DIGITAL LOGIC DESIGN

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EXPERIMENT 6

EXPERIMENT – 6

AIM: -

Verification of the truth table of the De-Multiplexer 74154.

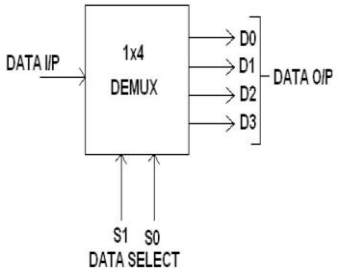
APPARATUS REQUIRED: -

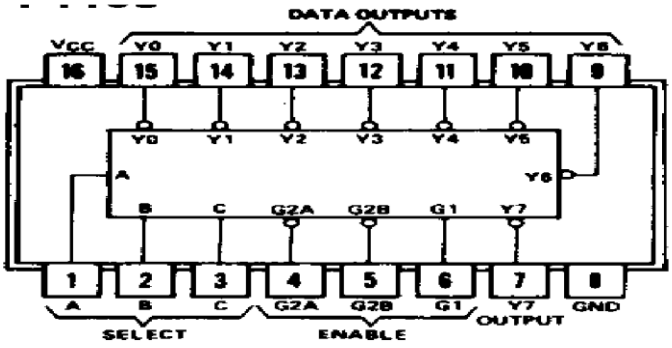
Logic trainer kit, IC- 74154, wires.

THEORY:

A Demultiplexer performs the reverse operation of a Multiplexer. It accepts a single input and distributes it over several outputs. The SELECT input code determines to which output the data input will be transmitted. The Demultiplexer becomes enabled when the strobe signal is active LOW.
This circuit can also be used as binary-to-decimal decoder with binary inputs applied at the select input lines and the output will be obtained on the corresponding line. These devices are available as 2-line-to-4-line decoder, 3-line-to8-line decoder, 4-line-to-16-line decoder. The output of these devices is active LOW. Also there is an active low enable/data input terminal available. Figure below shows the block diagram of a Demultiplexer.

BLOCK DIAGRAM FOR 1:4 DEMULTIPLEXER:



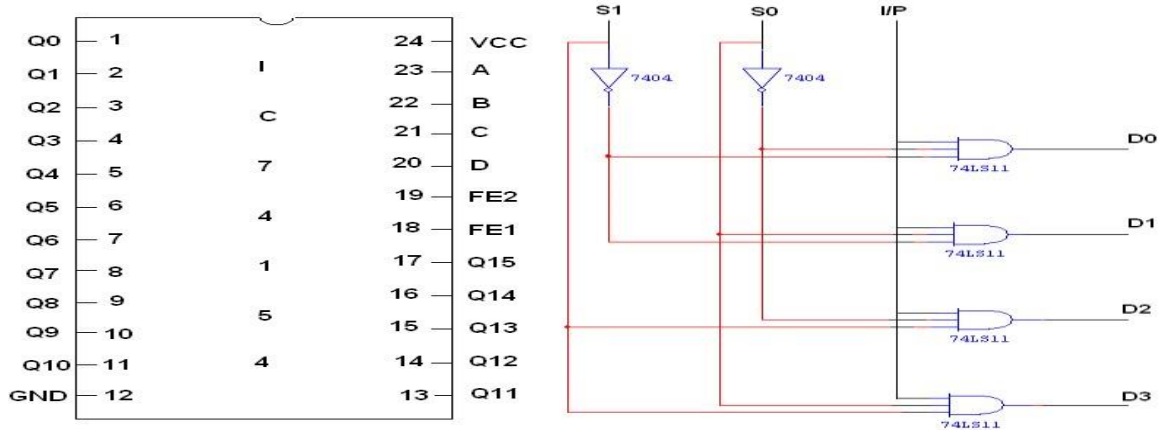


PIN CONFIGURATION:

FUNCTION TABLE:		
S1	S0	INPUT
0	0	D0 = X S1’ S0
0	1	D1 = X S1’ S0
1	0	D2 = X S1 S0’
1	1	D3 = X S1 S0
Y = X S1’ S0 + X S1’ S0 + X S1 S0’ + X S1 S0		

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 data is transmitted to the single output channel out of many. The pin out of a 16:1 Demultiplexer IC 74154 is shown above. The output of this circuit is active low. This is a 24-pin DIP.

CIRCUIT DIAGRAM:



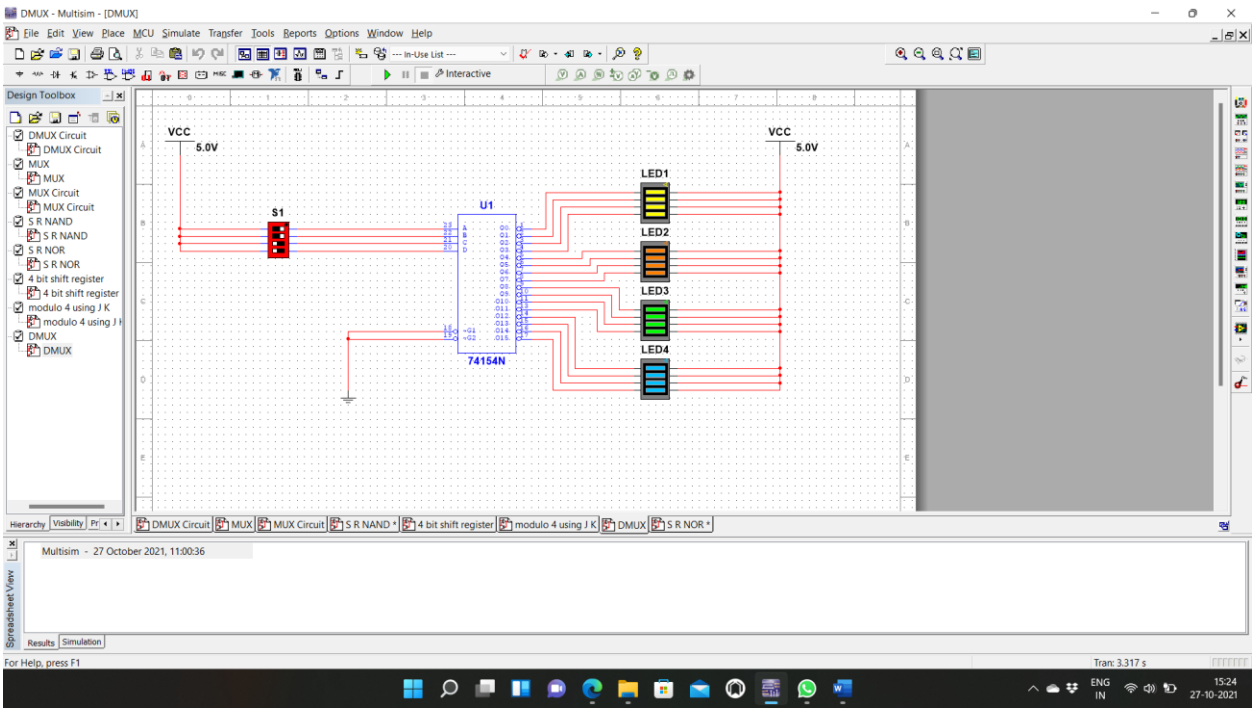
PIN DIAGRAM:

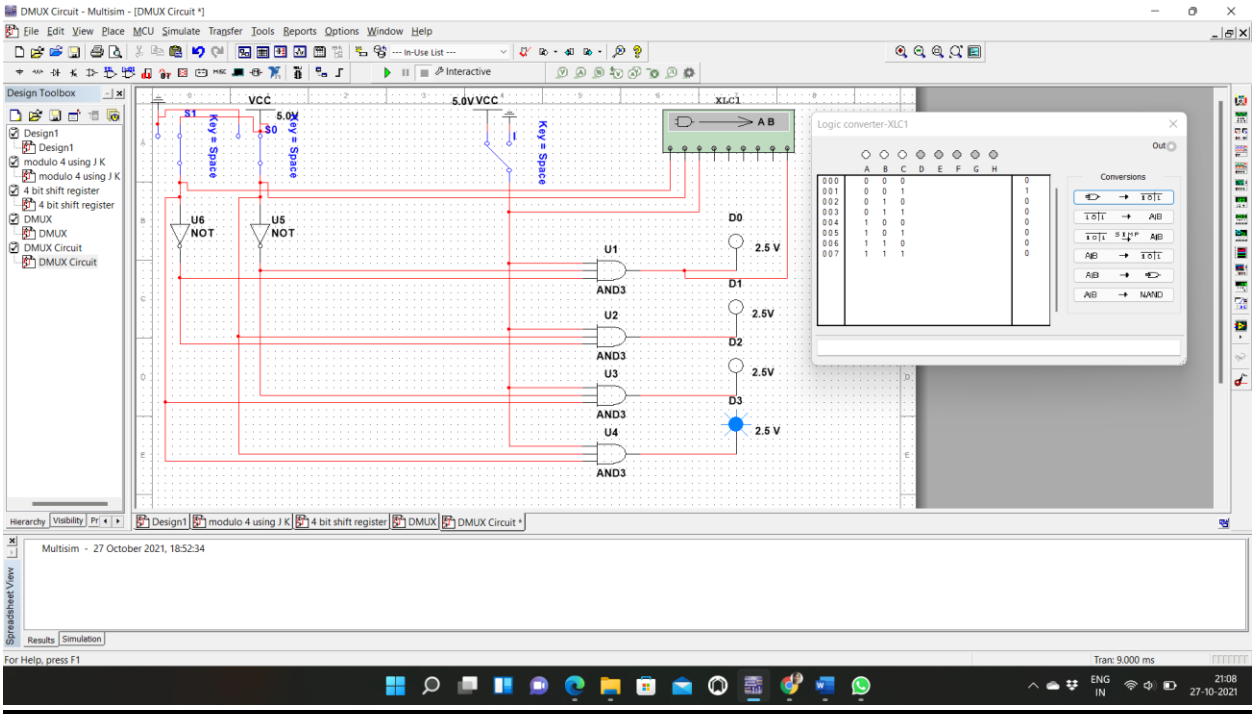
TRUTH TABLE						
INPUT			OUTPUT			
S1	S0	I/P	D0	D1	D2	D3
0	0	0	0	0	0	0
0	0	1	1	0	0	0
0	1	0	0	0	0	0
0	1	1	0	1	0	0
1	0	0	0	0	0	0
1	0	1	0	0	1	0
1	1	0	0	0	0	0
1	1	1	0	0	0	1

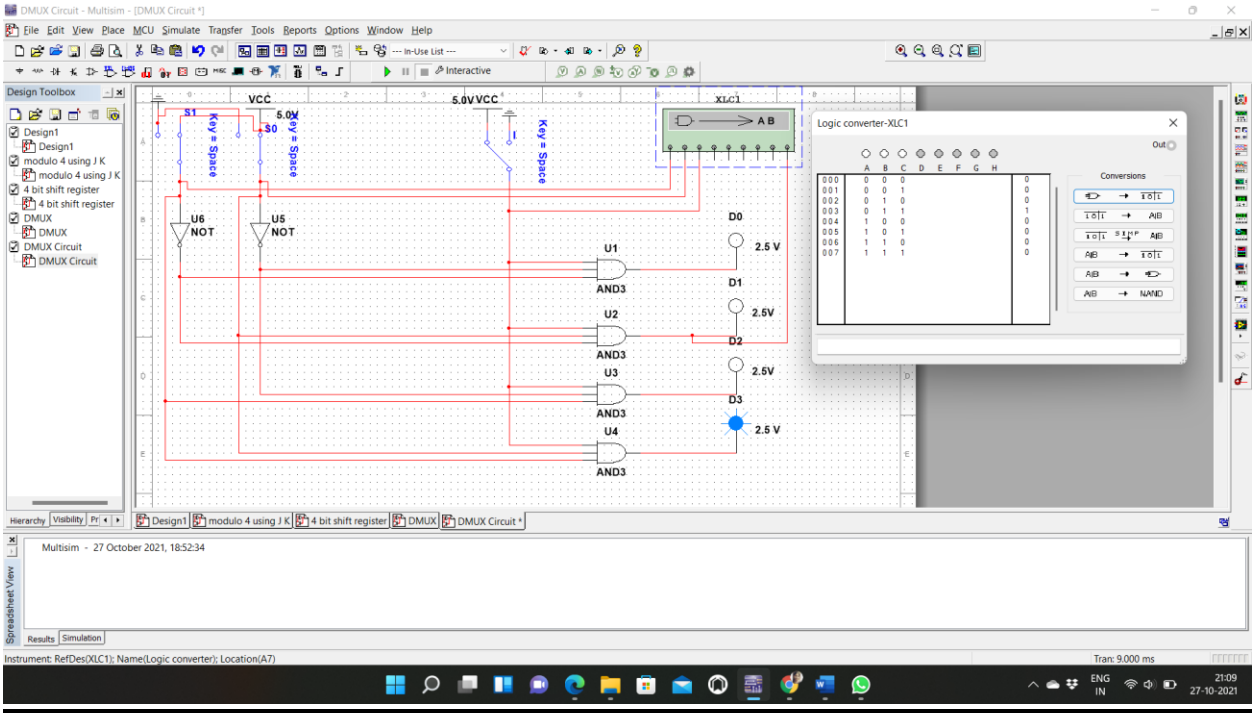
PROCEDURE: -

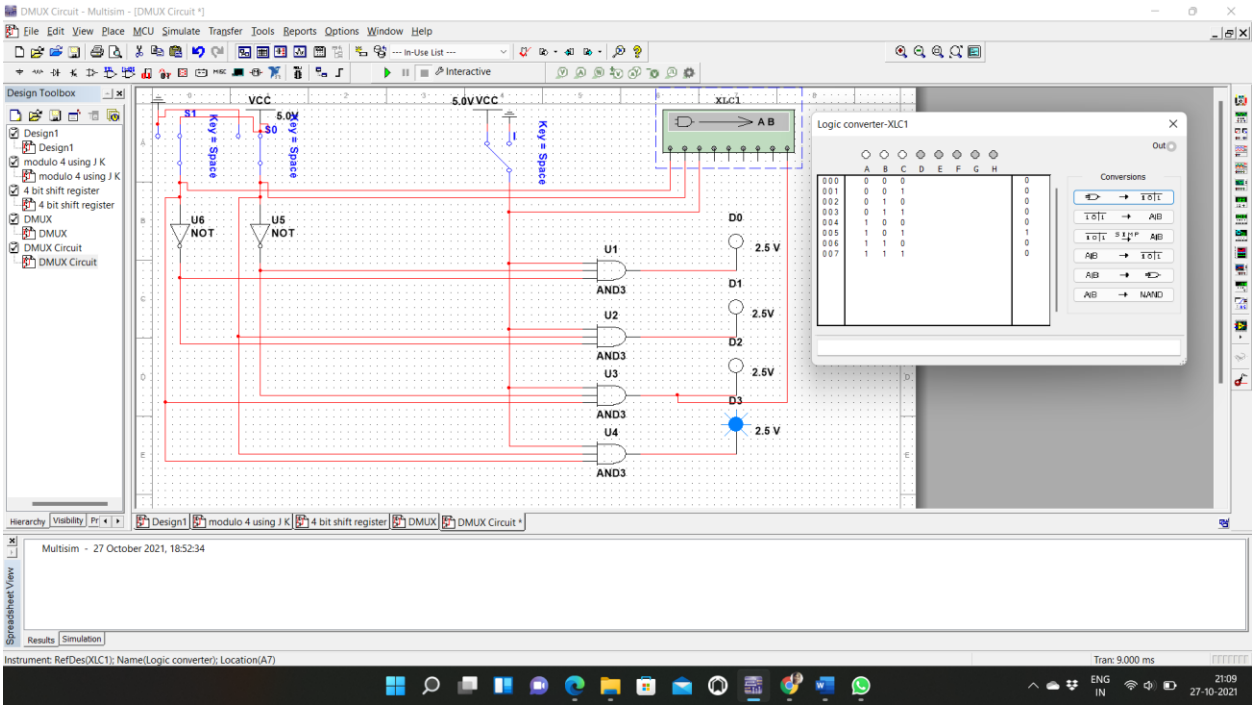
1) Assemble the circuit on bread board, as per above Pin diagram.
2) Give the logical inputs and check for the proper output, as per the truth table.

VERIFICATION OF DEMULTIPLEXER:






DMUX Circuit - Multisim - [DMUX Circuit *]
File Edit View Place MCU Simulate Transfer Tools Reports Options Window Help
Design Toolbox
Design1
modulo 4 using J K
4 bit shift register
DMUX
DMUX Circuit
VCC
5.0V
S1
S0
Key = Space
U6
NOT
U5
NOT
U1
AND3
U2
AND3
U3
AND3
U4
AND3
D0
D1
D2
D3
2.5 V
XLC1
Logic converter-XLC1
Conversions
Multisim - 27 October 2021, 18:52:34
Instrument: RefDes(XLC1); Name(Logic converter); Location(A7)
Tran: 9.000 ms
21:09
27-10-2021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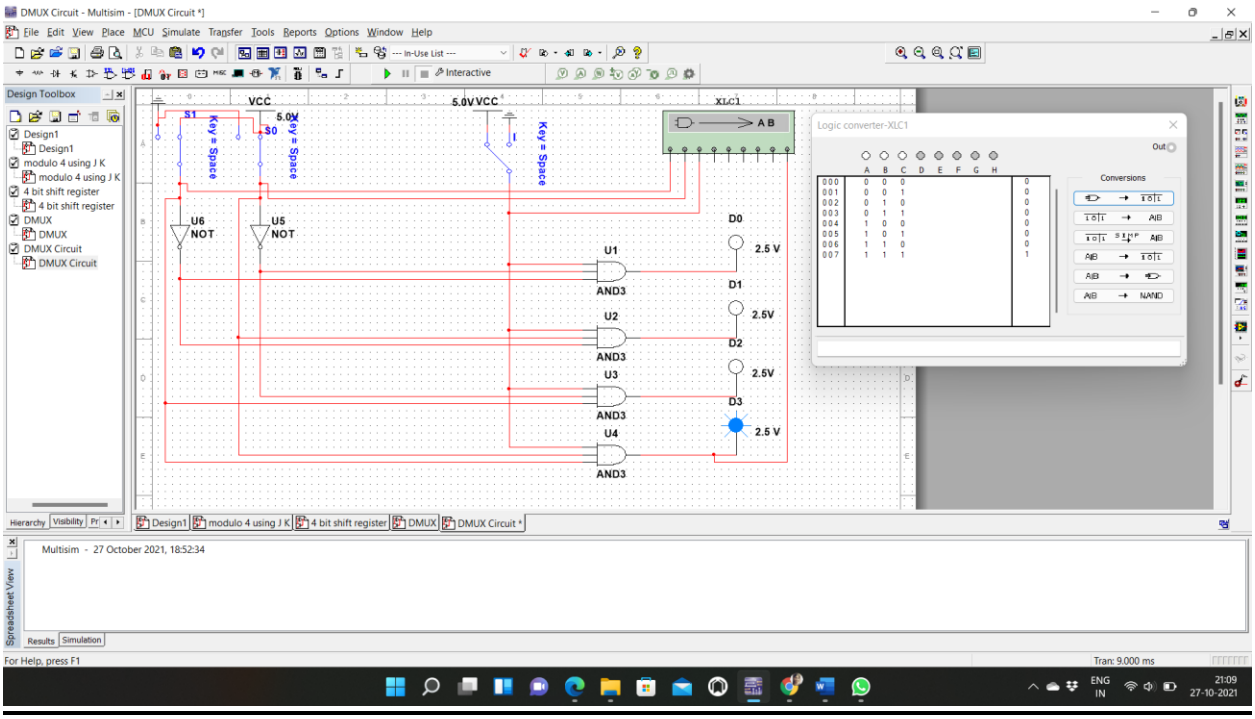

CONCLUSION:

Hence verified the Demultiplexer (16:1) operation using IC-74154.

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.