ASSIGNMENT

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Contents

1 Problem

Q.35. If $X = X_1X_0$ and $Y = Y_1Y_0$ are 2-bit binary numbers. The Boolean function S that satisfies the condition "If $X>Y$, then $S = 1$", in its minimized form, is ?

1. $X_1Y_1+X_0Y_0$
2. $X_1\overline{Y_1} + X_0\overline{Y_0Y_1} + X_0\overline{Y_0}X_1$
3. $X_1\overline{Y_1}X_0\overline{Y_0}$
4. $X_1Y_1 + X_0\overline{Y_0}Y_1 + X_0\overline{Y_0X_1}$

2 Components

Component	**Values**	**Quantity**
ArduinoUNO		1
JumperWires	M-M	6
Breadboard		1
LED		5
Resistor	220ohms	5

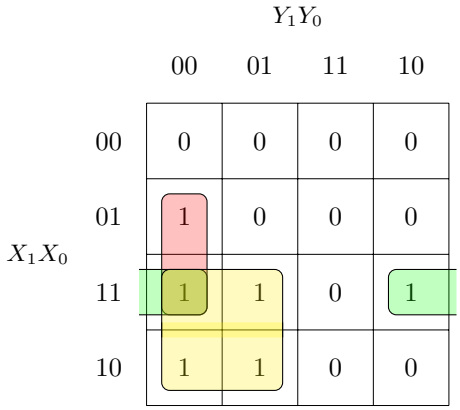
3 Reduction of logical circuit

$X = X_1X_0$ $Y = Y_1Y_0$
The boolean function S that satisfies the condition, if X >Y, then $S = 1$.
We can represent the above condition through a truth table.

X X_1X_0	Y Y_1Y_0	S $X>Y$
0 0	0 0	0
0 0	0 1	0
0 0	1 0	0
0 0	1 1	0
0 1	0 0	1
0 1	0 1	0
0 1	1 0	0
0 1	1 1	0
1 0	0 0	1
1 0	0 1	1
1 0	1 0	0
1 0	1 1	0
1 1	0 0	1
1 1	0 1	1
1 1	1 0	1
1 1	1 1	0

Table 1: TRUTH TABLE FOR $S = X>$Y

By using k-maps, we can find the bolean expression for the condition, $S = 1$ if, $X>Y$



Minimized form: $S = X_1\overline{Y_1} + X_1X_0\overline{Y_0} + X_0\overline{Y_1}\ \overline{Y_0}$

4 Implementation

arduino		output
2	resistor	led 1 (X_1)
3	resistor	led 2 (X_0)
4	resistor	led 3 (Y_1)
5	resistor	led 4 (Y_0)
8	resistor	led 5 (S)

Table 2:

5 Procedure

1. Connect the circuit as per the above table.
2. The leds 1,2,3,4 represent the values of X_1,X_0,Y_1 and Y_0 respectively.
3. The led 5 represent S. if the condition $X > Y$ is true.
4. Execute the circuits using the below code.

https://github.com/saikiran-1309/FWC/blob/main/in-gate-2019-35/code/src/comp.cpp