Experiment No.6 (Implementation of 4 bit Magnitude Comparato

11001

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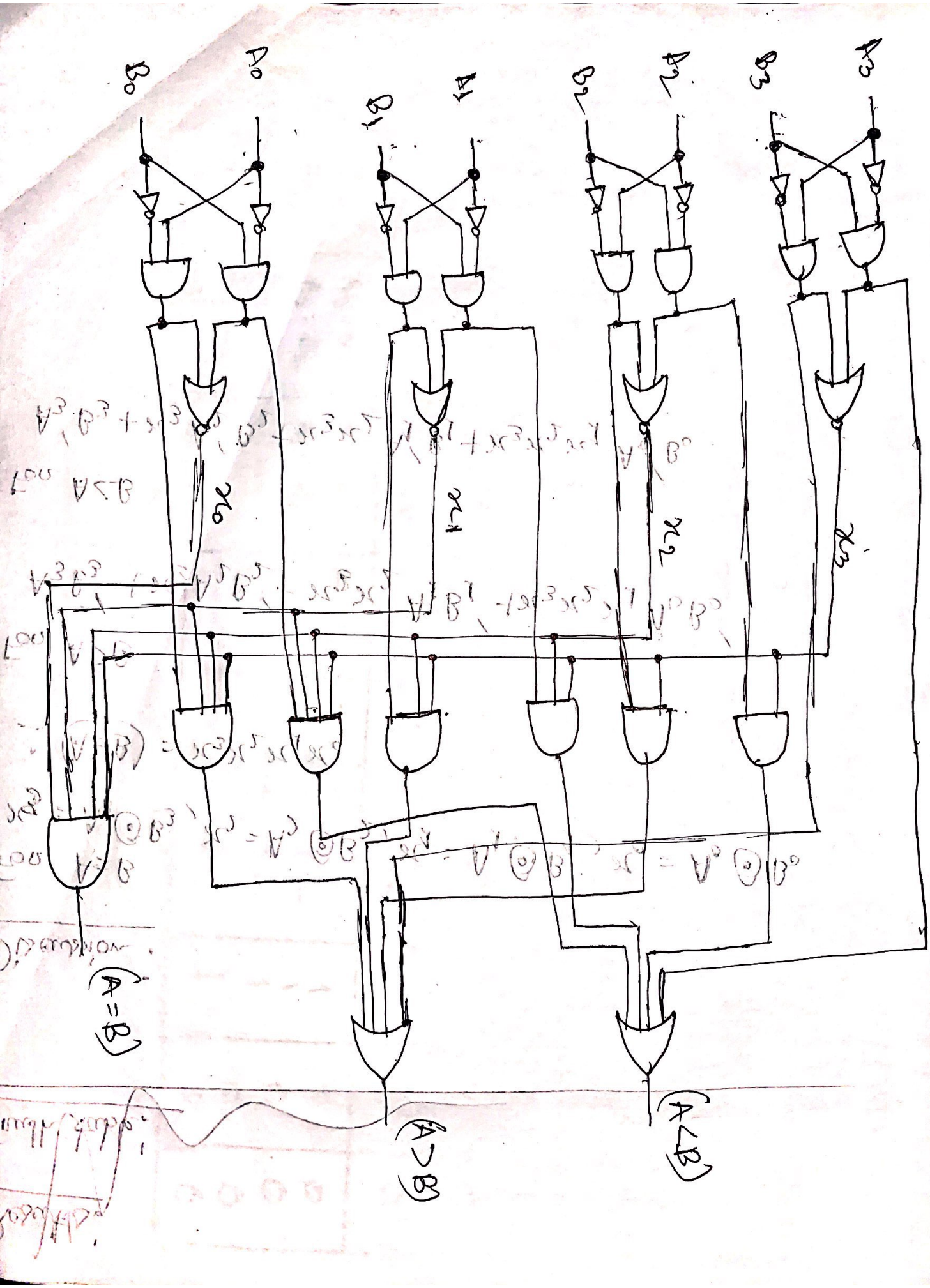
Objectives:

- Drawing the circuit that will act as a Magnitude Comparato
  Your circuit should be able to compare two 4 bit number
- To impliment my circuit (for two 4-bit numbers).

Required Equipments:

→ AND gate
→ NOT gate
→ NOR gate
→ LOGICPROBE
→ LOGICSTATE.
→ OR Gate
→ 4072
→ 4082
→ 7411

Experimental Setup:-



Truth Table:

Inputs							Outputs		
Compare				Cascade					
A_3, B_3	A_2, B_2	A_1, B_1	A_0, B_0	A<B	A=B	A>B	A<B	A=B	A>B
$A_3 > B_3$	—	—	—	—	—	1	0	0	1
$A_3 = B_3$	$A2 > B2$	—	—	—	—	1	0	0	1
$A_3 = B_3$	$A_2 = B_2$	$A1 > B_1$	—	—	—	1	0	0	1
$A_3 = B_3$	$A_2 = B_2$	$A_1 = B_1$	$A_0 > B_0$	—	—	1	0	0	1
$A_3 = B_3$	$A_2 = B_2$	$A_1 = B_1$	$A_0 = B_0$	0	0	1	0	0	1
$A_3 = B_3$	$A_2 = B_2$	$A_1 = B_1$	$A_0 = B_0$	0	1	—	0	1	0
$A_3 = B_3$	$A_2 = B_2$	$A_1 = B_1$	$A_0 = B_0$	1	0	—	1	0	0
$A_3 = B_3$	$A_2 = B_2$	$A_1 = B_1$	$A_0 < B_0$	—	—	—	1	0	0
$A_3 = B_3$	$A_2 = B_2$	$A_1 < B_1$	—	—	—	—	1	0	0
$A_3 = B_3$	$A_2 < B_2$	—	—	—	—	—	1	0	0
$A_3 < B_3$	—	—	—	—	—	—	1	0	0

Discussion:

For $A=B$

$x_3 = A_3 \odot B_3$, $x_2 = A_2 \odot B_2$, $x_1 = A_1 \odot B_1$, $x_0 = A_0 \odot B_0$

$\therefore (A=B) = x_3 x_2 x_1 x_0$

For $A>B$

$A_3 B_3' + x_3 A_2 B_2' + x_3 x_2 A_1 B_1' + x_3 x_2 x_1 A_0 B_0'$

For $A<B$

$A_3' B_3 + x_3 A_2' B_2 + x_3 x_2 A_1' B_1 + x_3 x_2 x_1 A_0' B_0$