CSE260 Lab Report

Experiment Name: Implementation of 4-bit Magnitude Comparator

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Section: 09

Date: 11/9/2021

Captain

Date :

1. Name of the Experiment: Implementation of 4-bit Magnitude Comparator

2. Objective:

i. To implement 4-bit magnitude comparator
ii. To implement the circuit (for two 4-bit numbers)
iii. To gain knowledge about 4-bit magnitude comparator.

3. Required components:

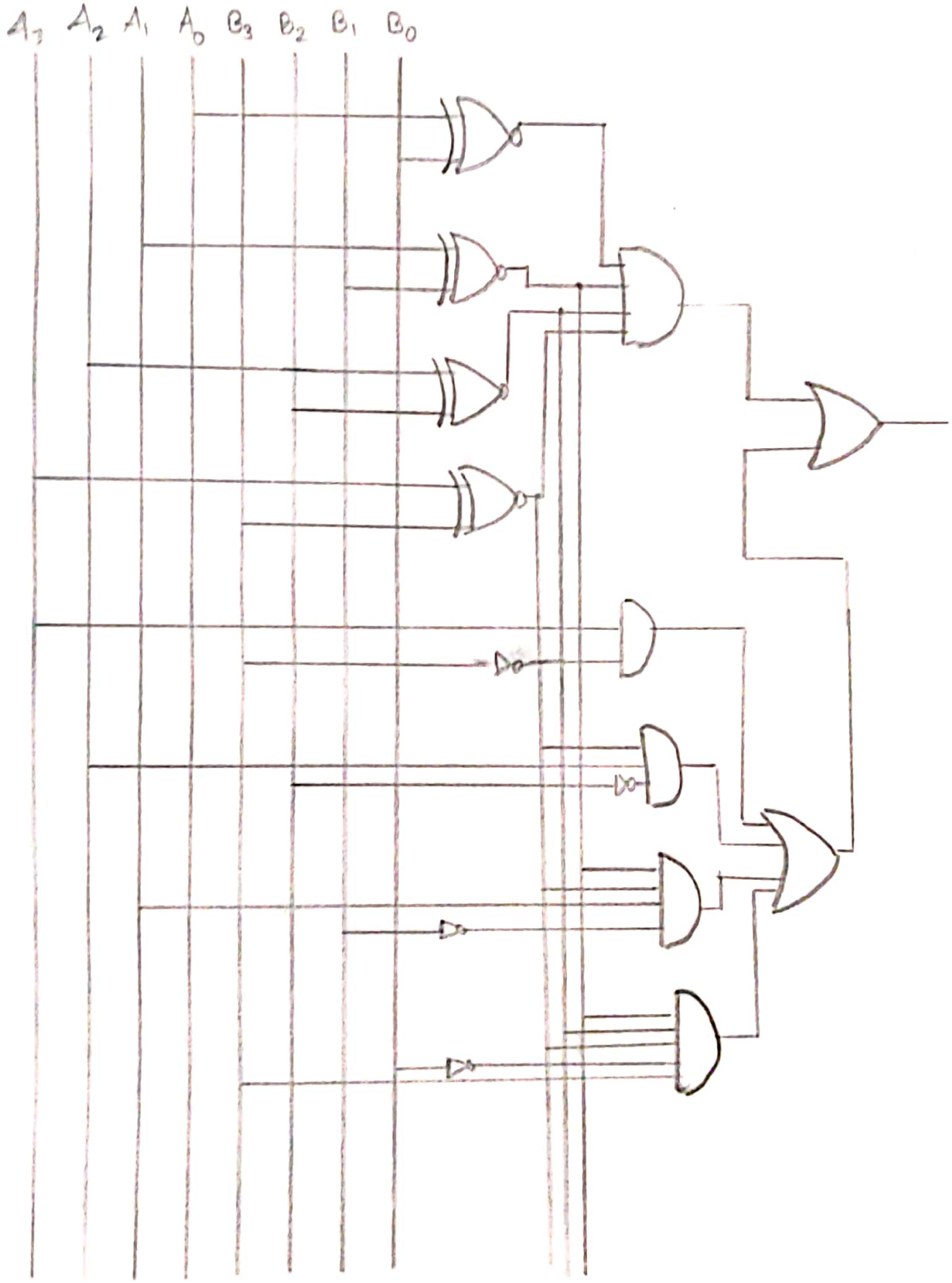
For simulation we need proteus software and in it we require:

i. Logic Probe (Big)
ii. Logic State
iii. 7485

4. Experimental Setup:

Captain

Date :.....



5. Result and Discussions:

(a) $A = B : (I)$;

$A_0 = B_0$ and $A_1 = B_1$ and $A_2 = B_2$ and $A_3 = B_3$

$A = B = (A_3 B_3' + A_3' B_3)' \cdot (A_2 B_2' + A_2' B_2)' \cdot (A_1 B_1' + A_1' B_1)' \cdot (A_0 B_0' + A_0' B_0)'$

$\therefore A = B = x_3 \cdot x_2 \cdot x_1 \cdot x_0$

(b) $A > B : (J)$;

$A_3 = 1$ and $B_3 = 0$ $A_3 \cdot B'$ or $(A_3 = B_3)$ and $(A_2 = B_2)$ and $(A_1 = B_1)$ and $(A_0 = 1$ and $B_0 = 0)$ $x_3 x_2 x_1 A_0 B_0'$

(c) $A < B : (K)$

$A_3 = 0$ and $B_3 = 1$, $A_3 B_3$ OR $(A_3 = B_3)$ and $(A_2 = 0$ and $B_2 = 1)$: $x_3 x_2' A_2' B_2$ OR $(A_3 = B_3)$ and $(A_2 = B_2)$ and $(A_1 = 0$ and $B_1 = 1)$: $x_3 x_2 A_1' B_1$ OR $(A_3 = B_3)$ and $(A_2 = B_2)$ and $(A_1 = B_1)$ and $(A_0 = 0$ and $B_0 = 1)$: $x_3 x_2 x_1 A_0' B_0$

The changes we need to make:

$A = B : (I) = x_0 x_1 x_2 x_3$

$A > B : (J) = A_3 B_3' + x_3 A_2 B_2' + x_3 x_2 A_1 B_1' + x_3 x_2 x_1 A_0 B_0'$

$A < B : (K) = A_3' B_3 + x_3 A_2' B_2 + x_3 x_2 A_1 B_1' + x_3 x_2 x_1 A_0' B_0$

for $(A < B)$

$(A < B)$; if A is not equal to B and A is greater than B

$\therefore (A < B) = I' \cdot J'$

$K = (I + J)'$

Implementation using NOR-gate :

A > B	A = B	A < B
0	0	1
0	1	0
1	0	0
1	1	undefined