Avr-gcc assignment

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***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**

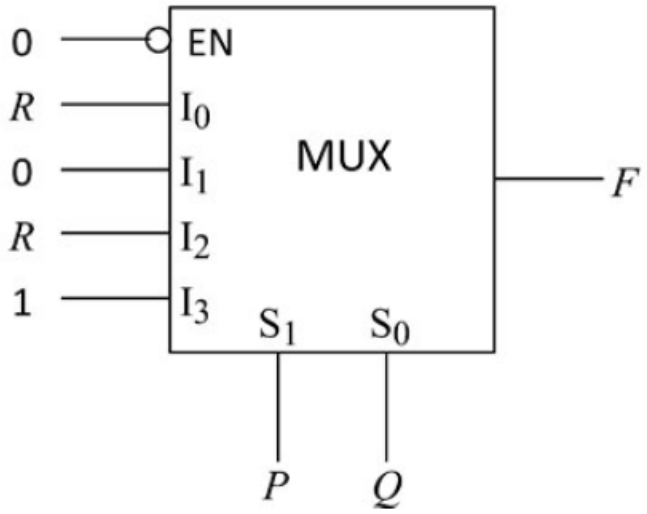

Figure 1: Multiplexer

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
- 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

Minimization using kmap

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

Boolean expression

The boolean expression for **F** is

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

Software

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

1. svn co https://github.com/drshyam-ou/avr-gcc/trunk/assignment/code
2. cd code
3. make
4. pio run t upload