4x1 MULTIPLEXER

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IITH-Future Wireless Communications(FWC22072) -

Contents

Abstarct-The objective of this manual is to show how to design a 4x1 multiplexer.

1 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.Then, by using the above Boolean Equation,construct circuit diagram

2 Components

Component	Value	Quantity
Arduino	UNO	1
Resistor	220ohm	1
Bread board	-	1
Jumber wires	M-M	20
Led	-	1

Figure-1 Components

2.1 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.

3 Truth Table of 4x1 Multiplexer

The truth table for 4x1 Multiplexer as follows:
Selection lines=A,B

A	B	q
0	0	D0
0	1	D1
1	0	D2
1	1	D3

Figure-2 Truth table

BUILDING THE BOOLEAN EQUATION:
By using the above truth table using k map we get the above equation as:
Y=A'B'D0+A'B D1+A B'D2+A B D3

4 Circuit Diagram

Using the above Boolean Equation the circuit diagram is drawn as:

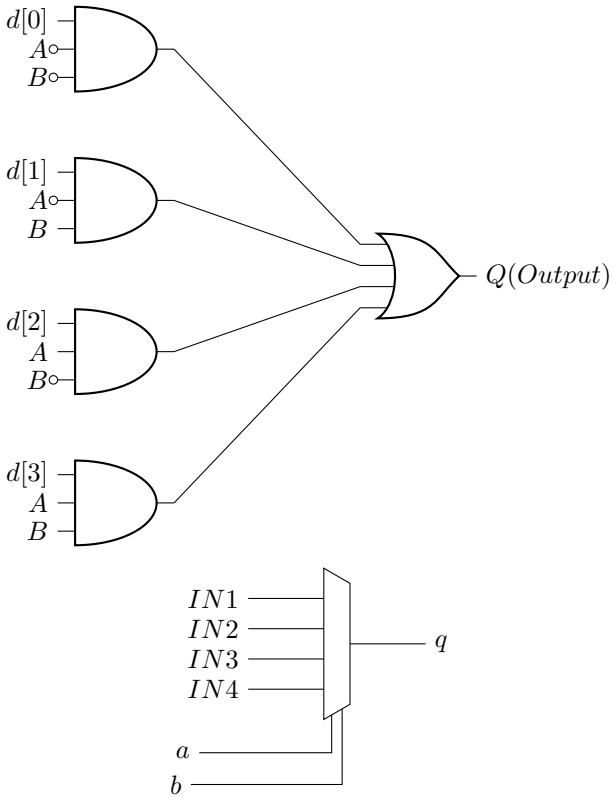

Figure-4 multiplexer

5 Hardware

1. Connect Arduino to the computer and upload the code in to the arduino.Make 2,3,4,5,6,7 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.

Verify the output depending upon below table:

selection line	selection line	Input	Input	Input	Input	output
a	b	D	C	B	A	Q
0	0	x	x	x	1	1
0	1	x	x	1	x	1
1	0	x	1	x	x	1
1	1	1	x	x	x	1

6 software

Download the following code

https://github.com/Sampathyenduru/IIT−fwc/blob/main/hello.asm