3 to 8 Decoder through AVR-GCC

Kukunuri Sampath Govardhan

CONTENTS

***Abstract*—This document shows how to use Arduino UNO as a 3 to 8 Decoder**

I. COMPONENTS

Component	Value	Qunatity
Resistor	220Ohm	8
LED	Red	8
Arduino	UNO	1
Jumper Wires	M-M	20
BreadBoard		1

TABLE I

II. HARDWARE

Problem 2.1 Make connections between the Arduino UNO and LED's as shown in Table 2

Problem 2.2 Connect anodes of LED's to the pins using resistors and cathodes to ground(gnd).

d2	d3	d4	d5	d6	d7	d8	d9
led1	led2	led3	led4	led5	led6	led7	led8

TABLE II

Problem 2.3 Connect the pins X, Y, Z to arduino as shown in Table 3.

X	Y	Z
d10	d11	d12

TABLE III
TRUTH TABLE

III. SOFTWARE

Problem 3.1 Now execute the following program and verify all the outputs as mentioned in Truth table (Table 4) by modifying the inputs X, Y, Z to 0's and 1's respectively.

wget https://github.com/mygit-sampath-govardhan/fwc-iith-assignments/blob/8bf678297ca6e7ab7dcf3929290591d789f59a4f/Assignment-3/Assignment3-code.c

Note: Output pins d2-d9 are referenced as A-H respectively and input pins d10-d12 are referred as X,Y,Z respectively.

X	Y	Z	A	B	C	D	E	F	G	H
0	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	1	0
0	1	0	0	0	0	0	0	1	0	0
0	1	1	0	0	0	0	1	0	0	0
1	0	0	0	0	0	1	0	0	0	0
1	0	1	0	0	1	0	0	0	0	0
1	1	0	0	1	0	0	0	0	0	0
1	1	1	1	0	0	0	0	0	0	0

TABLE IV
TRUTH TABLE

Solution : In the Truth table (Table3) X,Y,Z are inputs and A,B,C,D,E,F,G,H are outputs. This table represents the system that behaves as a 3 to 8 decoder. Using Boolean logic,

H= X' Y' Z'

G= X' Y' Z

F= X' Y Z'

E= X' Y Z

D= X Y' Z'

C= X Y' Z

B= X Y Z'

A= X Y Z

Here we can use same commands like DDR, PORT and many more which were used in Assembly and Ide.

IV. Conclusion

A 3 to 8 decoder has 3 inputs and 8 outputs are generated using these 3 inputs.

Here 3 to 8 decoder has been successfully verified.