# IDE assignment

dunna vamsi

January 2, 2023

a mux circuit shown in figure below implements a logic function F1 is

***Problem Statemet*-The figure Above shows a muliplexer where S is the select lines,z to $\bar{z}$ are the input lines and F(x,y,z) is the O/P.The objective is to find the boolean expression for output F as function of inputs x,y,z using K-map and implementing the logic of multiplexer using Arduino uno** (1)(!x+y)+z (2)(!(!x+y)+z) (3)x+y+!z (4)x+y+z

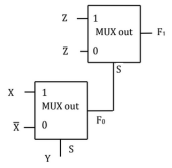



Figure 1: Multiplexer

## 1 Components

| Component | Value | Count |
|---|---|---|
| Arduino | Uno | 1 |
| LED | Red | 1 |
| Resistor | 220 Ohm | 1 |
| Jumper Wires | - | as-required |

## 2 Connections

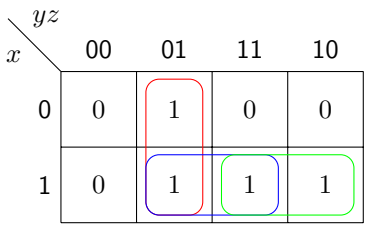
- Connect LED to pin 13 of Arduino with the 220ohm resistor in series
- Connect 5v and ground points from Arduino to extreme ends of bread board
- Use D2,D3,D4 pins of Arduino as inputs(x,y,z) referred in Fig.1. and D13 as output(F)

## 3 Truth table

| $x$ | $y$ | $z$ | $\bar{x}$ | $\bar{y}$ | $\bar{z}$ | $z+\bar{x}\bar{+}y$ |
|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 1 | 1 | 1 | 0 |
| 0 | 0 | 1 | 1 | 1 | 0 | 1 |
| 0 | 1 | 0 | 1 | 0 | 1 | 1 |
| 0 | 1 | 1 | 1 | 0 | 0 | 0 |
| 1 | 0 | 0 | 0 | 1 | 1 | 1 |
| 1 | 0 | 1 | 0 | 1 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| 1 | 1 | 1 | 0 | 0 | 0 | 1 |

$z+(\bar{x}\bar{+}y)$

### Minimization using kmap




### Boolean expression

The boolean expression for **F** is

$$F = xy+!(xy)$$
$$F =!x + y$$
$$F1 = zs+!(zs)$$
$$F1 =!z + s$$
$$F1 =!(z+!(x + y)$$

### Software

Make the connections and connect the arduino the PC via USB.In the location of choice ,type the below commands

### 3.1 Code Link

https://github.com/vamsi/FWC/tree/main/IDEassigment/code

1. cd code
2. pio run
3. pio run t upload