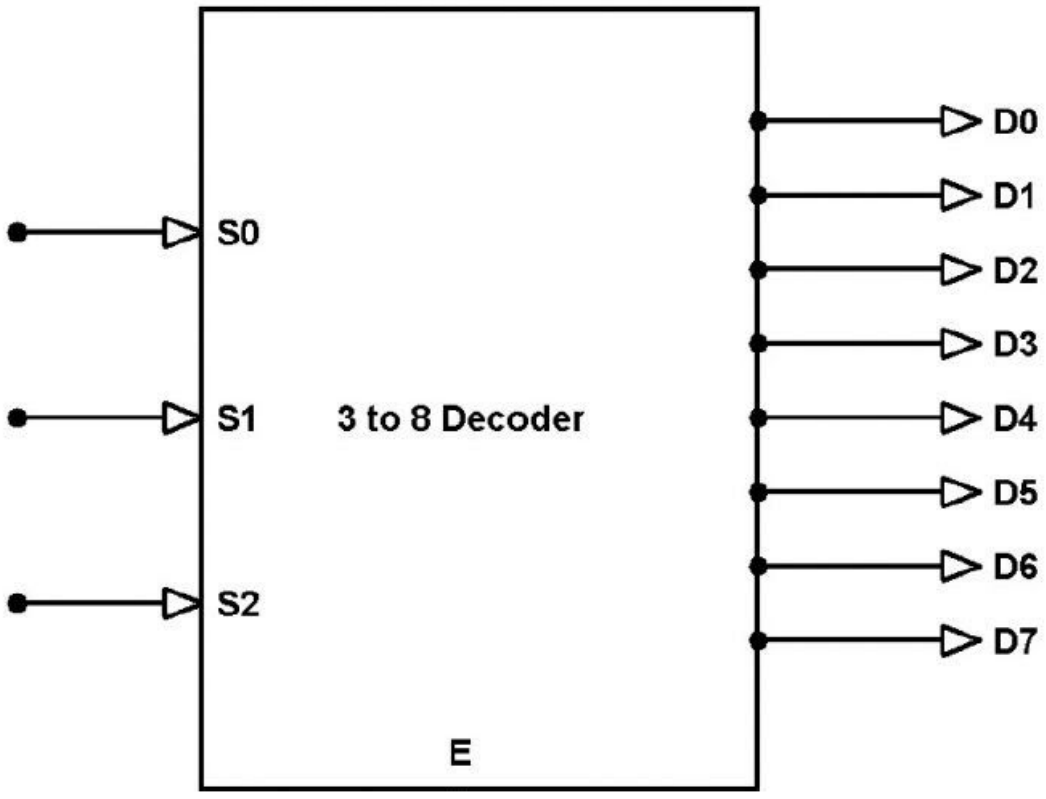


Truth Table –

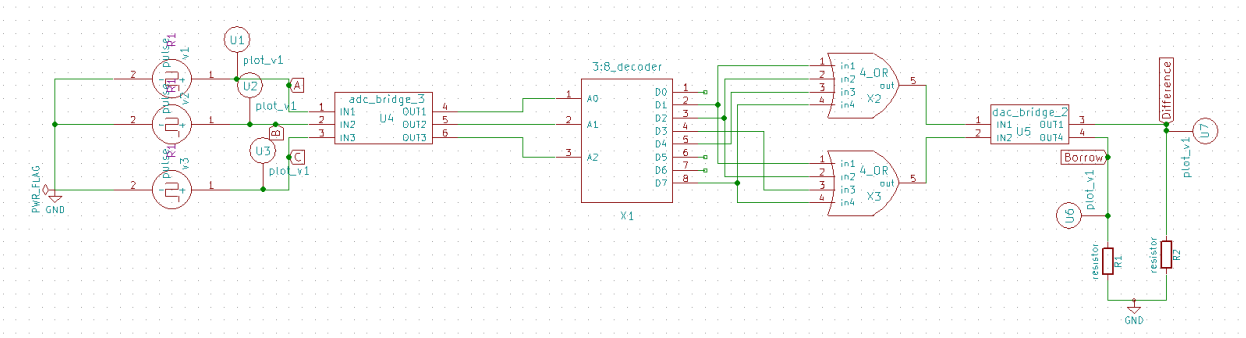
INPUT			OUTPUT	
A	B	Bin	D	Bout
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

Decoder - A decoder is a combinational logic circuit which is used to change the code into a set of signals. It is the reverse process of an encoder. A decoder circuit takes multiple inputs and gives multiple outputs. A decoder circuit takes binary data of 'n' inputs into '2_n' unique output

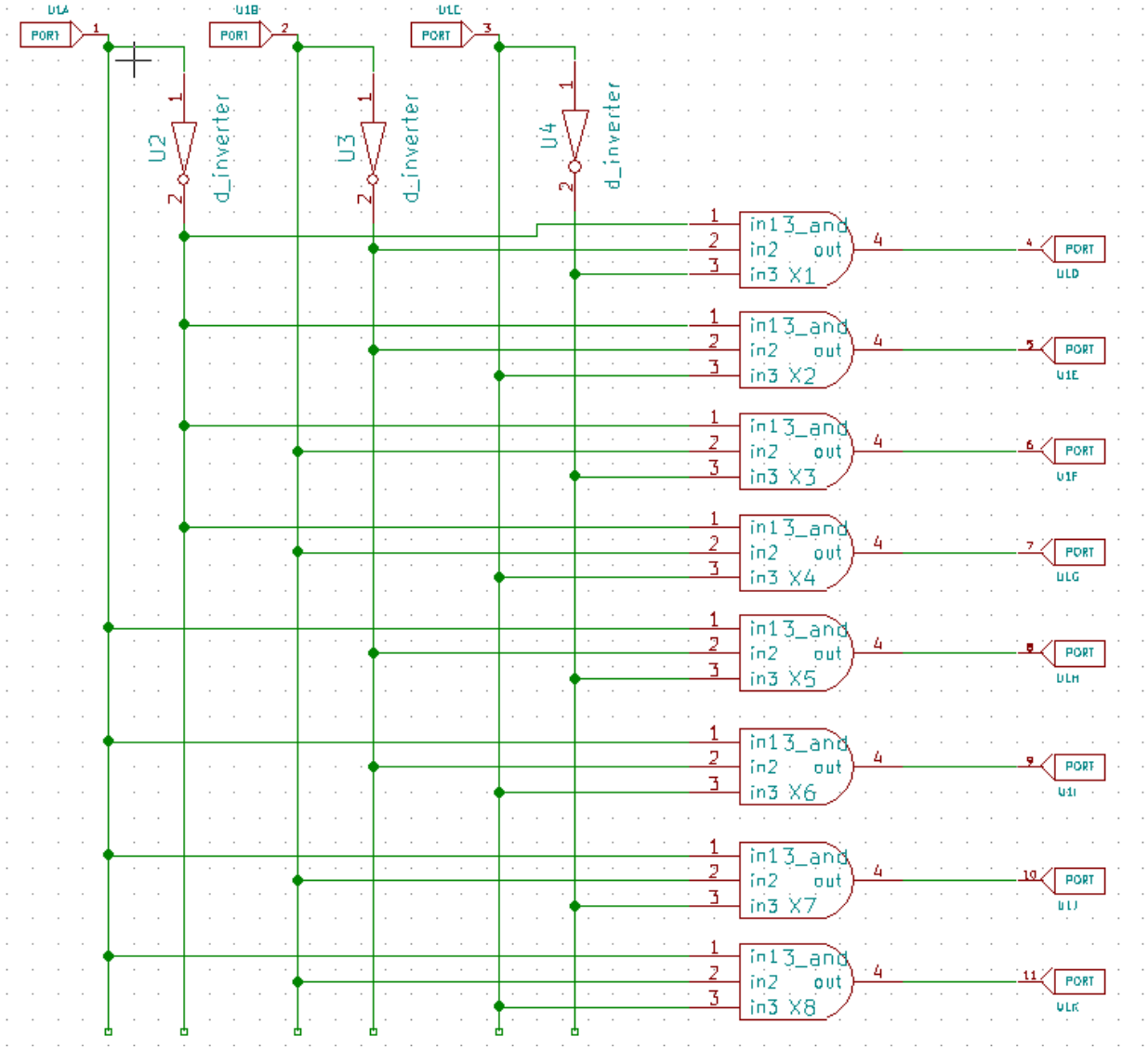
3 Line to 8 Line Decoder - This decoder circuit gives 8 logic outputs for 3 inputs. The circuit is designed with AND and OR logic gates. It takes 3 binary inputs and activates one of the eight outputs. 3 to 8 line decoder circuit is also called as binary to an octal decoder.



Circuit Diagram

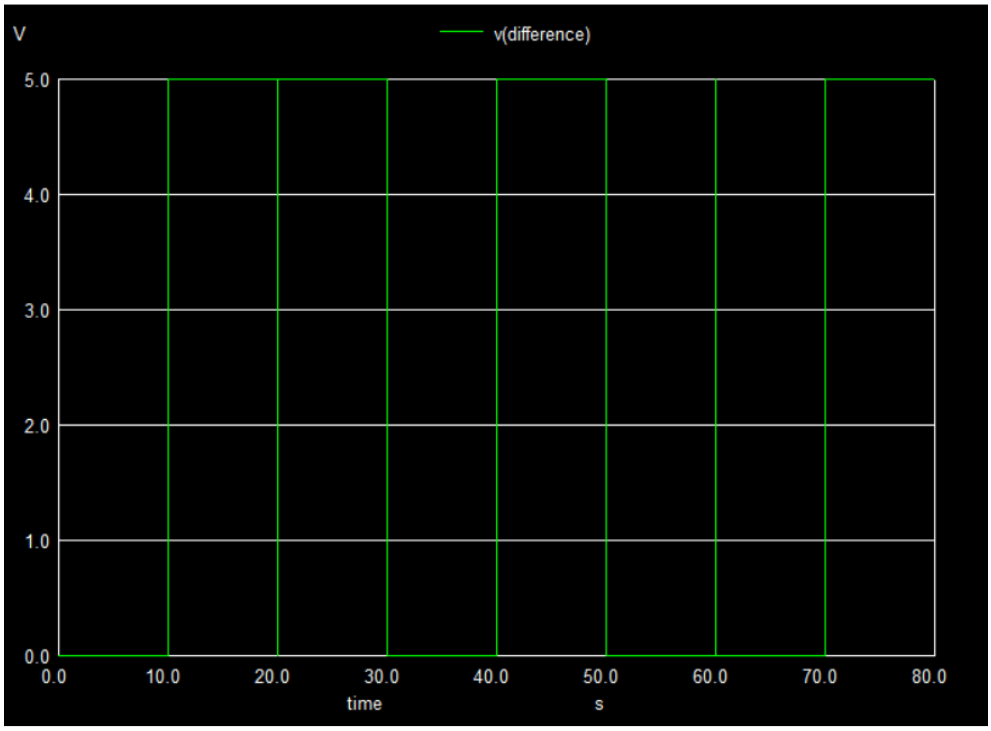


Subcircuit:

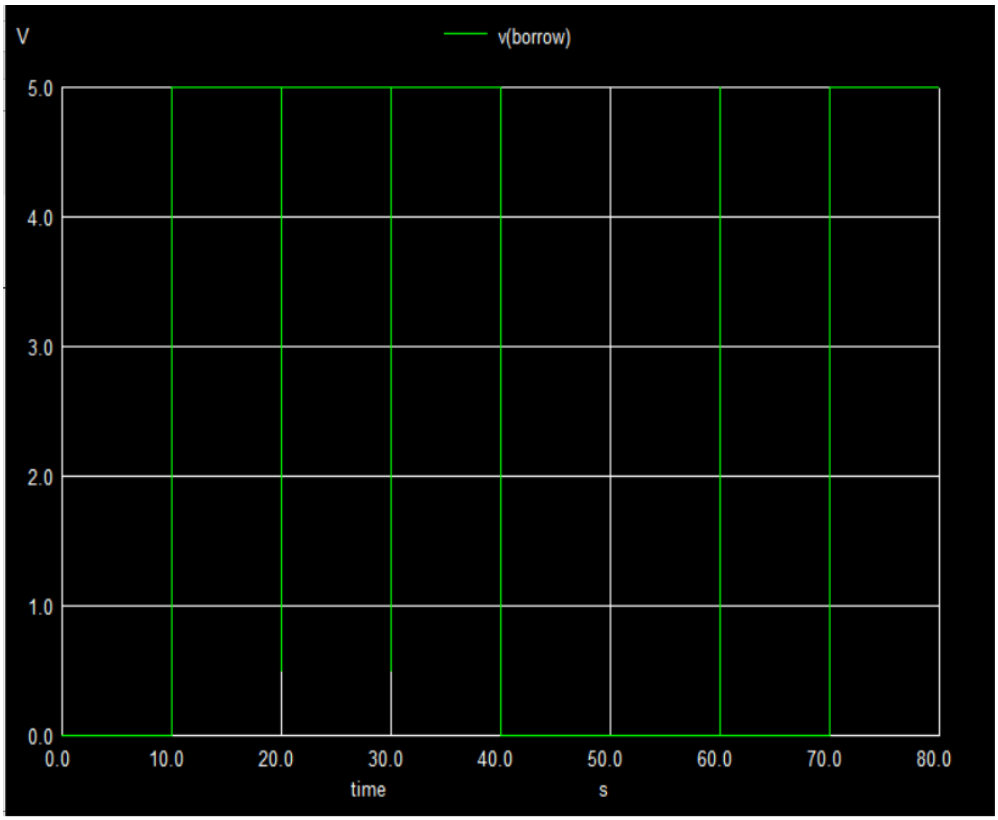


Waveforms:

Difference

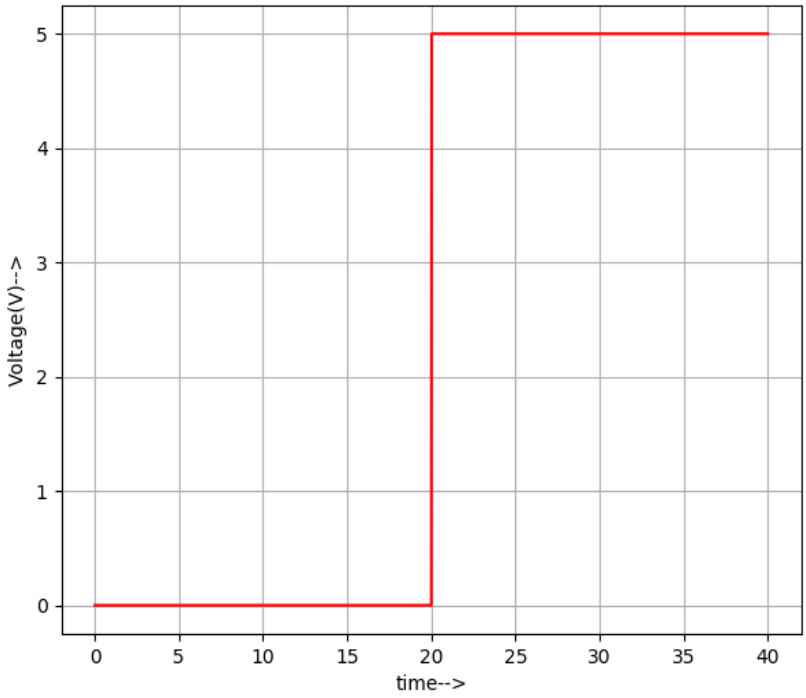


Borrow

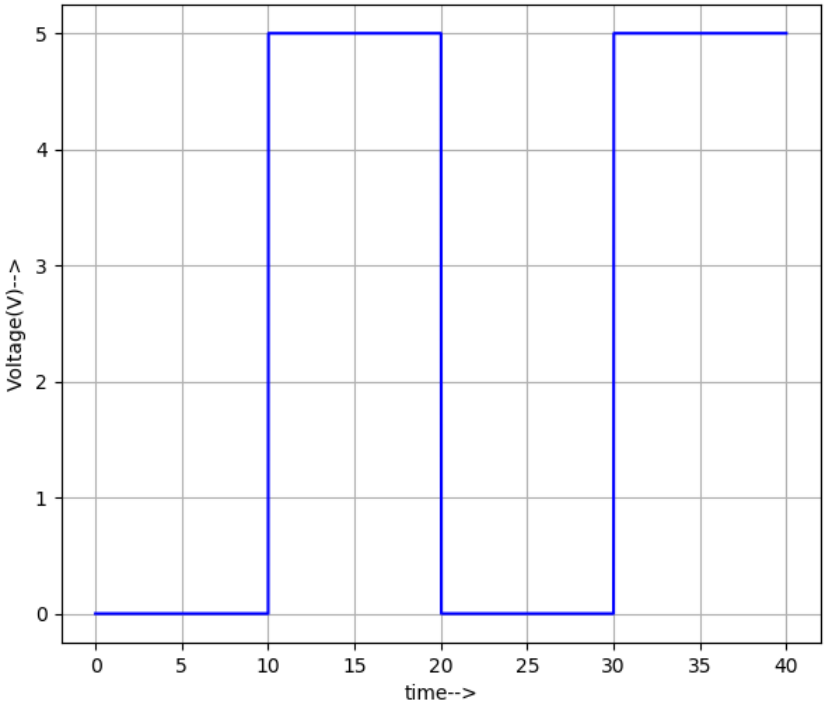


Python Plots:

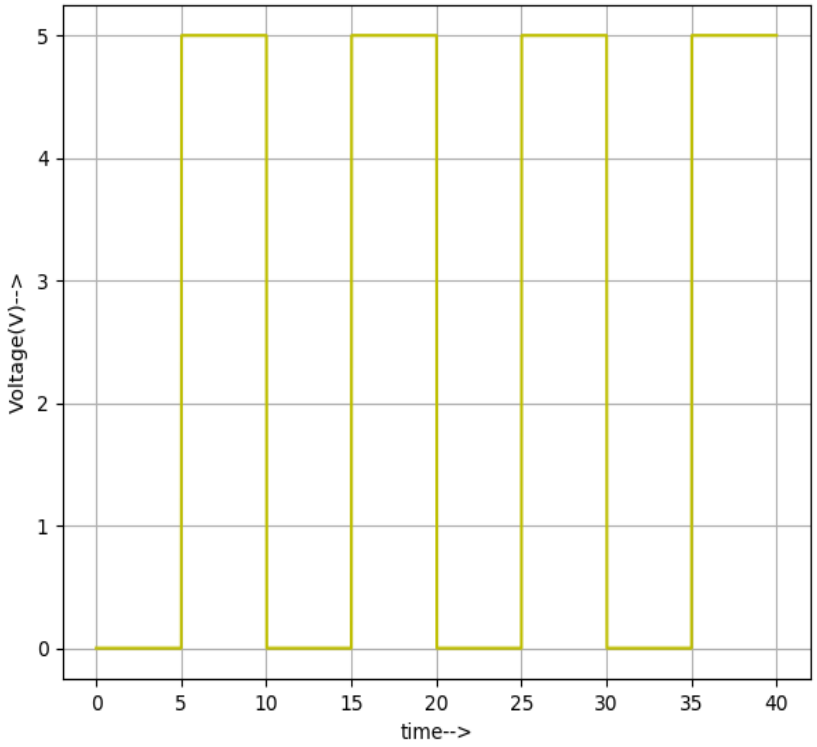
A:



B:

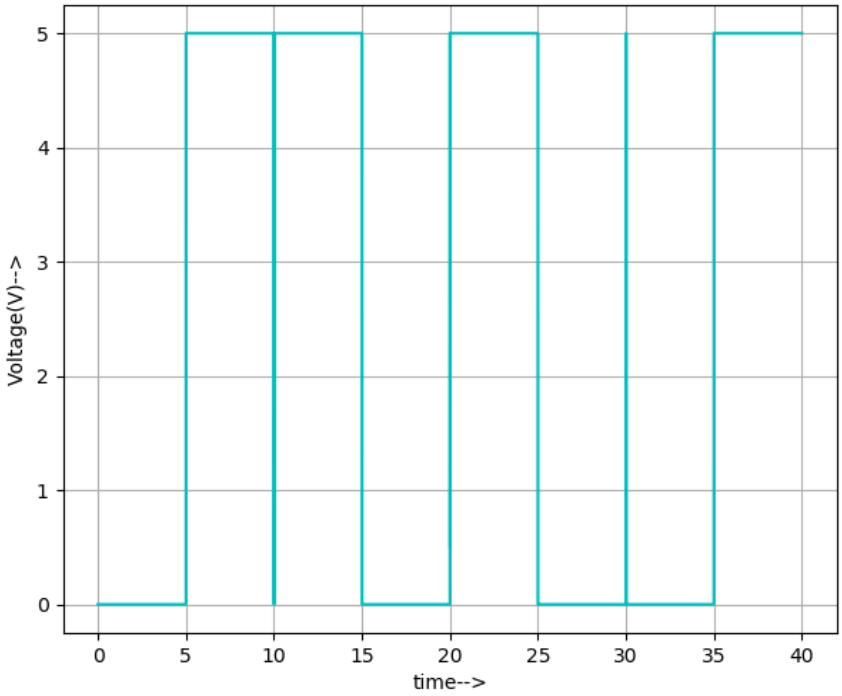


C:

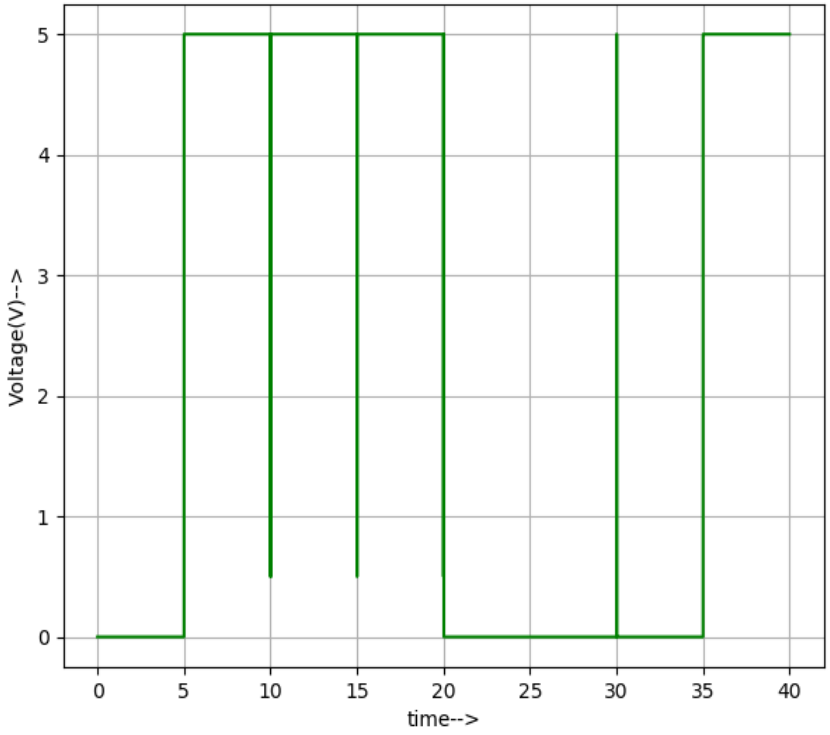


Output:

Difference



Borrow:



The required waveform for borrow and difference is same as truth table.

References

https://www.geeksforgeeks.org/full-subtractor-in-digital-logic/

https://www.electroniclinic.com/decoder-3-to-8-decoder-block-diagram-truth-table-and-logic-diagram/