Assignment 2

ANNU,EE21RESCH01010

FPGA Assignment-2

1 Introduction

We have to perform the problem presented in Assignment-1 on arduino and verify the output. **Draw the truth table for the inputs nd outputs given above and write POS expressions for it**

2 SOLUTION

A	B	C	D	X
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	0
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	0
1	1	0	0	1
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

Table 1: Truth Table

3 Code

```
#include<Arduino.h>
#define A 2
#define B 3
#define C 4
#define D 5
#define NAND_OUTPUT 12

//defining Variables

int a , b, c ,d , kmap_output , nand_output, temp1,temp2;

//Function for NAND

int NAND(int i1 , int i2)
{
        return !(i1 && i2);
}
int NAND2(int i1,int i2,int i3)
{
        return !(i1 && i2 && i3);
}


void setup() {
  pinMode(LED_BUILTIN,OUTPUT);
  pinMode(NAND_OUTPUT,OUTPUT);
  pinMode(A,INPUT);
  pinMode(B,INPUT);
  pinMode(C,INPUT);
  pinMode(D,INPUT);


  // put your setup code here, to run once:
}

void loop() {
        a = digitalRead(A);
        b = digitalRead(B);
        c = digitalRead(C);
        d = digitalRead(D);

        kmap_output = ((a||d)&&((~a)||b)&&((~b)||(~c))&&(b||c||(a))&&(a||c||(~d)));
```

```
        //temp1=NAND(NAND(a,b),(!c));
       //temp2=NAND(NAND((!a),(!b)),NAND(c,d));
        //nand_output = NAND(temp1,temp2);
nand_output=NAND(NAND(NAND(A,B),NAND2((!A),C,D)),NAND(B,D));

        if (kmap_output ==1)
                digitalWrite(LED_BUILTIN,HIGH);
        else
                digitalWrite(LED_BUILTIN, LOW);
        if(nand_output ==1)
                digitalWrite(NAND_OUTPUT, HIGH);
        else
                digitalWrite(NAND_OUTPUT,LOW);
}
```

4 Result

The assignment has been completed and truth table isverified.