

Assignment-1

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Abstract

Reduce the following Boolean Expression to its simplest form using K-Map : $E(U,V,Z,W) = (2, 3, 6, 8, 9, 10, 11, 12, 13)$

1 Components

| Components | Value | Quantity |
|-----------------------|---------|----------|
| Arduino | UNO | 1 |
| seven segment display | - | 1 |
| Jumper wires | M-M | 18 |
| Breadboard | | 1 |
| Resister | 150 ohm | 1 |
| Decoder | 7447 | 1 |

2 K-Map

From the given data the minterms are 2,3,6,8,9,10,11,12,13.

| ZY \ XW | 00 01 11 10 | | | |
|---------|-------------|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | 0 | 0 | 1 | 1 |
| 01 | 0 | 0 | 0 | 1 |
| 11 | 1 | 1 | 0 | 0 |
| 10 | 1 | 1 | 1 | 1 |

The minimized expression is $E = (UZ' + V'Z + U'ZW')$

| ZY \ XW | 00 01 11 10 | | | |
|---------|-------------|----|----|----|
| | 00 | 01 | 11 | 10 |
| 00 | 0 | 0 | 1 | 1 |
| 01 | 0 | 0 | 0 | 1 |
| 11 | 1 | 1 | 0 | 0 |
| 10 | 1 | 1 | 1 | 1 |

3 HardwareConnections

*Make the connections as shown in the Figure3 and Figure4.

*Connect COM pin of seven segment display to Vcc through Resister and Dot pin to ground.

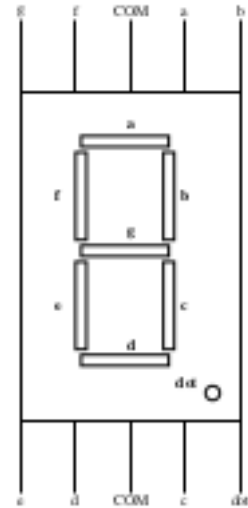


Figure 1: Seven segment display



Figure 2: Pin diagram of 7447IC

| 7447 | \bar{a} | \bar{b} | \bar{c} | \bar{d} | \bar{e} | \bar{f} | \bar{g} |
|---------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Display | a | b | c | d | e | f | g |

Figure 3:

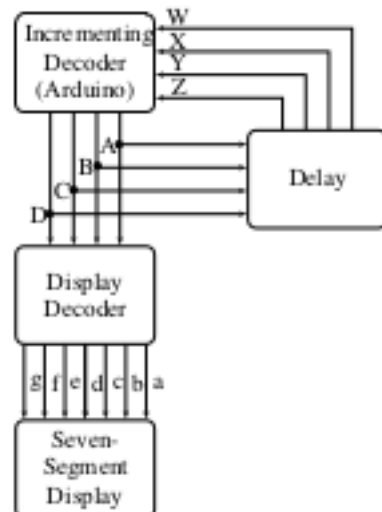


Figure 4:

| U | V | Z | W | E |
|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 |
| 0 | 0 | 0 | 1 | 0 |
| 0 | 0 | 1 | 0 | 1 |
| 0 | 0 | 1 | 1 | 1 |
| 0 | 1 | 0 | 0 | 0 |
| 0 | 1 | 0 | 1 | 0 |
| 0 | 1 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 | 0 |
| 1 | 0 | 0 | 0 | 1 |
| 1 | 0 | 0 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 |
| 1 | 0 | 1 | 1 | 1 |
| 1 | 1 | 0 | 0 | 1 |
| 1 | 1 | 0 | 1 | 1 |
| 1 | 1 | 1 | 0 | 0 |
| 1 | 1 | 1 | 1 | 0 |

Truth Table

4 Execution

*Verify the above truth table by using the minimized expression in the following code.

https://github.com/gowripriya-2002/FWC/blob/main/main.cpp