

# IMPLEMENTATION OF BOOLEAN LOGIC IN ARM

V.GOKULKUMAR

velicharlagokulkumar@gmail.com

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## Contents

1	Components	1
2	Implementation	1
3	Setup	1
3.1	The steps for implementation:	1

		YZ			
		00	01	11	10
X	0	1	1	1	1
	1	0	0	1	1

## Abstract

To Obtain the Boolean Expression for the Logic circuit shown below

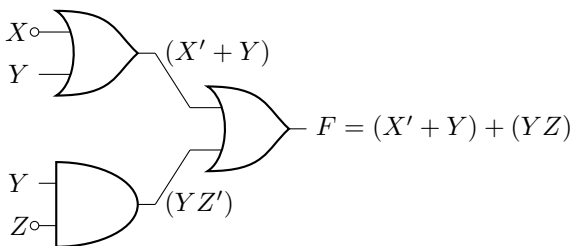


Fig. 1

## 1 Components

Components	Values	Quantity
Vaman Board		1
JumperWires	M-F	5
Breadboard		1
USB-C cable		1

## 2 Implementation

The truth table for Fig. 1 is available in Table-1 Using Boolean logic, output F in Table 1 can be expressed in terms of the inputs X, Y, Z as  $F = (X' + Y) + (YZ')$ .....(2.1)

X	Y	Z	F
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Table-1

Fig. 2

**Karnugh Map :** The expression in (2.1) can be minimized using the K-map in Fig 2. In Fig.2 ,the implicants in boxes 0,1,2,3 result in  $X'$  The implicants in boxes 2,3,6,7 result in  $Y$  Thus, after minimization using Fig. 2, (2.1) can be expressed as  $F = X' + Y$ .....(2.2). Verify the truth table for F in TABLE 1.

The code below realizes the Boolean logic for F in (2.2) using 5V,GND of Vaman Board  
2,4,6 GPIO Pins of Vaman Board are configured as input pins and the required Logic for X,Y,Z are drawn from 5V (Digital '1'),GND (Digital '0'). Built in led at 22nd pin will glow based on F satisfying the Table-1

[https://github.com/velicharlagokulkumar/FWC\\_module1/blob/main/arm/codes/src/main.c](https://github.com/velicharlagokulkumar/FWC_module1/blob/main/arm/codes/src/main.c)

## 3 Setup

1. Connect the Vaman to the Laptop through USB.
2. There is a button and an LED to the left of the USB port on the Vaman. There is another button to the right of the LED.
3. Press the right button first and immediately press the left button. The LED will be blinking green. The Vaman is now in bootloader mode.

### 3.1 The steps for implementation:

1. Login to termux-ubuntu on the android device and execute the following commands:  
Make sure that the required installation of pygmy-sdk had done prior executing below commands

```
proot--distro login debian
cd /data/data/com.termux/files/home/
mkdir arm
svn co https://github.com/velicharlagokulkumar/
FWC_module1/trunk/arm/codes
```

```
cd codes/GCC_Project  
make  
scp /data/data/com.termux/files/home/arm/codes/  
GCC_Project/output/bin/codes.bin  
usernameofpc@IPaddress:/home/username
```

Make sure that the appropriate username, IP address of the Laptop is given in the above command.

2. Now execute the following commands on the Laptop terminal

Make sure that required installation of programmer application and modification of bash file had done prior executing below command

```
bash flash.sh codes.bin
```

3. After finishing the process of flashing with the programmer application press the button to the right of the USB port to reset. Vaman is now flashed with our source code