

Assignment 2

Tarun Sriteja Adipe

FPGA Assignment-2

1 Introduction

We have to perform the problem presented in Assignment-1 on arduino and verify the output.

2 Code

```
#include <Arduino.h>

unsigned char num ; //input number
unsigned char _X=0x00,_P=0x00,_Q=0x00,_R=0x00; //binary inputs
unsigned char one = 0x01;
unsigned char Out; //outputs
char buffer[40];

void disp_num(unsigned char A, unsigned char B, unsigned char C, unsigned char D){
// A = 0;
    unsigned char a,b,c,d,e,f,g;
    a = ~( ((A)&(~B)&(~C)) | ((~A)&(B)&(D)) | ((A)&(~D)) | ((~A)&(C)) | ((B)&(C)) | ((~B)&(D)) );
    b = ~( ((~A)&(~C)&(~D)) | ((~A)&(C)&(D)) | ((A)&(~C)&(D)) | ((~B)&(~C)) | ((~B)&(~D)) );
    c = ~( ((~B)&(~C)) | ((~A)&(D)) | ((D)&(~C)) | ((~A)&(B)) | ((A)&(~B)) );
    d = ~( ((~A)&(~B)&(~D)) | ((~B)&(C)&(D)) | ((B)&(~C)&(D)) | ((B)&(C)&(~D)) | ((A)&(~C)) );
    e = ~( ((~D)&(~B)) | ((C)&(~D)) | ((A)&(C)) | ((A)&(B)) );
    f = ~( ((~A)&(B)) | ((~C)&(~D)) | ((B)&(~D)) | ((A)&(~B)) | ((A)&(C)) );
    g = ~( ((~A)&(B)&(~C)) | ((C)&(~B)) | ((C)&(~D)) | ((A)&(~B)) | ((A)&(D)) );

    digitalWrite(2,one&a);
    digitalWrite(3,one&b);
    digitalWrite(4,one&c);
    digitalWrite(5,one&d);
    digitalWrite(6,one&e);
    digitalWrite(7,one&f);
    digitalWrite(8,one&g);
}
```

```

}

void setup() {
    pinMode(2,OUTPUT);    //a
    pinMode(3,OUTPUT);    //b
    pinMode(4,OUTPUT);    //c
    pinMode(5,OUTPUT);    //d
    pinMode(6,OUTPUT);    //e
    pinMode(7,OUTPUT);    //f
    pinMode(8,OUTPUT);    //g
    pinMode(13,OUTPUT);   //output
}

unsigned char NOR(unsigned char X, unsigned char Y){ return ~(X|Y); } //NOR function

unsigned char Output(unsigned char X, unsigned char Y, unsigned char z){ return ~((~(Y|Z)&X)|X); }

void loop() {

    for (num = 0x00; num<0x10; num++){
        //loop to iterate through all usecases
        delay(1000);

        _P = num>>2;    _Q = num>>1;    _R = num>>0; //changing the inputs , D is LSB
        disp_num(_X, _P, _Q, _R);
        Out = Output(_P, _Q, _R);           //NAND gate equivalent Boolean Function

        digitalWrite(13,one&Out); //Output Org, Nor
    }
}

```

3 Result

The assignment has been completed and verified.