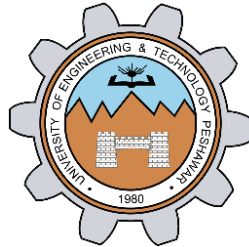


MULTIPLEXER AND DEMULTIPLEXER

LAB # 07



Fall 2020

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Registration No: **19PWCSE1845, 19PECSR1850**

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Class Section: **C**

Date: **jan 19 2021**

“On my honor, as student of University of Engineering and Technology, I have neither given nor received unauthorized assistance on this academic work.”

Student Signature: _____

Submitted to:

Engr. Rehmat Ullah

DEPARTMENT OF COMPUTER SYSTEMS ENGINEERING

MULTIPLEXER AND DEMULTIPLEXER

OBJECTIVES:

After completing this experiment, you will be able to:

- Design and construct Multiplexer and De Multiplexer.
- Verify their truth tables using logic gates.

EQUIPMENT:

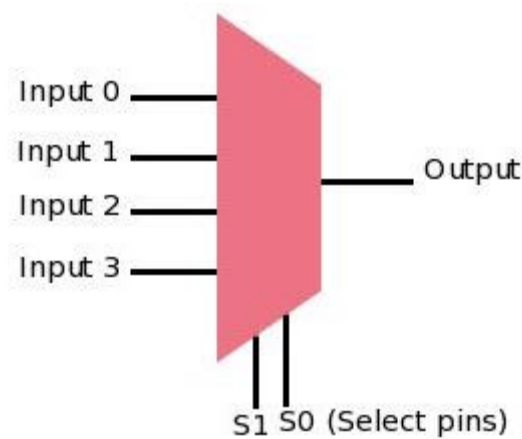
- Dc power supply
- Breadboard

COMPONENTS:

- 7432 quad 2-input OR gate
- 7410 quad 3-input NAND gate if 4711 is not
- 7404 hex inverter
- LEDs
- DIP switch
- Two 280 Ω resistors
- Wires

THEORY:**MULTIPLEXER:**

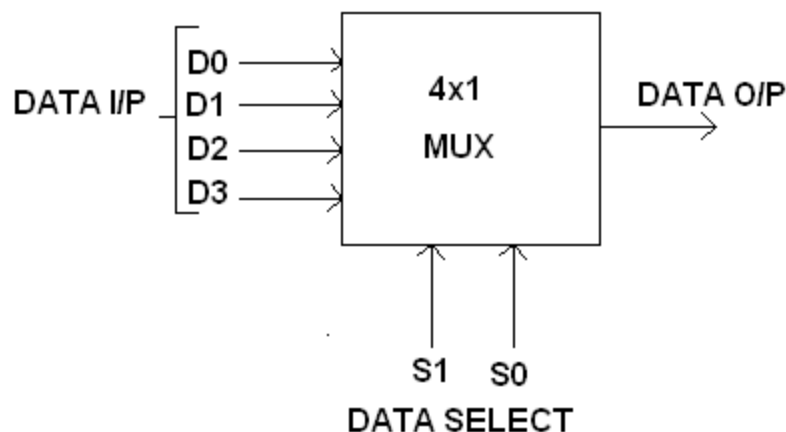
Multiplexer is a device that has multiple inputs and a single line output. The select lines determine which input is connected to the output, and also to increase the amount of data that can be sent over a network within certain time. It is also called a data selector.



Multiplexer

The single pole multi-position switch is a simple example of non-electronic circuit of multiplexer, and it is widely used in many electronic circuits. The multiplexer is used to perform high-speed switching and is constructed by electronic components.

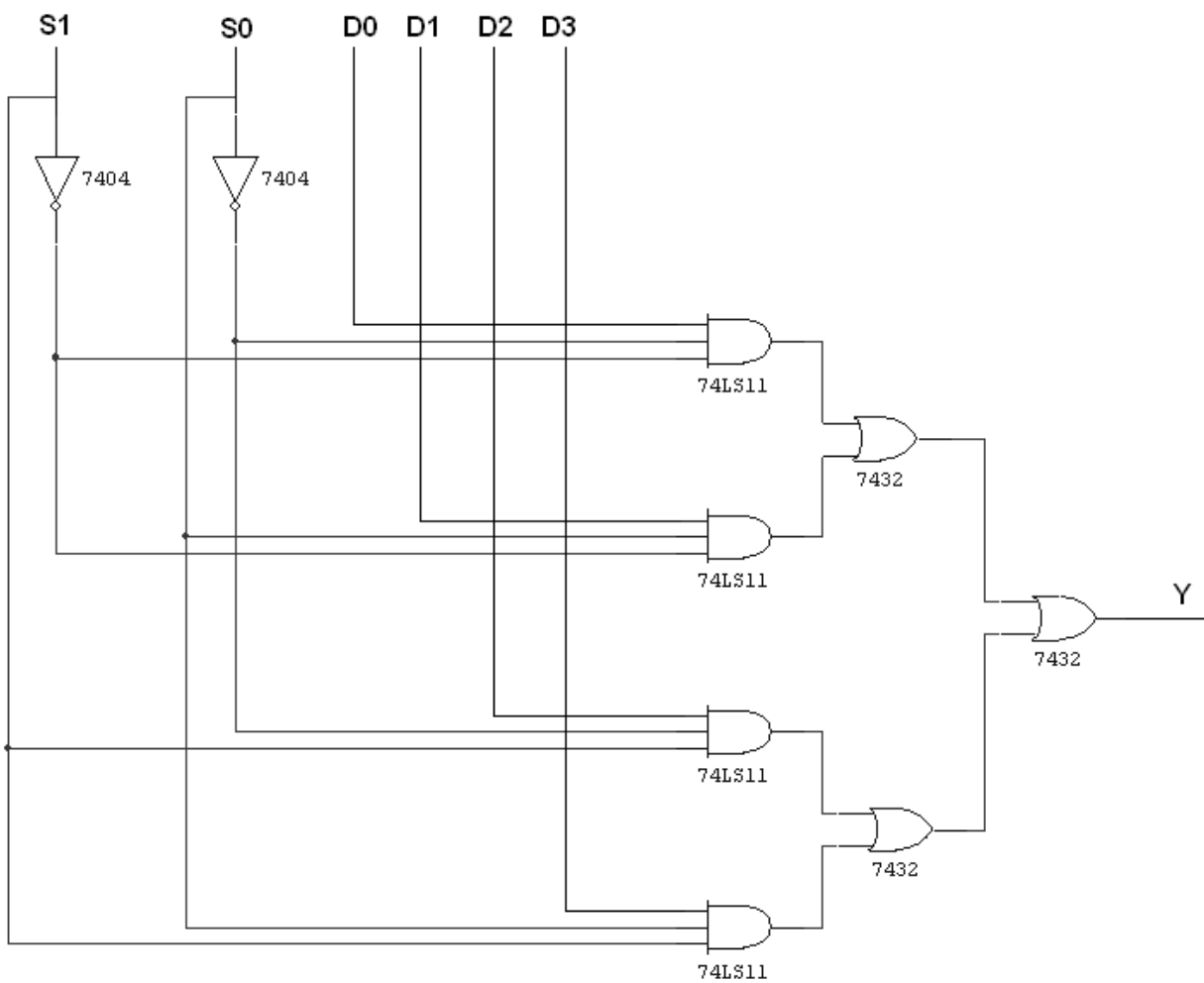
Multiplexers are capable of handling both analog and digital applications. In analog applications, multiplexers are made up of relays and transistor switches, whereas in digital applications, the multiplexers are built from standard logic gates. When the multiplexer is used for digital applications, it is called a digital multiplexer.

BLOCK DIAGRAM FOR 4x1 MULTIPLEXER:

FUNCTION TABLE:

S1	S2	OUTPUT Y
0	0	$D0 \rightarrow D0 S1' S0'$
0	1	$D1 \rightarrow D1 S1' S0$
1	0	$D2 \rightarrow D2 S1 S0'$
1	1	$D3 \rightarrow D3 S1 S0$

$$Y = D0 S1' S0' + D1 S1' S0 + D2 S1 S0' + D3 S1 S0$$

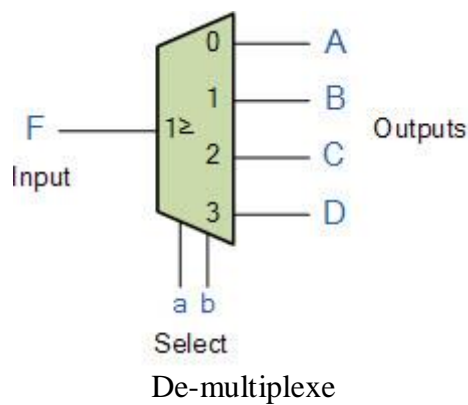
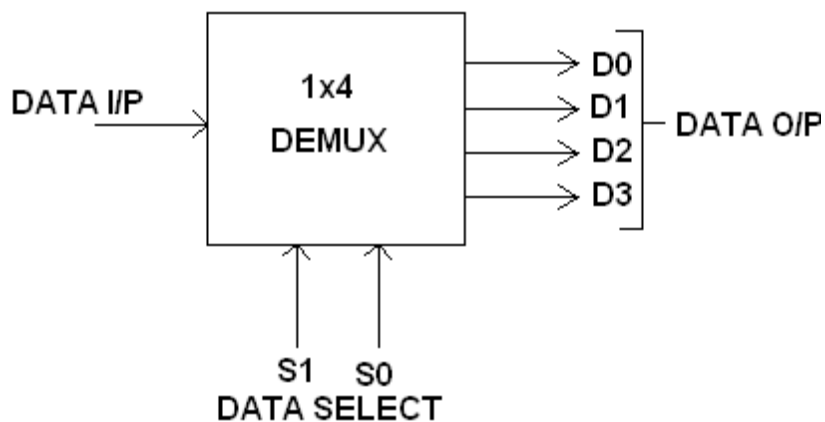
CIRCUIT DIAGRAM FOR 4x1 MULTIPLEXER:

TRUTH TABLE:

S1	S2	OUTPUT Y
0	0	D0
0	1	D1
1	0	D2
1	1	D3

DE MULTIPLEXER:

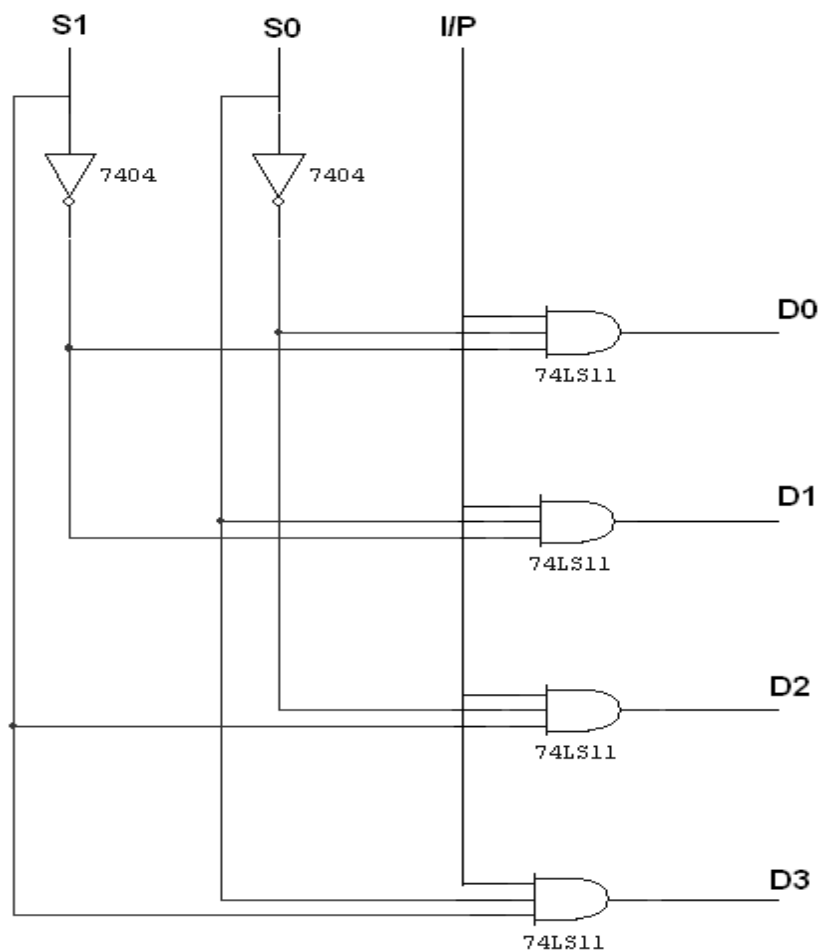
De-multiplexer is also a device with one input and multiple output lines. It is used to send a signal to one of the many devices. The main difference between a multiplexer and a de-multiplexer is that a multiplexer takes two or more signals and encodes them on a wire, whereas a de-multiplexer does reverse to what the multiplexer does.

**BLOCK DIAGRAM FOR 1x4 DEMULTIPLEXER:**

FUNCTION TABLE:

S1	S2	OUTPUT Y
0	0	$X \rightarrow D0 = XS1' S0'$
0	1	$X \rightarrow D1 = XS1' S0$
1	0	$X \rightarrow D2 = XS1 S0'$
1	1	$X \rightarrow D3 = XS1 S0$

$$Y = X S1' S0' + X S1' S0 + X S1 S0' + X S1 S0$$

LOGIC DIAGRAM FOR DEMULTIPLEXER:

TRUTH TABLE:

INPUT			OUTPUT			
S1	S0	I/P	D0	D1	D2	D3
0	0	0	0	0	0	0
0	0	1	1	0	0	0
0	1	0	0	0	0	0
0	1	1	0	1	0	0
1	0	0	0	0	0	0
1	0	1	0	0	1	0
1	1	0	0	0	0	0
1	1	1	0	0	0	1

PROCEDURE:

1. Connections are given as per circuit diagram.
2. Logical inputs are given as per circuit diagram.
3. Observe the output and verify the truth table.

REVIEW QUESTIONS:

Q1: What is the difference between Multiplexer and De-Multiplexer?

ANS:

Multiplexer

Multiplexer processes the digital information from various sources into a single source.

It is known as Data Selector

Multiplexer is a digital switch

It follows combinational logic type

It has n data input

It has a single data output

Demultiplexer

Demultiplexer receives digital information from a single source and converts it into several sources

It is known as Data Distributor

Demultiplexer is a digital circuit

It also follows combinational logic type

It has single data input

It has n data outputs

Multiplexer

It works on many to one operational principle

In time division Multiplexing, multiplexer is used at the transmitter end

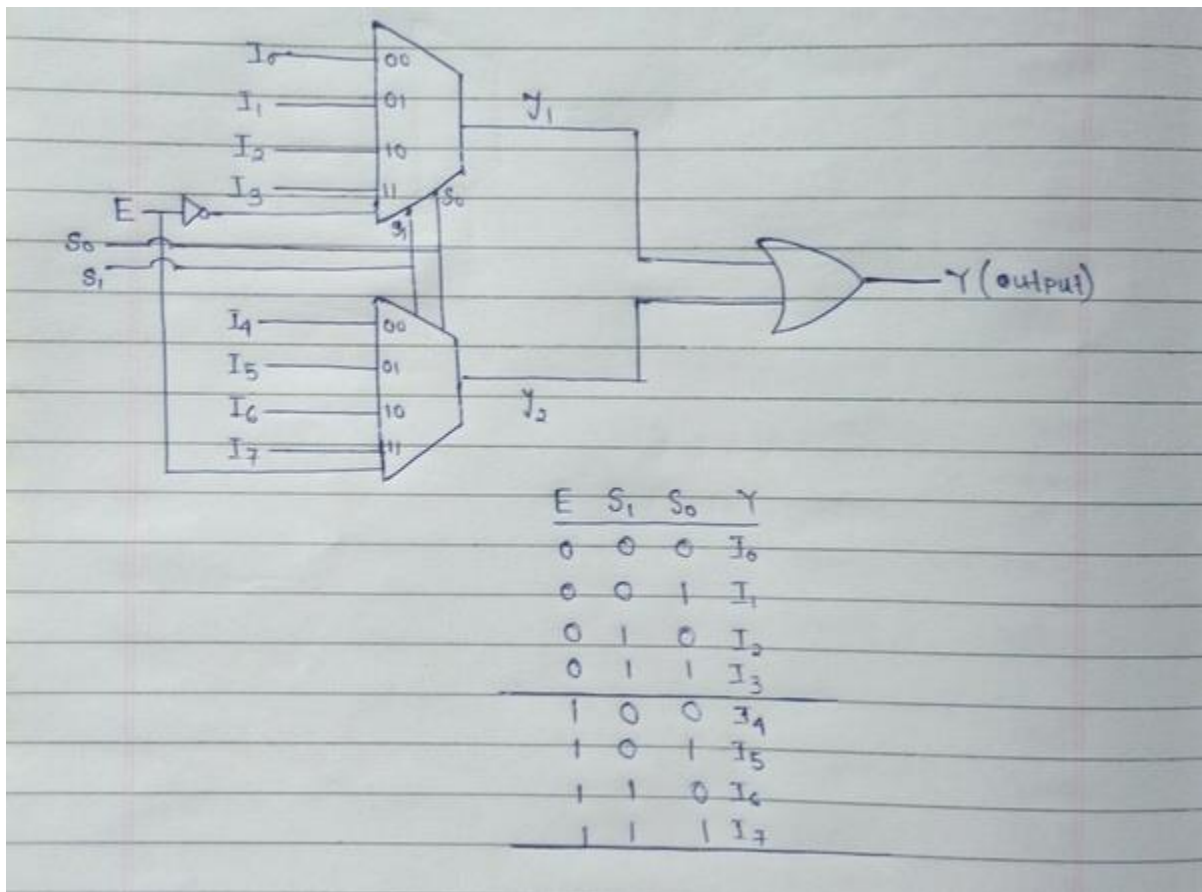
Demultiplexer

It works on one to many operational principle

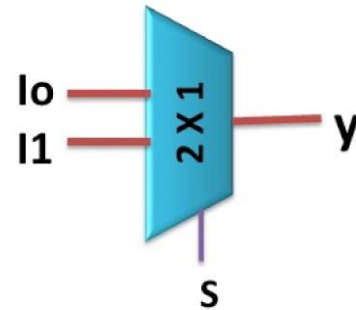
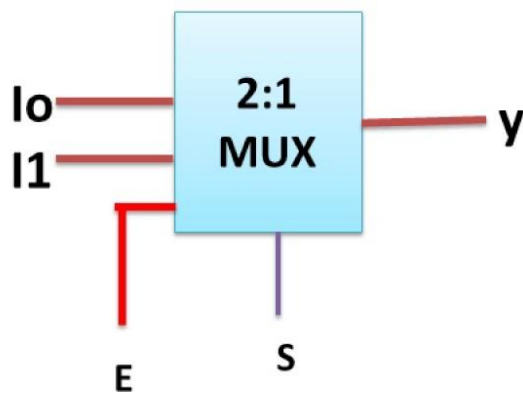
In time division Multiplexing, demultiplexer is used at the receiver end

Q2: Design a 8x1 MUX using two 4x1 MUXes (74153) and a 2x1 MUX (74157).

ANS:



GROW



LEARN

E	S	Y
0	X	0
1	0	I_0

$$Y = E.S'.I_0 + E.S.I_1$$

CONCLUSION:

Thus MULTIPLEXER AND DEMULTIPLEXER are studied. They have studied they have to draw the logic function and logic diagram in verify by experimental to the truth table in the logic gates.