

IDE assignment

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November 2022

Problem Statemet-The figure below shows a multiplexer where S0 and S1 are the select lines,I0 to I3 are the input lines,EN is the enable line,and F(P,Q,R) is the O/P.The objective is to find the boolean expression for output F as function of inputs P,Q,R using K-map and implementing the logic of multiplexer using Arduino uno

- Use D2,D3,D4 pins of Arduino as inputs(P,Q,R points) referred in Fig.1. and D13 as output(F)

Truth table

P	Q	R	F
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	1
1	1	0	1
1	1	1	1

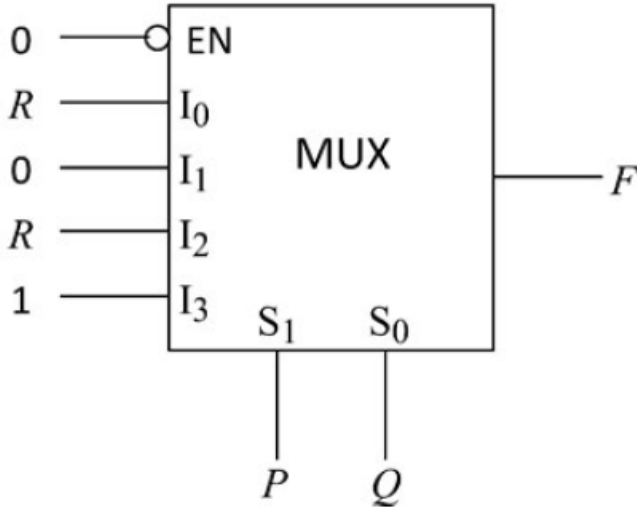


Figure 1: Multiplexer

Minimization using kmap

P \ QR	QR			
	00	01	11	10
0	0	1	0	0
1	0	1	1	1

Boolean expression

The boolean expression for **F** is

$$F = Q'R + PR + PQ$$

$$F = Q'R + PR(Q + Q') + PQ$$

$$F = Q'R + PRQ + PRQ' + PQ$$

$$F = Q'R(1 + P) + PQ(1 + R)$$

$$F = PQ + Q'R$$

Hardware

Components

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

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

Software

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

1. `svn co https://github.com/drshyamou/Arduino_ide/trunk/ide_assignment/code`
2. `cd code`
3. `pio run`
4. `pio run t upload`