IMPLEMENTATION OF BOOLEAN LOGIC IN AVRGCC

DUDEKULA USENI
r171099@rguktrkv.ac.in
FWC22098 IITH-Future Wireless Communications Assignment-3

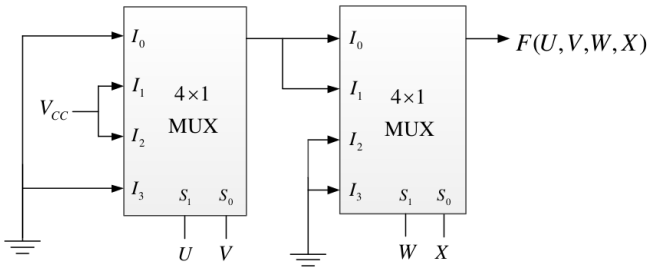

Figure 1: **The logic realised by the circuit shown in figure is**

Contents

1 Abstract

The objective of this manual is to show how to implement the Boolean function of a given 4x1 multiplexer :

Y=(U'V+V'U).(W'X'+WX')

2 Introduction

Mutiplexer is a combinational logic circuit designed to switch one of the several inputs lines through a single common output line by the application of a control signal.
The implementation of multiplexer takes three steps
1.To get the truth table of multiplexer
2.To get the Boolean equation using the truth table by using k map.

3 Components

Component	Value	Quantity
Arduino UNO		1
Bread board	-	1
Jumber wires	M-M	8
Led	-	1
Resistor	150ohms	1

3.1 Arduino

The Arduino uno has some ground pins, analog input pins A0-A3 and digital pins D1-D13 that can be used for both input as well as output. It also has two power pins that can generate 3.3V and 5V.In the following exercises, only the ground, 5V and digital pins will be used.

4 Introduction of 4x1 Multiplexer

4x1 Multiplexer has four data inputs I3,I2,I1,I0 two selection lines S1,S0 and one output Y. The block diagram of 4x1 Multiplexer is shown in the following Figure-1. One of these 4 inputs will be connected to the output based on the combination of inputs present at these two selection lines.

5 Truth table for 4x1 multiplexer

S1	S0	Y
0	0	I0
0	1	I1
1	0	I2
1	1	I3

Truth Table for 4x1 Mux

6 Boolean Equation

By solving the given multiplexer circuit diagram we get the boolean equation as fallows : Y=(U'V+V'U).(W'X'+WX')

7 Truth table for given multiplexer-circuit diagram

U	V	W	W	Y
0	0	0	0	0
0	0	0	1	0
0	0	1	0	0
0	0	1	1	0
0	1	0	0	1
0	1	0	1	0
0	1	1	0	1
0	1	1	1	0
1	0	0	0	1
1	0	0	1	0
1	0	1	0	1
1	0	1	1	0
1	1	0	0	0
1	1	0	1	0
1	1	1	0	0
1	1	1	1	0

TABLE 1

8 Hardware

1. Connect Arduino to the computer and upload the code in to the arduino.Make 2,3,4,5 pins as input pins and 13 pin as output pin. Corresponds to the given inputs for the selection lines of multiplexer the outputs will be obtained at 13 pin. The builtin led in arduino is the indication of the output of multiplexer.

9 Software

Download the following code

https://github.com/dudekulauseni123/FWC0982022/tree/main/Assignment_3_avrgcc