Assignment 2 | FPGA Lab

Akhil Kumar Donka

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1 Question

Implementing given truth table logic on Arduino UNO board using platformio.

U	V	W	G
0	0	0	1
0	0	1	0
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	0
1	1	0	0
1	1	1	1

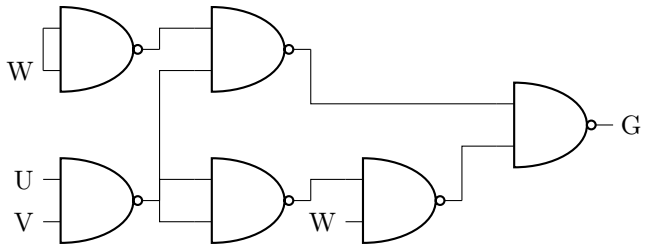
2 Solution

2.1 SOP Minimized Expression & NAND Logic Implementation

To implement it using NAND Logic, we first convert it into SOP form, which gives :

$$\overline{V}.\overline{W} + \overline{U}.\overline{W} + U.V.W$$
$$(\overline{V} + \overline{U}).\overline{W} + U.V.W$$
$$\overline{V.U}.\overline{W} + U.V.W$$

The last expression can be implemented using only NAND Gates.



2.2 Procedure

Arduino uno board requires firmware files to be flashed and the firmware files can be created using platformio environment. For this problem statement, iteratively binary numbers from 0 to 7 are passed to output function which contains logic for given truth table. At every delay of 1 second, new input is generated and input is passed to both output function as well as seven segment display function which contains logic for 7 segments of display.
Hex file is generated by compiling C code using platformio and then hex file is transferred from termux mobile environment to linux so that we can flash it onto arduino.