United International University
QUEST FOR EXCELLENCE

CSE 1326: Digital Logic Design Lab
Basic Logic Gates and ICs

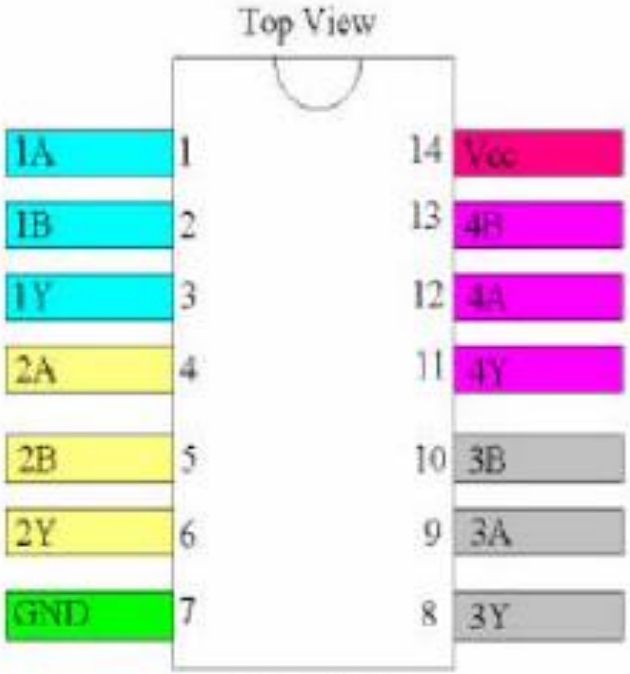
United International University

Basic Gates and ICs

- Objective & What to do
  - To know the basic gates below and related ICs
  - Verify those gates using logisim and trainer board.

  - 74LS00 Quad 2-Input NAND gate
  - 74LS02 Quad 2-Input NOR gate
  - 74LS04 Quad 2-Input NOT gate
  - 74LS08 Quad 2-Input AND gate
  - 74LS32 Quad 2-Input OR gate
  - 74LS86 Quad 2-Input XOR

An IC


Top View
1A
1
1B
2
1Y
3
2A
4
2B
5
2Y
6
GND
7
14
Vcc
13
4B
12
4A
11
4Y
10
3B
9
3A
8
3Y

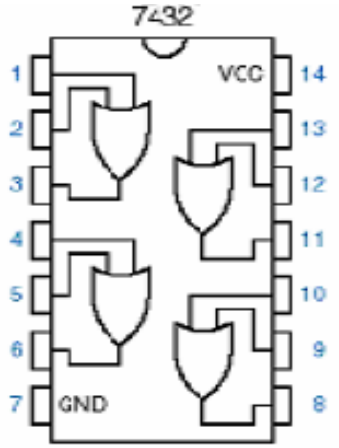
OR, AND

OR

The output is active high if any one of the input is in active high state, Mathematically,

Q = A+B

A	B	Output Q
0	0	0
0	1	1
1	0	1
1	1	1

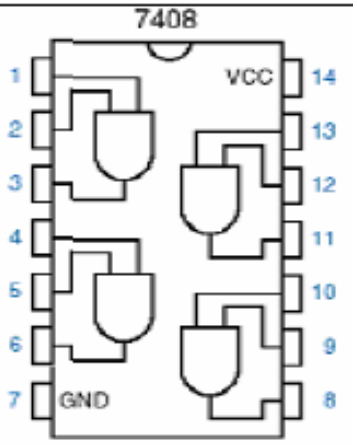


AND

The output is active high only if both the inputs are in active high state, Mathematically,

Q = A.B

A	B	Output Q
0	0	0
0	1	0
1	0	0
1	1	1



NOT, NOR

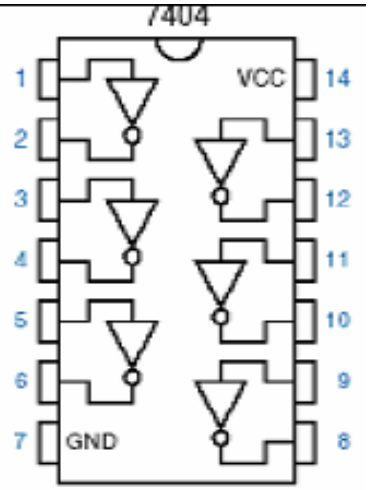
<table>
<tr>
<td>NOT</td>
<td>In this gate the output is opposite to the input state, Mathematically,

$Q = \overline{A}$</td>
<td>A

0

1</td>
<td>Output Q

1

0</td>
<td> 
</td>
<td> 
</td>
</tr>
<tr>
<td>NOR</td>
<td>The output is active high only if both the inputs are in active low state, Mathematically,

$Q = \overline{A+B}$</td>
<td>A

0

0

1

1</td>
<td>B

0

1

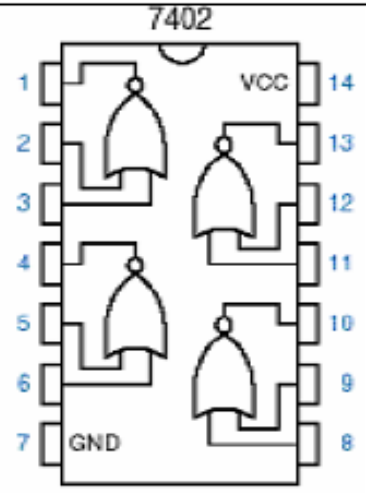
0

1</td>
<td>Output Q

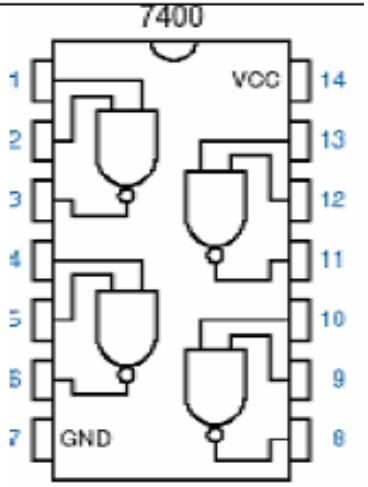
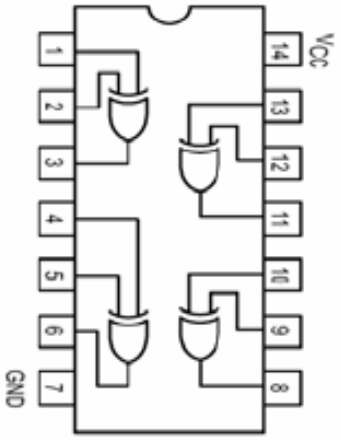
1

0

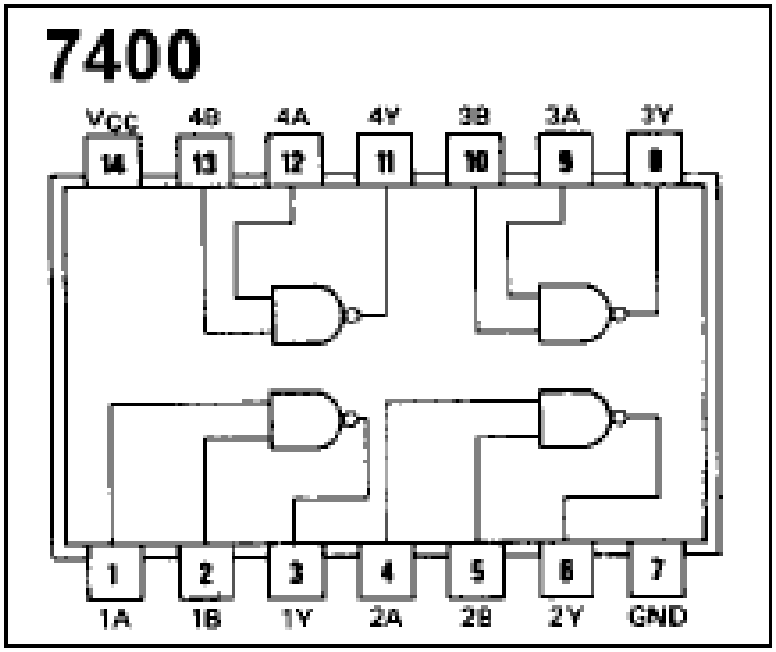
0

0</td>
<td> 
</td>
<td> 
</td>
</tr>
</table>

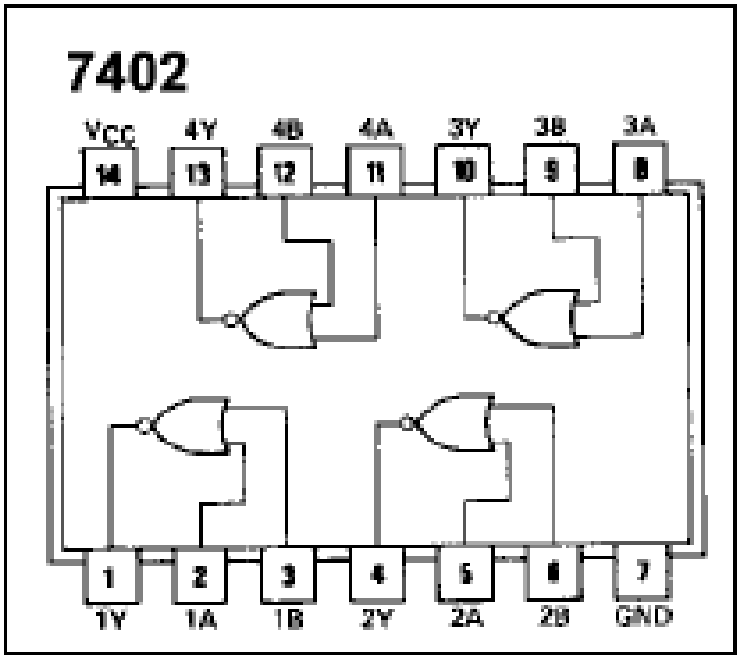
NAND, EXOR

NAND	The output is active high only if any one of the input is in active low state, Mathematically, $Q = \overline{A.B}$	**A** 0 0 1 1	**B** 0 1 0 1	**Output Q** 1 1 1 0		
EXOR	The output is active high **only if** any one of the input is in active high state, Mathematically, $Q = A \oplus B$	**A** 0 0 1 1	**B** 0 1 0 1	**Output Q** 0 1 1 0		

NAND, NOR

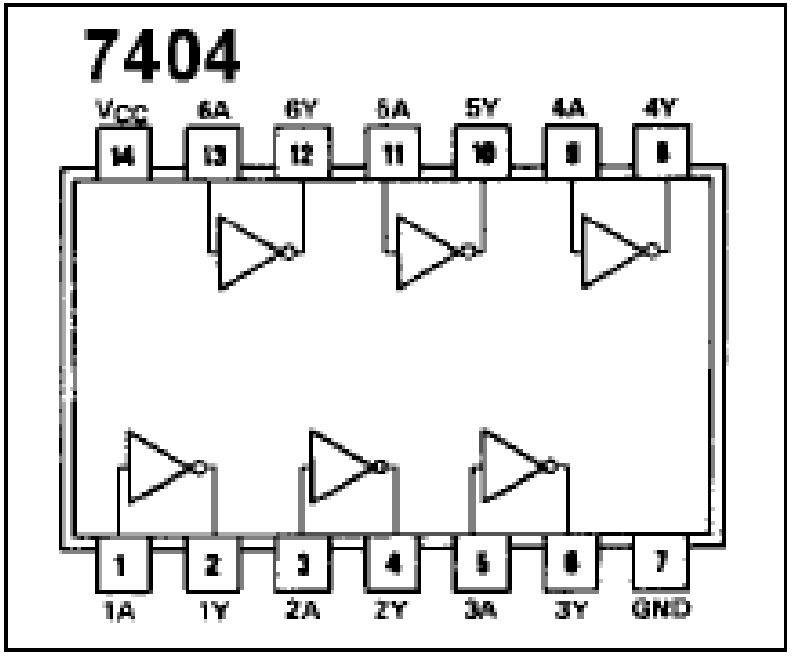


2 INPUT NAND GATE

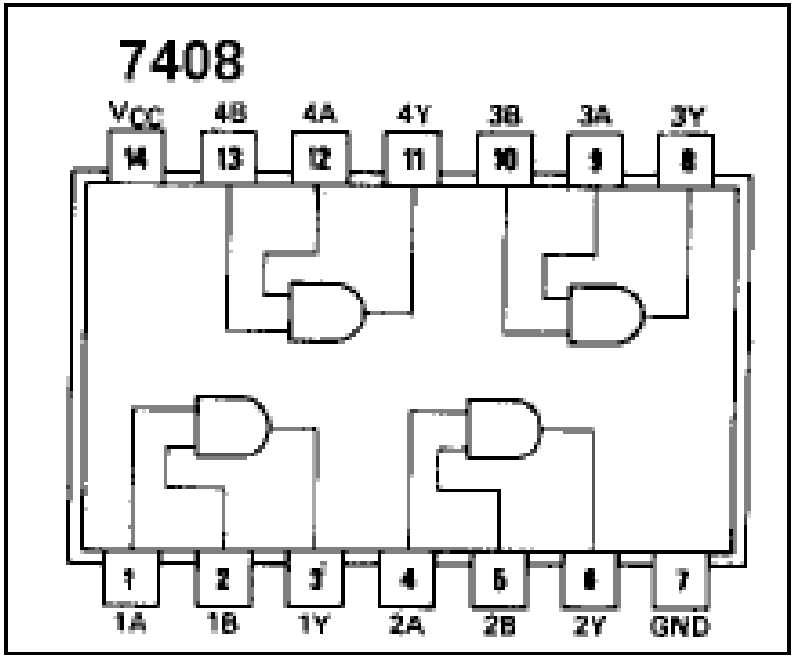


2 INPUT NOR GATE

NOT, AND

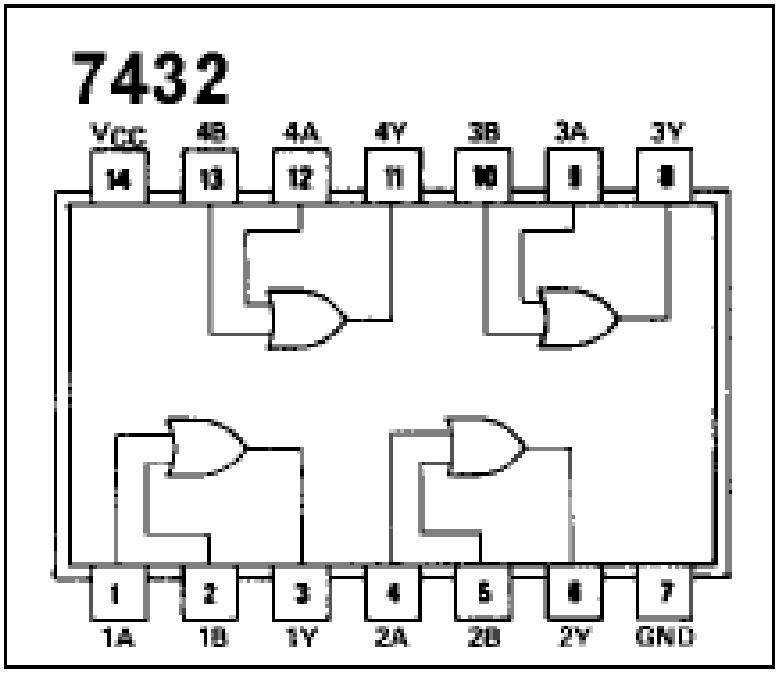


NOT GATE

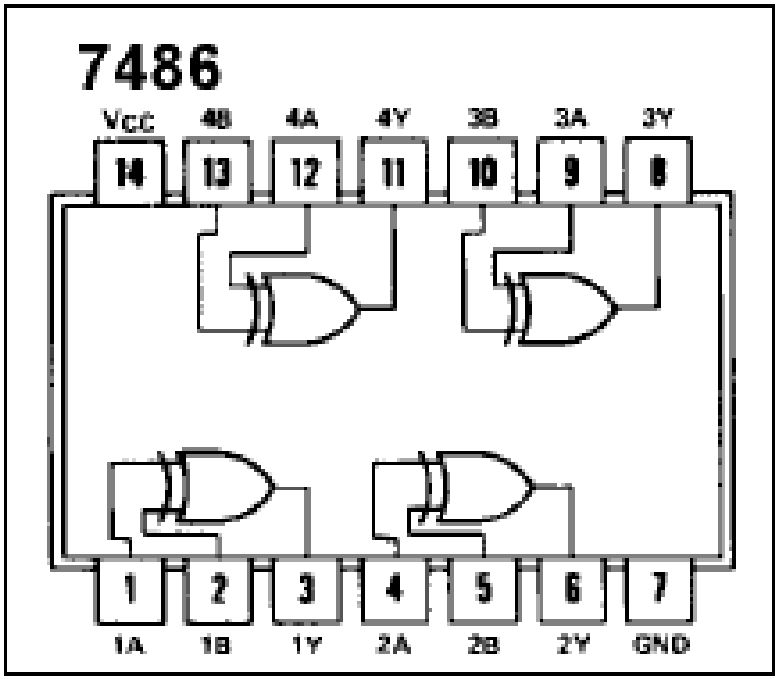


2 INPUT AND GATE

OR, XOR



2 INPUT OR GATE



2 INPUT XOR GATE

- No Report for Lab One!!!