DIGITAL LOGIC DESIGN

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EXPERIMENT 5

EXPERIMENT – 5

AIM: -

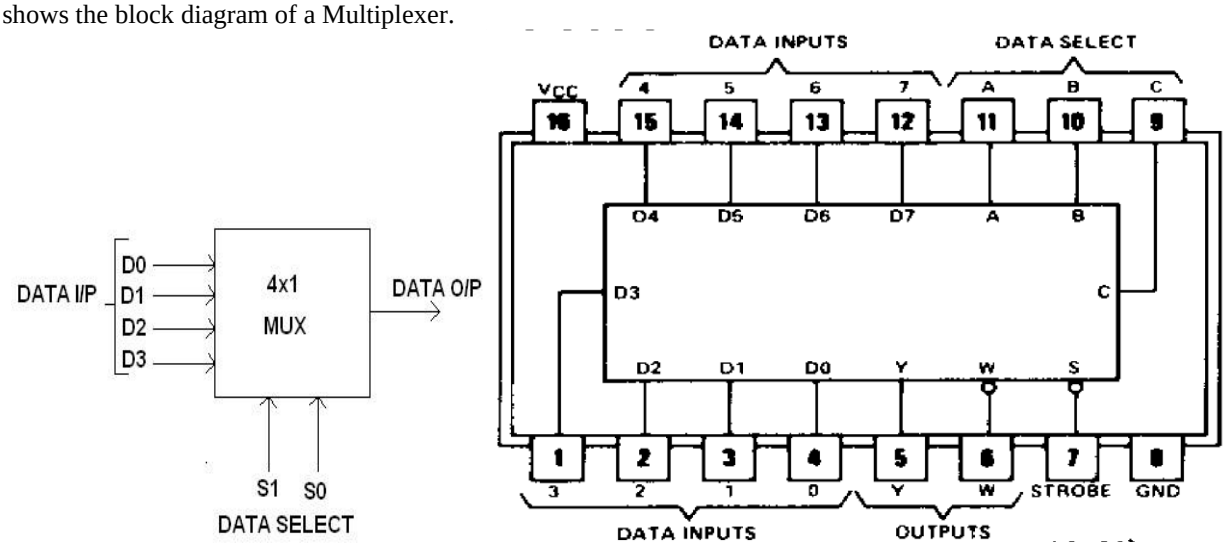
Verification of the truth table of the Multiplexer 74150.

APPARATUS REQUIRED: -

logic trainer kit, IC- 74150, wires.

THEORY:

A Multiplexer (or a data selector) is a logic circuit that accepts several data inputs and allows only one of them at a time to get through to the output. The selection of the desired data input is controlled by the SELECT (or ADDRESS) INPUTS. Multiplexer means transmitting a large number of information units over a smaller number of channels or lines. A digital multiplexer 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. Normally there are 2n input line and n selection lines whose bit combination determine which input is selected. Figure below shows the block diagram of a Multiplexer.

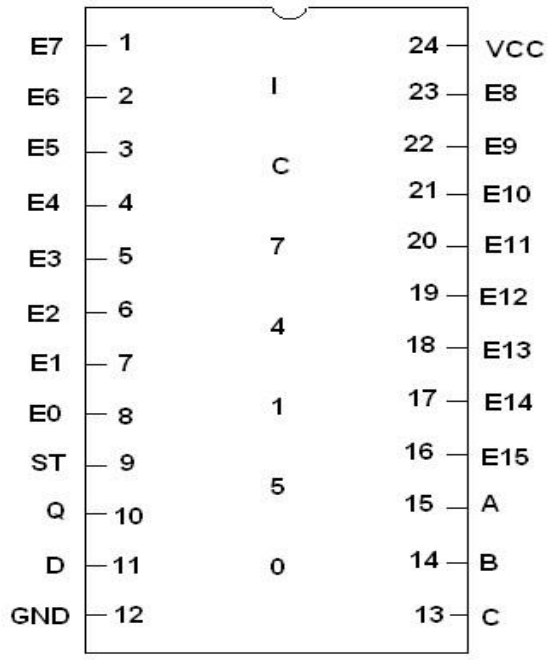


In this diagram the inputs and outputs are indicated by means of broad arrows to indicate that there may be one or more lines. Depending upon the digital code applied at the SELECT inputs, one out of the data sources is selected and transmitted to the single output channel. The Multiplexer becomes enabled when the strobe signal is active LOW. The pin out of a 8:1 multiplexer IC 74150 is shown above. The output of this circuit is the inverted input. This is a 16-pin DIP.

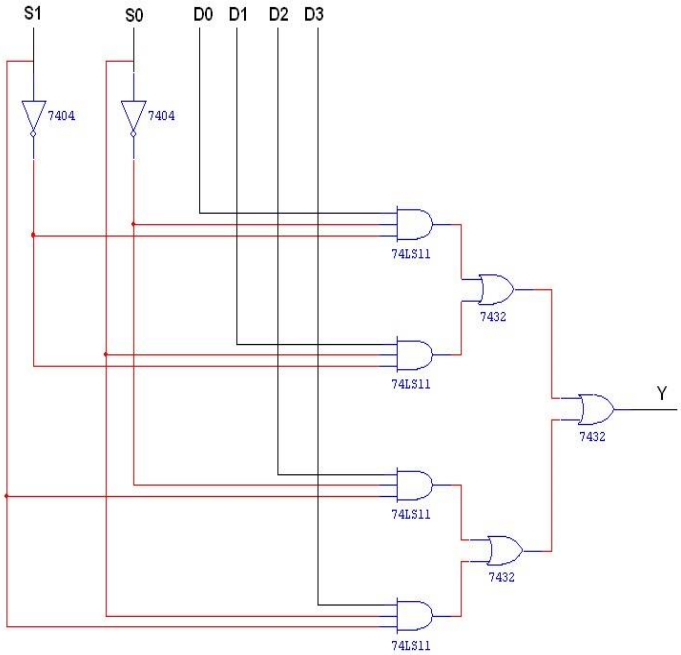
Function Table

INPUT		OUTPUT
S1	**S0**	**Y**
0	0	D0 = D0 S1' S0'
0	1	D1 = D1 S1' S0
1	0	D2 = D2 S1 S0'
1	1	D3 = D3 S1 S0
Y = D0 S1' S0' +D1 S1' S0 +D2 S1 S0' +D3 S1 S0		

PIN DIAGRAM:



CIRCUIT DIAGRAM FOR MULTIPLEXER:



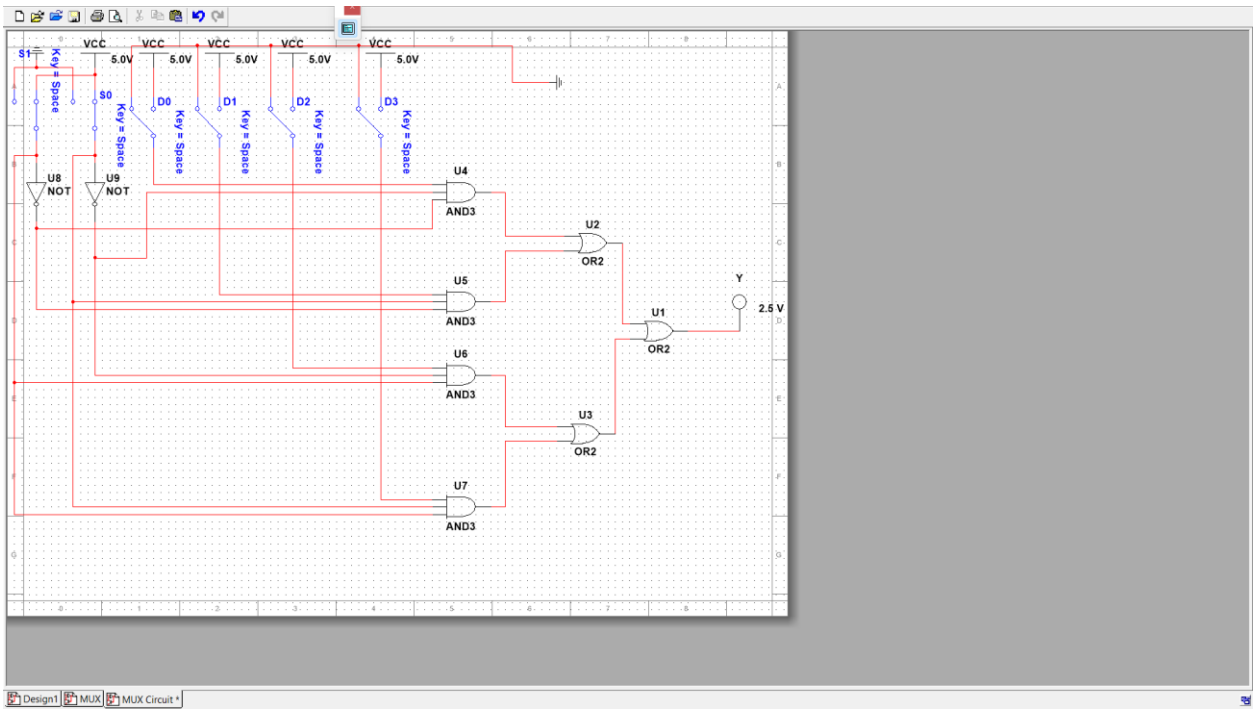
Truth Table

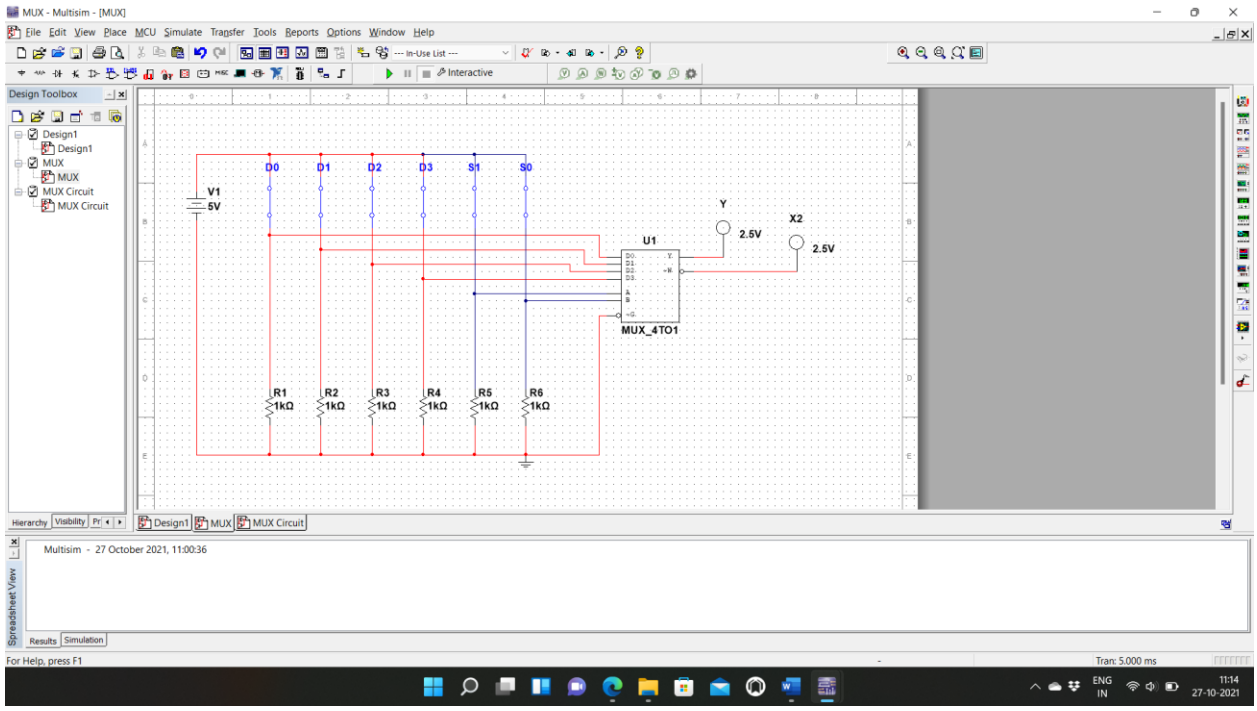
INPUT		OUTPUT
S1	**S0**	**Y**
0	**0**	**D0**
0	**1**	**D1**
1	**0**	**D2**
1	**1**	**D3**

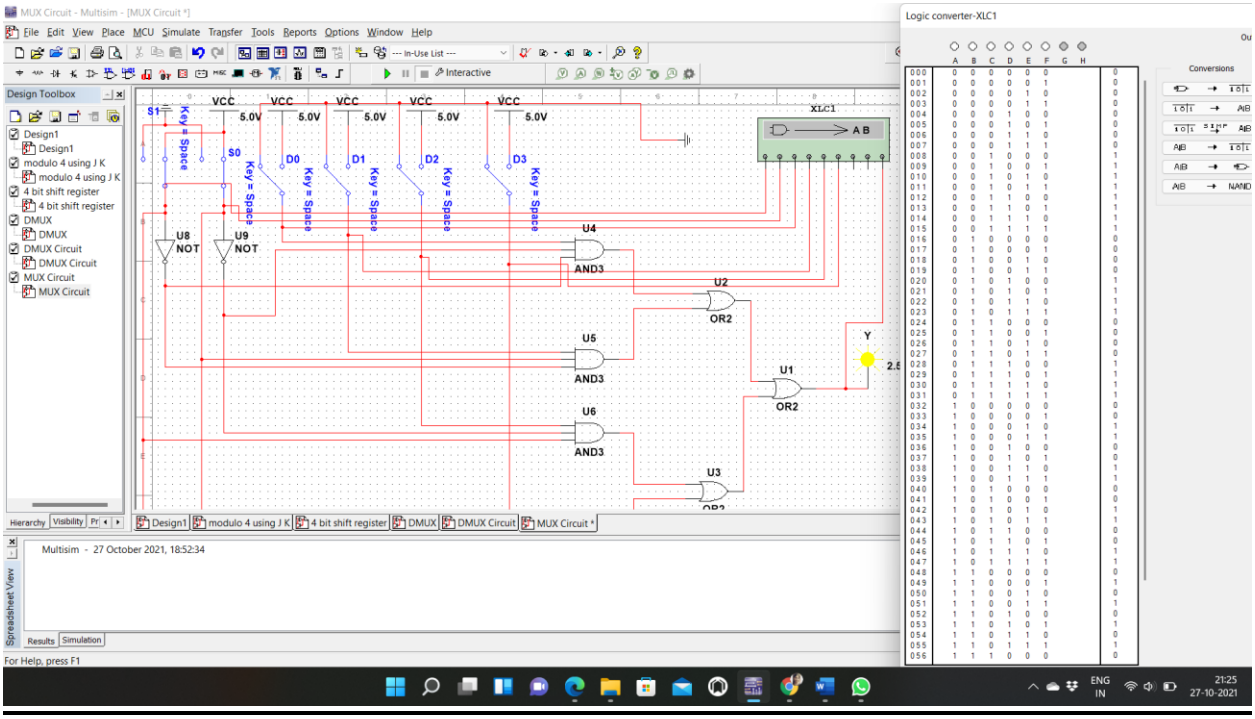
PROCEDURE: -

1) Assemble the circuit on bread board, as per above diagram.
2) Give the logical inputs and check for the proper output, as per the truth table.

VERIFICATION OF MULTIPLEXER:


S1
Key = Space
VCC
5.0V
S0
D0
D1
D2
D3
U8
NOT
U9
NOT
U4
AND3
U5
AND3
U6
AND3
U7
AND3
U2
OR2
U3
OR2
U1
OR2
Y
2.5 V
Design1
MUX
MUX Circuit *


MUX - Multisim - [MUX]
File Edit View Place MCU Simulate Transfer Tools Reports Options Window Help
Design Toolbox
Design1
MUX
MUX Circuit
V1
5V
D0
D1
D2
D3
S1
S0
U1
MUX_4TO1
Y
2.5V
X2
2.5V
R1
1kΩ
R2
1kΩ
R3
1kΩ
R4
1kΩ
R5
1kΩ
R6
1kΩ
Multisim - 27 October 2021, 11:00:36
Results
Simulation
For Help, press F1
Tran: 5.000 ms
ENG
IN
11:14
27-10-2021



CONCLUSION:

Hence verified the Multiplexer (8:1) operation using IC-74150

PRECAUTIONS:

- All connections should be made neat and tight.
- Digital lab kits and ICs should be handled with utmost care.
- While making connections main voltage should be kept switched off.
- Never touch live and naked wires.