IMPLEMENTATION OF 2-INPUT AND XOR LOGIC ON ARDUINO

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Question

What are the minimum number of 2-to-1 multiplexers required to generate a 2-input AND gate and a 2-input Ex-OR gate?

(A) 1 and 2

(B) 1 and 3

(C) 1 and 1

(D) 2 and 2

Components

Component	Value	Quantity
ArduinoBoard	–	
JumperWires	M-F	1 10 2 1 1
PushButtons	–	1 1 1,2
Breadboard	–	
USBCable	–	
LED(Optional)	–	
7-SegmentDisplay	CommonCathode	
Resistors	220Ω,10kΩ	

Truth Table for 2-input AND and XOR using MUX

A	B	AND(A·B)	XOR (A ⊕ B)
0	0	0	0
0	1	0	1
1	0	0	1
1	1	1	0

Setup

1. Connect two push buttons to digital pins D2 and D3 with 10kΩ pull-down resistors as inputs A and B.

2. Connect a common cathode 7-segment display to Arduino digital pins D4–D10 for segments a–g.

3. Write code to read button states using digitalRead(D2) and digitalRead(D3).

4. Use logic to calculate A AND B and A XOR B and store results.

5. Display AND output on one digit and XOR output on another using segment encoding.

Implementation

1. Define input pins for push buttons A and B and output pins for 7-segment display segments.

2. Initialize all pin modes in setup() using pinMode() for inputs and outputs.

3. Read button values using digitalRead() and store them in variables a and b.

4. Compute $andresult = a \& b$ and $xor\ result = a \wedge b$.

5. Use digitalWrite() to display andresult and xorresult on respective 7-segment digits.