# IMPLEMENTATION OF BOOLEAN LOGIC

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## Contents



## Abstract

To Obtain the Boolean Expression for the Logic circuit shown below

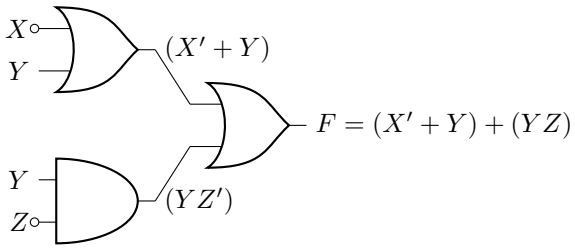


Fig. 1

## 1 Components

| Components | Values | Quantity |
|---|---|---|
| Arduino | UNO | 1 |
| JumperWires | M-M | 5 |
| Breadboard | | 1 |

## 2 Implementation

### 2.1 METHOD-1

The truth table for Fig. 1 is available in Table-1 Using Boolean logic, output F in Table 1 can be expressed in terms of the inputs X, Y, Z as F=(X'+Y)+(Y.Z').....(2.1) Built in led at 13th pin of Arduino will glow for the logic '1' of F based on the initialization of X,Y,Z. The code below realizes the Boolean logic for F in Table-1

https://github.com/velicharlagokulkumar/FWC_module1/blob/main/Assignment−1/codes/method_1.ino

| X | Y | Z | F |
|---|---|---|---|
| 0 | 0 | 0 | 1 |
| 0 | 0 | 1 | 1 |
| 0 | 1 | 0 | 1 |
| 0 | 1 | 1 | 1 |
| 1 | 0 | 0 | 0 |
| 1 | 0 | 1 | 0 |
| 1 | 1 | 0 | 1 |
| 1 | 1 | 1 | 1 |

Table-1

### 2.2 METHOD-2

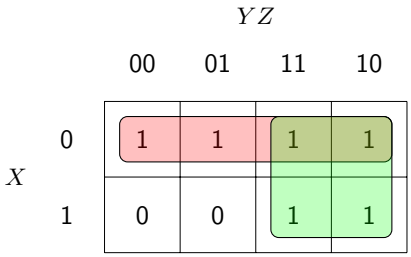


Fig. 2

**Karnugh Map :** The expression in (2.1) can be minimized using the K-map in Fig 2. In Fig.2 ,the implicants in boxes 0,1,2,3 result in X' The implicants in boxes 2,3,6,7 result in Y Thus, after minimization using Fig. 2, (2.1) can be expressed as F=X'+ Y.....(2.2). Verify the truth table for F in TABLE 1. The code below realizes the Boolean logic for F in 2.2

https://github.com/velicharlagokulkumar/FWC_module1/blob/main/Assignment−1/codes/method_2.ino

### 2.3 METHOD-3

The code below realizes the Boolean logic for F in (2.2) using 5V,GND of Arduino
D3,D4,D5 Pins of Arduino are configured as input pins instead of initializing X,Y,Z inside software,inputs are given manually as X,Y,Z.Built in led will glow based on F satisfying the Table-1

https://github.com/velicharlagokulkumar/FWC_module1/blob/main/Assignment−1/codes/method_3.ino