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### **ASSIGNMENT-1**

# 0.1 Question-2013 Section D Q6(d)

Obtain the Minimal Form for the Boolean Expression: H(P,Q,R,S)= $\sum (0,1,2,3,5,7,8,9,10,14,15)$ 

#### 0.2 Contents

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Abstract- This manual shows the Boolean Logic for the given minterms using k-map

## 0.3 Components

Component	Value	Quantity
Resistor	220 Ohm	1
Arduino	UNO	1
Jumper Wires	M-M	20
Breadboard		1

Table 3.0

### 0.4 Hardware

- 1.Make connections with arduino pins which are declared as the input and output pins. 2.Connect the output pin to the Resistor and the LED.
- 3. When the input is given from the bread board then the LED glows accordingly.
- 4.In this we used the number 5 as an input to the Arduino and that would give the output as 1 so the LED starts blinking and when the input is changes there will be change in the state of LED.

P	Q	R	S	Н
0	0	0	0	1
0	0	0	1	1
0	0	1	0	1
0	0	1	1	1
0	1	0	0	0
0	1	0	1	1
0	1	1	0	0
0	1	1	1	1
1	0	0	0	1
1	0	0	1	1
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	1
1	1	1	1	1

Roll No.: FWC22037

Table 5.0

- 1. The following K-map is obtained from the above truth table.
- $2.\mathrm{As}$  we have Four Variables we obtain a 16 cell K-Map

PQ	S 00	01	11	10
00	1	1	1	1
01	0	1	1	0
11	0	0	1	1
10	1	1	0	1

Table 5.1

3. Now we do grouping to obtain the minimal expression using the K-Map.

#### 0.5 Solution

Truth Table

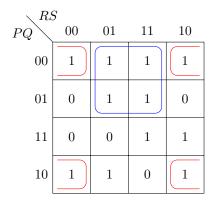


Table 5.2

The minterm expression for the two groupings are  $\overline{QS}$  and  $\overline{P}\mathrm{S}$ 

and i				
PQ	S 00	01	11	10
00	1	1	1	1
01	0	1	1	0
11	0	0	1	1
10	1	1	0	1

Table 5.3

The minterm expression for the two groupings are PQR and  ${\rm P}\overline{QR}$ 

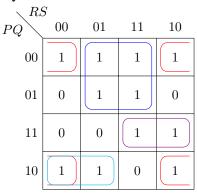


Table 5.4

The Minimal expression is

 $\mathbf{H} = \overline{QS} + \overline{P}\mathbf{S} + \mathbf{PQR} + \mathbf{P}\overline{QR}\mathbf{S}$ 

 $4.\mbox{Download}$  the code from the given link and upload to the Arduino.

https://github.com/siva-gayathri/FWC/blob/main/assignment-1/avrgcc/codes/main.c

- $5.\mathrm{Go}$  to the working directory execute pio run and pio run -t upload.
- 6. Whenever you change the inputs you will see the respective output.