Experiment No. 1

Aim: **To Study of a Multiplexer (MUX) & Demultiplexer (DEMUX)**

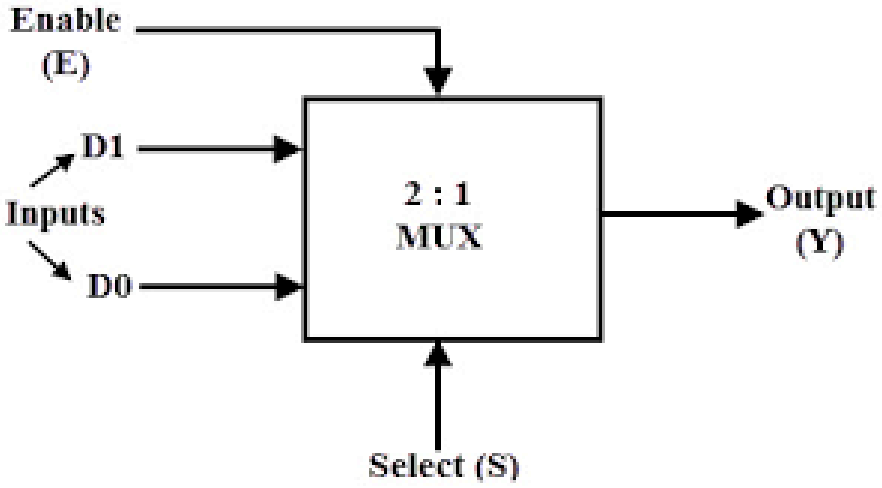
Theory: A multiplexer, also known as a MUX, is a combinational circuit that selects binary information from one of many input lines and directs it to a single output line. The selection of a particular input line is controlled by a set of selection lines. The number of selection input lines depends on the number of input lines. For instance, if there are 8 input lines, then 3 selection lines are required.

A MUX is a data selector which takes an n-bit selection line to select 1 out of 2^n input data lines to send the selected data to a single line output. MUX is mainly used to perform high-speed switching and is used in applications like data routing, voice/data transmission and others.

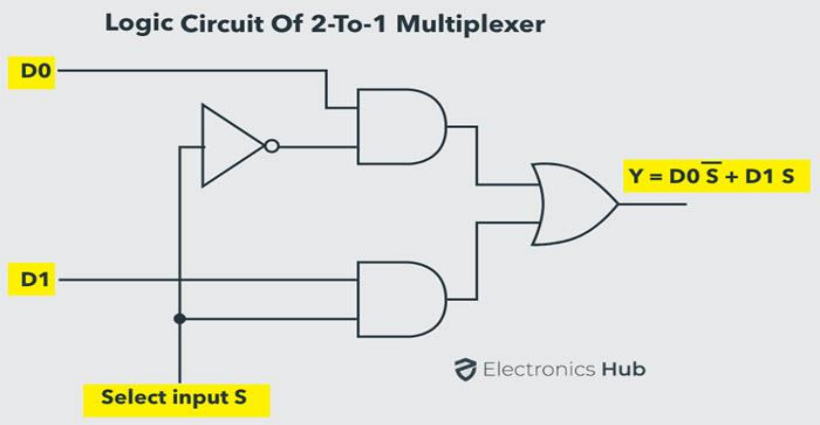
Truth Table:

S	D0	D1	Y
0	X	0	D0
0	X	1	D0
1	0	X	D1
1	1	X	D1

Diagram: The circuit diagram of a 2:1 MUX is made by connecting one NOT gate, two AND gates and one OR gate. The NOT gate is used to invert the selection line, the AND gates are used to select the data and the OR gate is used to direct the selected data to the output.



Logic Diagram:



Demultiplexer (DEMUX)

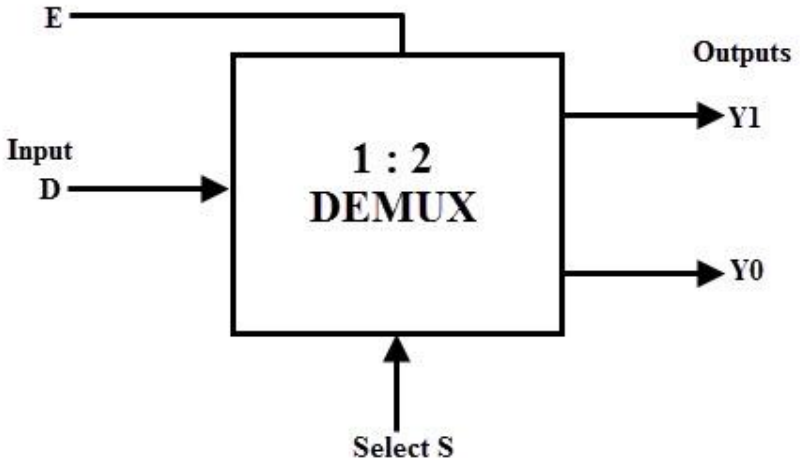
Theory: A demultiplexer, also known as a DEMUX, is a combinational circuit that takes a single input line and directs it to one of several output lines. The selection of a particular output line is controlled by a set of selection lines. The number of selection input lines depends on the number of output lines. For instance, if there are 8 output lines, then 3 selection lines are required.

A DEMUX is essentially a data distributor which takes an input line and a set of selection lines, and routes the input to one of the many output lines. DEMUX is mainly used in applications like data routing, digital to analog conversion, and others.

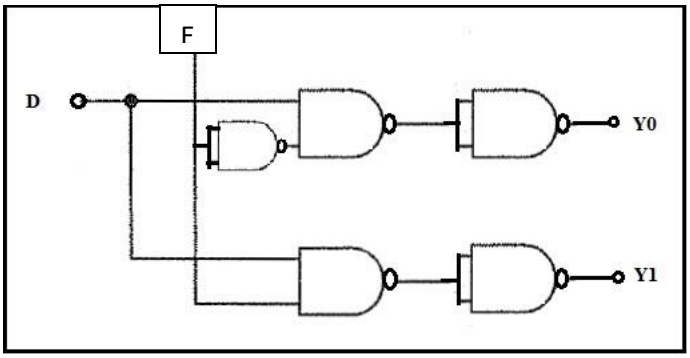
Truth Table:

S	D	Y0	Y1
0	X	D	0
1	X	0	D

Diagram: The circuit diagram of a 1:2 DEMUX is made by connecting one NOT gate and two AND gates. The NOT gate is used to invert the selection line, and the AND gates are used to route the data to the selected output.



Logic Diagram:



Result: The multiplexer circuit and demultiplexer circuit was successfully studied.