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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

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.

0.5 Solution

Truth Table

P	Q	R	S	H
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

Table 5.0

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

PQ \ RS	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.

PQ \ RS	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 5.2

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

PQ \ RS	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 P$\overline{QR}$

PQ \ RS	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 5.4

The Minimal expression is

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

4.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.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.