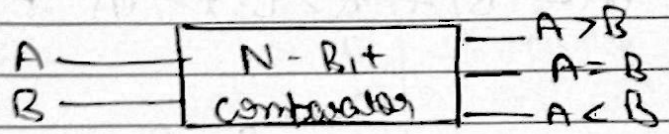
Hassk Mehtu
1082 G-2 Date Page No.
5C

Assignment - DE MC

1. Magnitude Comparator [1 Bit And 2 Bit]

A magnitude digital comparator is a combinational circuit that compares two digit or binary numbers in order to find out whether one binary number is equal, less than or greater than the other binary number. We logically design a circuit for which we will have two inputs one for A and other for B and have three output terminals, one for A ≥ B condition, one for A > B condition, one for A = B and one for A < B.



1- Bit Magnitude Comparator

A Comparator used to compare two bits is called a single bit comparator. It consists of two inputs each for two single bit numbers and three outputs to generate less than, equal to and greater than between two binary numbers.

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

Date
Page No.

Exp:-

$A > B : A\bar{B}$

$A < B : \bar{A}B$

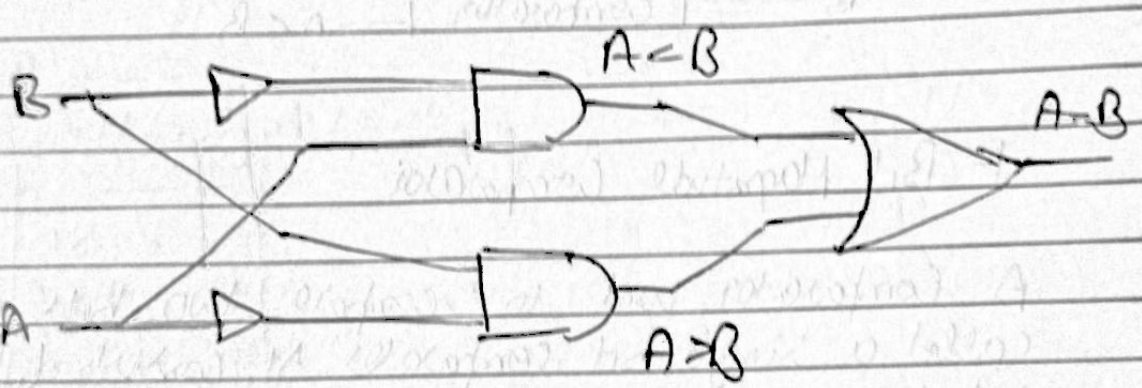
$A = B : \bar{A}\bar{B} + AB$

∴—

$(A < B) + (A > B) = \bar{A}B + A\bar{B}$

$((A < B) + (A > B))' = (A + \bar{B})(\bar{A} + B)$

Thus, $(A < B) + (A > B) \neq (A = B)$

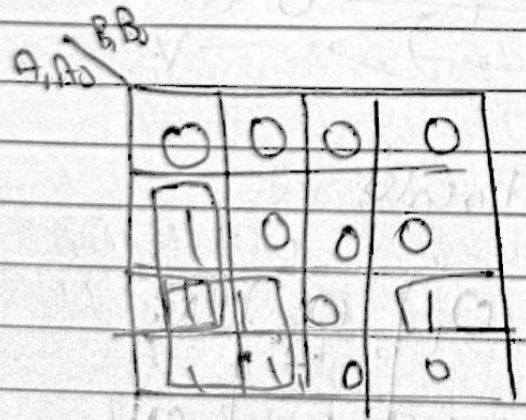


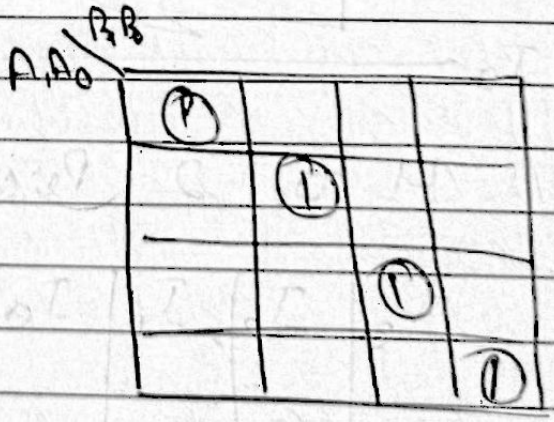
2 Bit Magnitude Comparator

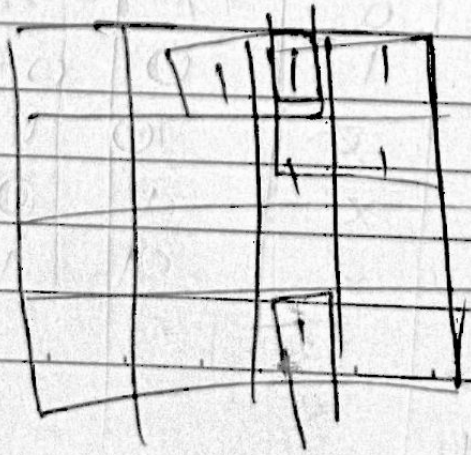
It is used to compare two binary numbers each of two bits is called a 2-bit Magnitude comparator. It consists of 4 inputs and 3 outputs to generate less than equal to and greater than b/w two binary numbers.

Date
Page No.

Input				Output		
A_1	A_0	B_1	B_0	$A<B$	$A=B$	$A>B$
0	0	0	0	0	1	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	0	0	1	0
1	0	1	1	1	0	0
1	1	0	0	0	0	1
1	1	0	1	0	0	1
1	1	1	0	0	0	1
1	1	1	1	0	1	0







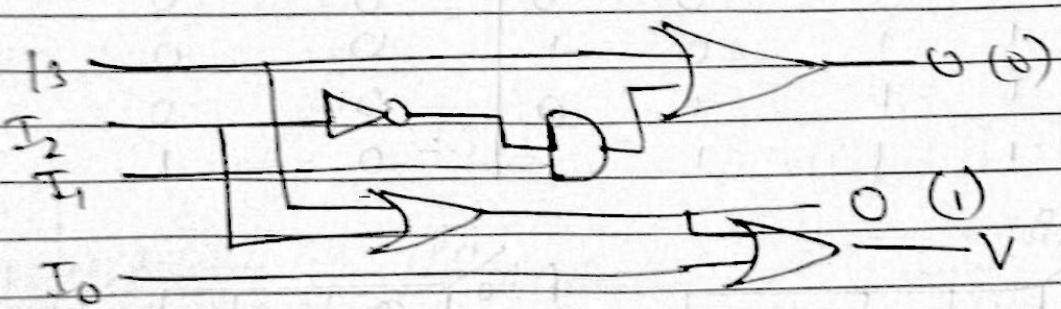
Date
Page No.

Exp :- $A < B : \bar{A}_1 B_1 + \bar{A}_0 B_1 B_0 + \bar{A}_1 \bar{A}_0 B_0$

Priority encoder :-

A priority encoder is a circuit that compresses multiple binary inputs into a smaller number of o/p

They are often used to control interrupt requests by acting on the highest priority interrupt input.



4 to 2 Priority Encoder

I_3	I_2	I_1	I_0	O_1	O_0	V
0	0	0	0	x	x	0
0	0	0	1	0	0	1
0	0	1	x	0	1	1
0	1	x	x	1	0	1
1	x	x	x	1	1	1

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