

IDE assignment

dunna vamsi

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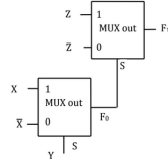


Figure 1: Multiplexer

Problem Statemet-The figure below shows a muliplexer where S is the select lines,z to \bar{z} are the input lines and $F(x,y,z)$ is the O/P.The objective is to find the boolean expression for output F as function of inputs x,y,z using K-map and implementing the logic of multiplexer using Arduino uno

1 Components

Component	Value	Count
Arduino	Uno	1
LED	Red	1
Resistor	220 Ohm	1
Jumper Wires	-	as-required

2 Connections

- Connect LED to pin 13 of Arduino with the 220ohm resistor in series
- Connect 5v and ground points from Arduino to extreme ends of bread board
- Use D2,D3,D4 pins of Arduino as inputs(x,y,z) referred in Fig.1. and D13 as output(F)

3 Truth table

x	y	z	\bar{x}	\bar{y}	\bar{z}	$z + x + \bar{y}$
0	0	0	1	1	1	0
0	0	1	1	1	0	1
0	1	0	1	0	1	1
0	1	1	1	0	0	0
1	0	0	0	1	1	1
1	0	1	0	1	0	0
1	1	0	0	0	1	0
1	1	1	0	0	0	1

$$z + (\bar{x} + \bar{y})$$

Minimization using kmap

		<i>yz</i>			
		00	01	11	10
<i>x</i>	0	0	1	0	0
	1	0	1	1	1

Boolean expression

The boolean expression for **F** is

$$F = xy + \neg(xy)$$

$$F = \neg x + y$$

$$F1 = zs + \neg(zs)$$

$$F1 = \neg z + s$$

$$F1 = \neg(z + \neg(x + y))$$

Software

Make the connections and connect the arduino the PC via USB. In the location of choice, type the below commands

1. <https://github.com/dunnvamsi/FWC/tree/main/IDEassignment/code>
2. `cd code`
3. `pio run`
4. `pio run t upload`