IMPLEMENTATION OF BOOLEAN LOGIC IN VAMAN ESP

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Abstract

To Obtain the Boolean Expression for the Logic circuit shown below

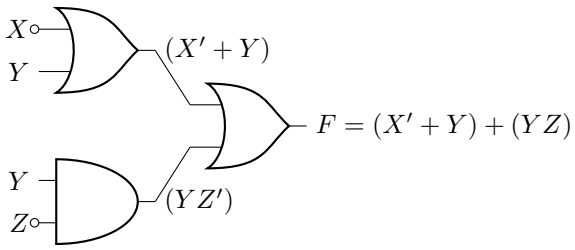

Fig. 1

1 Components

Components	Values	Quantity
Vaman Board		1
JumperWires	M-F	5
Breadboard		1
USB-C Cable		1
USB-UART		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)+(Y.Z').....(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

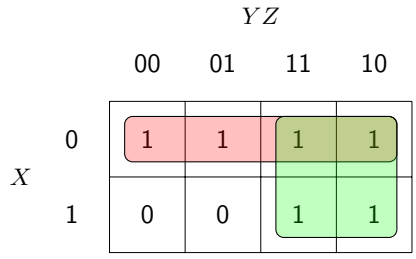

Fig. 2

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). 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 will glow based on F satisfying the Table-1

2.1 The steps for implementation:

1. Connect the USB-UART pins to the Vaman ESP32 pins according to Table

VAMAN LC PINS	UART PINS
GND	GND
ENB	ENB
TXD0	RXD
RXD0	TXD
0	IO0
5V	5V

2. Flash the following setup code through USB-UART using laptop

https://github.com/velicharlagokulkumar/FWC_module1/blob/main/iot/codes/setup/src/main.cpp

```
svn co https://github.com/velicharlagokulkumar/iot/
    trunk/codes/setup
cd setup
pio run
pio run -t upload
```

after entering your wifi username and password (in quotes below)

```
#define STASSID "..." // Add your network
    credentials
#define STAPSK "..."
```

in src/main.cpp file

3. You can notice that vaman will be connnected to the network credentials provided above.Connect your laptop to the same network ,You should be able to find the ip address of your vaman-esp on laptop using

```
ifconfig
nmap --sn 192.168.6.1/24
```

where your computer's ip address is the output of ifconfig and given by 192.168.6.x

4. Login to termux-ubuntu on the android device and execute the following commands:

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

5. Assuming that the username is gokul and password is gokulkumar2208, flash the following code wirelessly

```
https://github.com/velicharlagokulkumar/
FWC_module1/blob/main/iot/codes/src/main.
cpp
```

through

```
pio run
pio run --t nobuild --t upload ----upload--port
    ip_addres_of_esp
```

where you may replace the above ip address with the ip address of your vaman-esp.