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Boolean Expression to its simplest form using K-map

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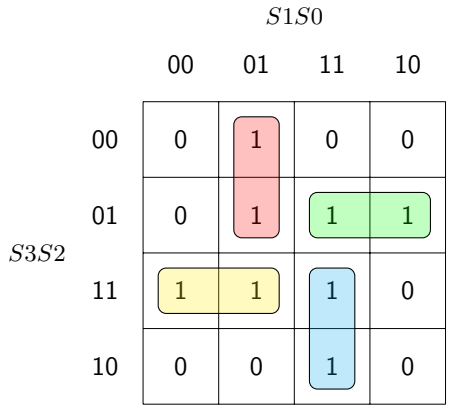
Contents

1 Introduction

K maps are used to Simplify Boolean Expressions. The given Expression to solve is F(S3,S2,S1,S0)=(1,5,6,7,11,12,13,15)

2 karnaugh-map



Y=S0S1'S3'+S1S2S3'+S1'S2S3+S0S1S3

3 Components

Component	value	quantity
Resistor	220 ohm	1
Arduino	UNO	1
LED		1
Bread board		1
Jumper wires	M-M	10

Table 1:

4 Truth table for given expression

S3	S2	S1	S0	Y
0	0	0	0	0
0	0	0	1	1
0	0	1	0	0
0	0	1	1	0
0	1	0	0	0
0	1	0	1	1
0	1	1	0	1
0	1	1	1	1
1	0	0	0	0
1	0	0	1	0
1	0	1	0	0
1	0	1	1	1
1	1	0	0	1
1	1	0	1	1
1	1	1	0	0
1	1	1	1	1

Table 2:

5 Connections and results

Also make connections to arduino UNO ,led and inputs based on table3.

Arduino UNO	5	4	3	2	8	gnd
Input	S3	S2	S1	S0		
led					+	-

Table 3:

Sample input	S3	S2	S1	S0	LED
1	0	0	0	0	OFF
2	0	0	0	1	ON

Table 4:

5.1 Code Link:

https://github.com/19pa1a0405/sai1729/blob/main/assignment1(asm)/assembly.asm

6 Logic Circuit

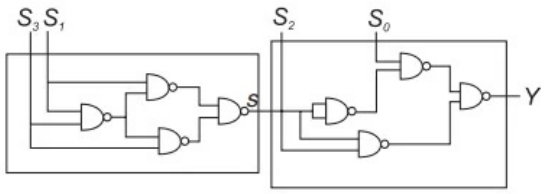


Figure 1: Logic circuit using four 2-input NAND gates