# 3 to 8 Decoder through VAMAN ARM-GCC

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CONTENTS

*Abstract*—**This document shows how to use VAMAN Board as a 3 to 8 Decoder**

## I. COMPONENTS

| Component | Value | Qunatity |
|---|---|---|
| Resistor | 220Ohm | 8 |
| LED | Red | 8 |
| VAMAN Board | | 1 |
| Jumper Wires | M-F | 20 |
| BreadBoard | | 1 |

TABLE I

## II. HARDWARE

**Problem 2.1** Make connections between the Vaman Board(PYGMY) 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).

| IO_4 | IO_5 | IO_6 | IO_7 | IO_8 | IO_10 | IO_11 | IO_12 |
|---|---|---|---|---|---|---|---|
| led1 | led2 | led3 | led4 | led5 | led6 | led7 | led8 |

TABLE II

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

| X | Y | Z |
|---|---|---|
| IO_28 | IO_29 | IO_31 |

TABLE III

## 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/09f0300f7c4e978e90bd83b2fc8915eab9db8b98 /Assignment-9(ARM-3to8%20decoder)/codes/src/main.c

**Note:** Output pins IO_4-8,IO_10-12 are referenced as A-H respectively and input pins IO_28,29,31 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

## IV. 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,

$$A = X' \ Y' \ Z'$$

$$B = X' \ Y' \ Z$$

$$C = X' \ Y \ Z'$$

$$D = X' \ Y \ Z$$

$$E = X\ Y'\ Z'$$

$$F = X\ Y'\ Z$$

$$G = X\ Y\ Z'$$

$$H = X\ Y\ Z$$

## V. CONCLUSION

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

Here 3 to 8 decoder with Vaman Board has been successfully verified.