ASSIGNMENT

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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. $X_1Y_1 + X_0\overline{Y_0}Y_1 + X_0\overline{Y_0}X_1$

2 Components

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

3 Reduction of logical circuit

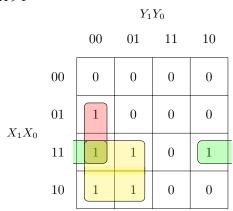
$$X = X_1 X_0 \ Y = Y_1 Y_0$$

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	Y	S
X_1X_0	Y_1Y_0	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	$\det 2 (X_0)$
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