Lab Manual

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Experiment No: 1
Experiment Name: Design of a 2-bit Logic unit.

Introduction:

In this experiment you will construct a 2-bit logic unit which is actually a part of an ALU. This logic unit will have 4 micro-operations which are AND, OR, XOR and NOT operations. Logic micro operations are very useful for manipulating individual bits or a portion of a word stored in a register. They can be used to change bit values, delete a group of bits or insert a new set of bits in a register. As we are going to design a 2-bit logic unit, we will have two outputs which is one output for each of the 2 bits.

Equipments:

- Trainer board
- IC 7404,7408,7432,7486, 74F153
- Wires for connection.

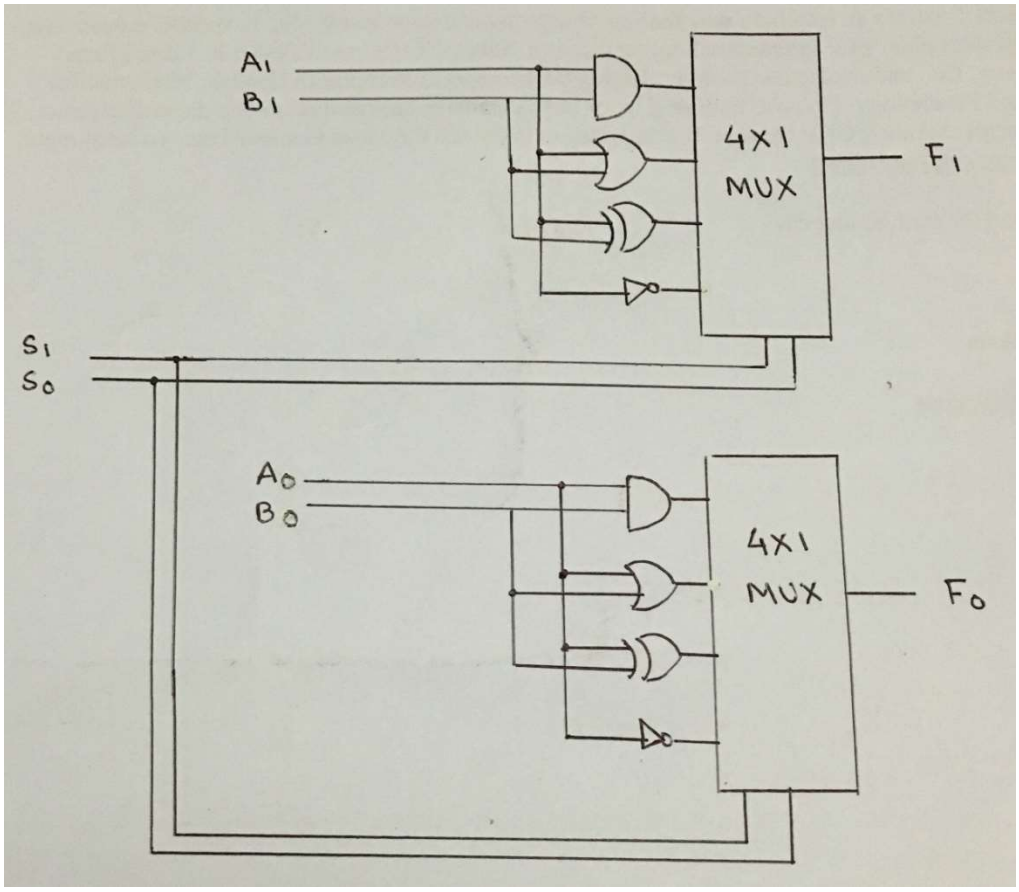
Truth Table:

Complete the Truth Table according to your theoretical knowledge.

A1	A0	B1	B0	AND1	AND0	OR1	OR0	XOR1	XOR0	NOT A1	NOT A0
0	0	0	0								
0	0	0	1								
0	0	1	0								
0	0	1	1								
0	1	0	0								
0	1	0	1								
0	1	1	0								
0	1	1	1								
1	0	0	0								

1	0	0	1								
1	0	1	0								
1	0	1	1								
1	1	0	0								
1	1	0	1								
1	1	1	0								
1	1	1	1								

Logic Diagram:



Procedure:

1) Place the ICs on the trainer board.
2) Connect V_{cc} and ground to the respective pins of IC.
3) Connect the inputs with the switches and the outputs with LEDs.
4) Apply various combinations of inputs and observe the outputs.
5) Verify the experimental outputs with the Truth Table.

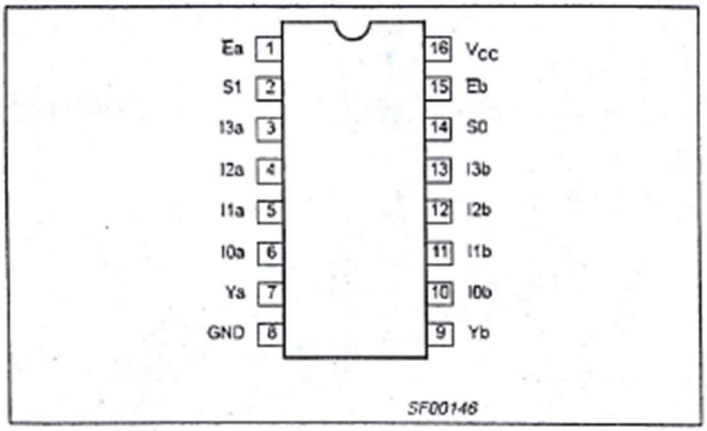
Assignment:

1) Prepare the lab report.
2) Implement the circuit in Logisim. Take a screenshot and include it in your lab report.

Pin configuration of ICs:

EEE336/CSE232 LAB
Dual 4x1 Multiplexer 74F153
Data Sheet

PIN CONFIGURATION



INPUT AND OUTPUT LOADING AND FAN-OUT TABLE

PINS	DESCRIPTION
I0a – I3a	Port A data inputs
I0b – I3b	Port B data inputs
S0, S1	Common Select inputs
$\overline{Ea}$	Port A Enable input (active Low)
$\overline{Eb}$	Port B Enable input (active Low)
Ya, Yb	Port A, B data outputs

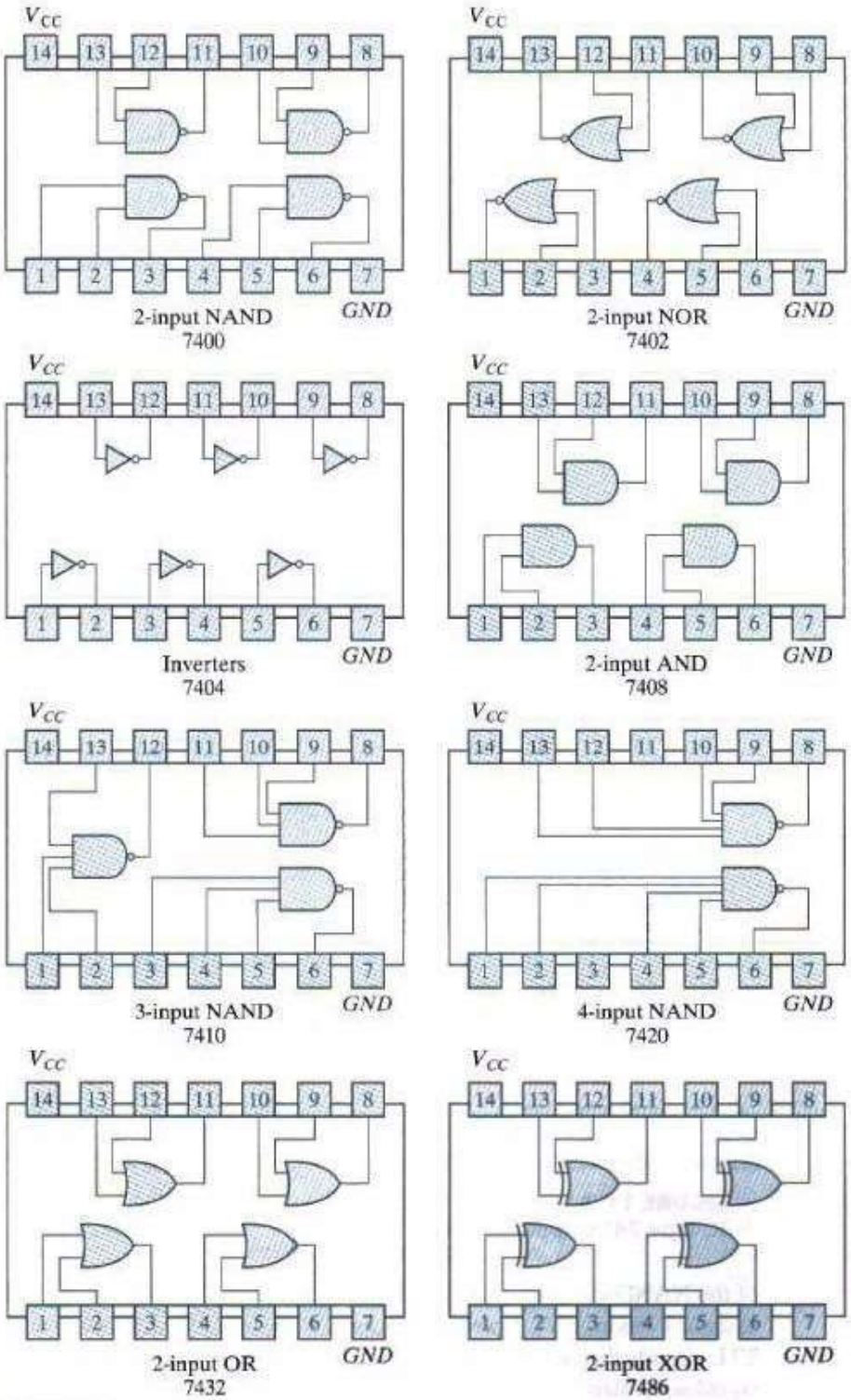


FIGURE 11.1
Digital gates in IC packages with identification numbers and pin assignments