IMPLEMENTATION OF BOOLEAN LOGIC IN ARDUINO

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Abstract

Q(52)2010 GATE:A Minimized form of the Function F

The following Karnaugh map represents a function F.

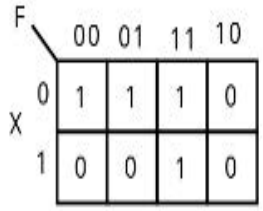

Fig. 1

1 Components

Components	Values	Quantity
Arduino		1
JumperWires	M-F	5
Breadboard		1
USB-C cable		1

2 Setup

1. Connect the Arduino to the laptop using the USBcable.
2. Open the Arduino IDE on your system.
3. Go to Tools > Board and select Arduino Uno or Nano based on your board.
4. Go to Tools > Port and select the correct COM port for your connected board.

2.1 Steps for implementation

1. Open Arduino IDE and create a new sketch (program).
2. Paste the Clanguage code into the sketch
3. Upload the code to the Arduino board using the Upload button in the IDE
4. Place Arduino on breadboard (optional).
5. Connect digital input pins (2, 3, 4) to switches or jumper wires.
6. Pull-down resistors (10kΩ to GND) recommended on inputs to prevent floating values.
7. Built-in LED on Pin 13 used to show output F

3.Implementation

The given Karnaugh Map has 1s at positions where:

X = 0, YZ = 00 → gives term X'Y'Z'

X = 0, YZ = 01 → gives X'Y'Z

X = 0, YZ = 11 → gives X'YZ

X = 1, YZ = 11 → gives XYZ

Now we simplify:

Combine X'Y'Z' and X'Y'Z → common part is X'Y'

Combine X'Y'Z and X'YZ → common part is X'Z

So final minimized terms:

X'Y'

X'Z

XYZ

Final Answer:

F=X′Y′+X′Z+XYZ
F=X′Y′+X′Z+XYZ

This is the minimized Boolean function.