IMPLEMENTATION OF LOGIC EXPRESSION WITH ARDUINO

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Abstract

Q.36 If $X = 1$ in the logic equation $[x + Z(\overline{Y} + (\overline{Z} + XY)\overline{\ })](\overline{X} + Z(\overline{X} + Y))) = 1$,

then:

(A) $Y = Z$

(B) $Y = \overline{Z}$

(C) $Z = 1$

(D) $Z = 0$

Truth Table for $f = \overline{Z}(1 + Y)$

	Z	$\overline{Z}$	Y	$1 + Y$	$f = \overline{Z}(1+Y)$
	0	1	0	1	1
	1	0	1	1	0
	0	1	0	1	1
	1	0	1	1	0

Components

Component	Value	Quantity
ArduinoBoard	– M-F – – – –	1 10 2 1 1
JumperWires	220Ω,10kΩ	1 1,2
PushButtons		
Breadboard		
USBCable		
LED		
Resistors		

Setup

1. Connect push button for Y to D2 with a 10kΩ pull-down resistor to GND.
2. Connect push button for Z to D3 with a 10kΩ pull-down resistor to GND.
3. Connect LED anode to D13 through a 220Ω resistor, and cathode to GND.
4. Upload the Arduino code that reads Y and Z, sets X = 1, evaluates logic, and controls the LED.
5. Power the Arduino using a USB cable or external 5V source to run the circuit.

Implementation

1. Set X = 1 directly in the Arduino code.
2. Read Y from digital pin D2 and Z from D3 using digitalRead().
3. Compute notZ = !Z to evaluate the simplified logic expression.
4. Use the result (notZ) to control the LED with digitalWrite(13, result).
5. Continuously run the logic in the loop() function to respond to input changes.