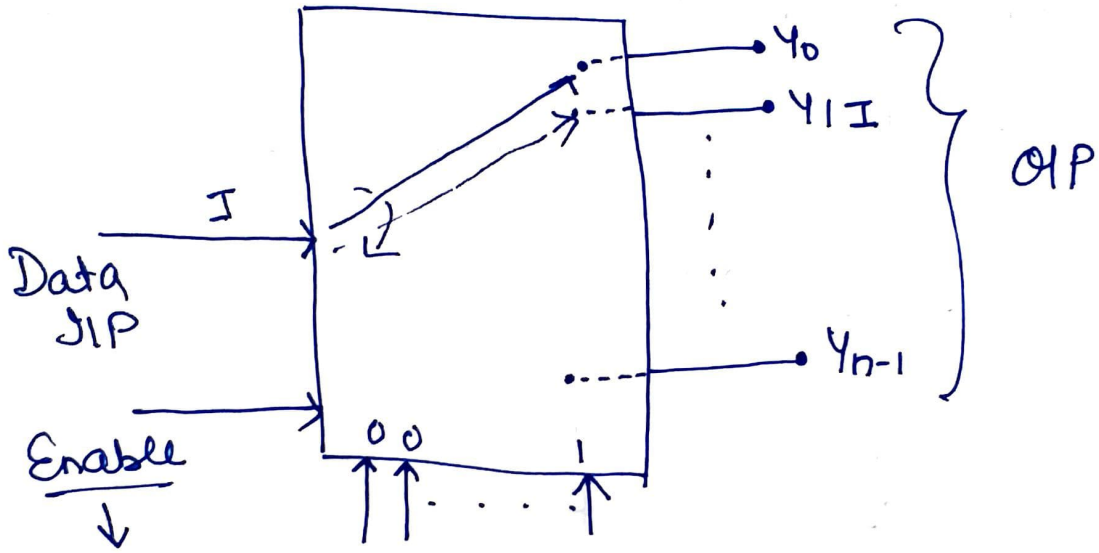
Introduction to DEMUX

(Demultiplexer)

↳ one I/P and many O/P

↳ Reverse operation of MUX

↳ one to many Ckt or data distributor



↓

0 → not working

1 → working.

$\overline{E}$ → 0 working

1 → Not working

↳ If I_0 to Y_5 → Select lines

1 0 1

n → O/P lines

m → Select lines

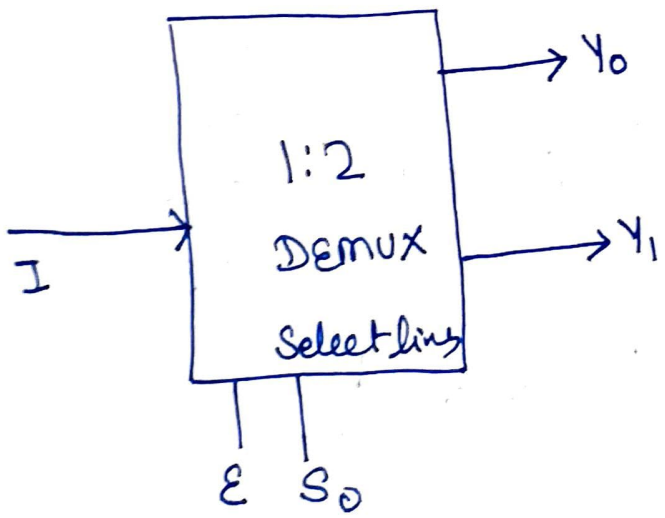
$$n = 2^m$$

$$m = \log_2 n$$ → no. of Select lines.

Q 1:2 DEMUX

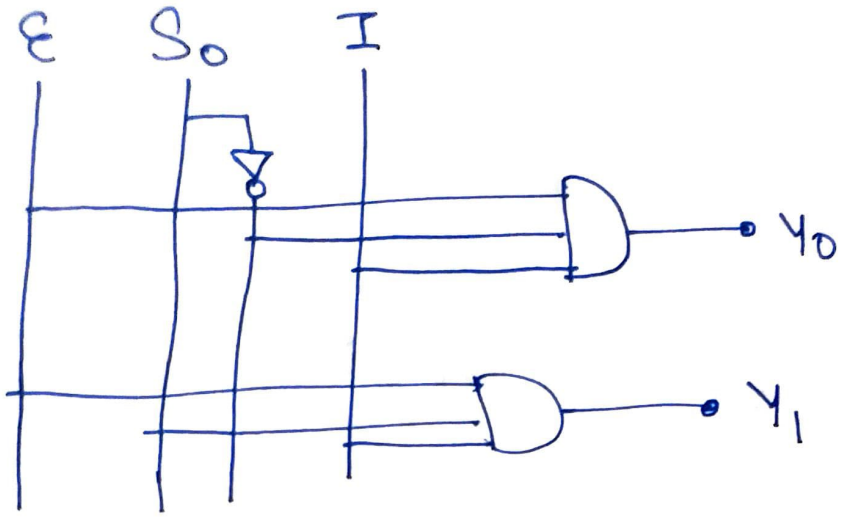
$m = \log_2 2$

$m = 1$

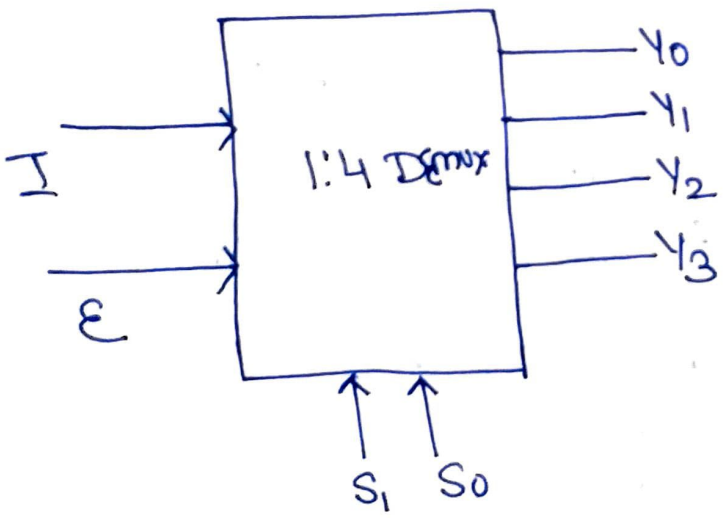


E	S_0	Y_0	Y_1
0	0	0	0
0	1	0	0
1	0	I	0
1	1	0	I

$Y_0 = E\bar{S}_0 I$ $\quad Y_1 = E S_0 I$



1:4 DEMUX



$n = 4$

$m = \log_2 4$

$= 2 \log_2 2$

$m = 2$

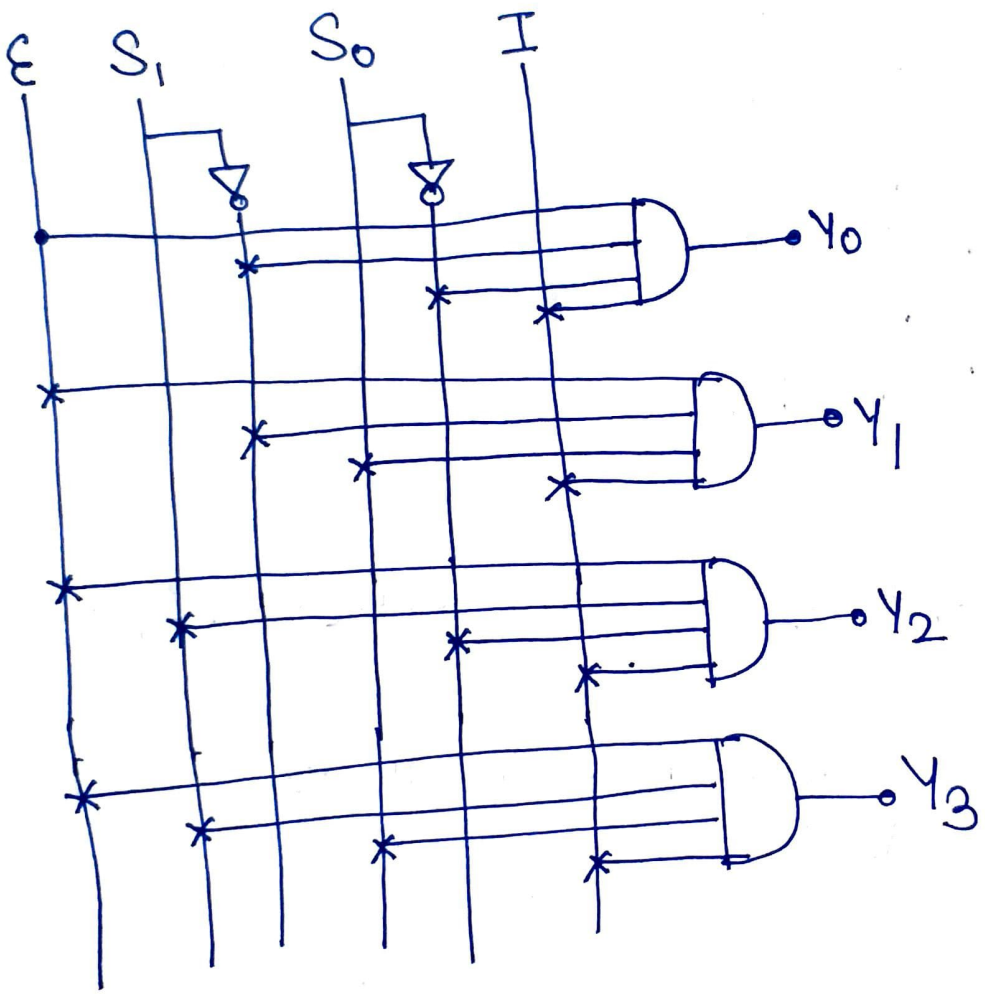
E	S_1	S_0	Y_0	Y_1	Y_2	Y_3
0	x	x	0	0	0	0
1	0	0	I	0	0	0
1	0	1	0	I	0	0
1	1	0	0	0	I	0
1	1	1	0	0	0	I

$Y_0 = \varepsilon \bar{S}_1 \bar{S}_0 I$

$Y_1 = \varepsilon \bar{S}_1 S_0 I$

$Y_2 = \varepsilon S_1 \bar{S}_0 I$

$Y_3 = \varepsilon S_1 S_0 I$



FULL SUBTRACTOR USING 1:8 DEMUX

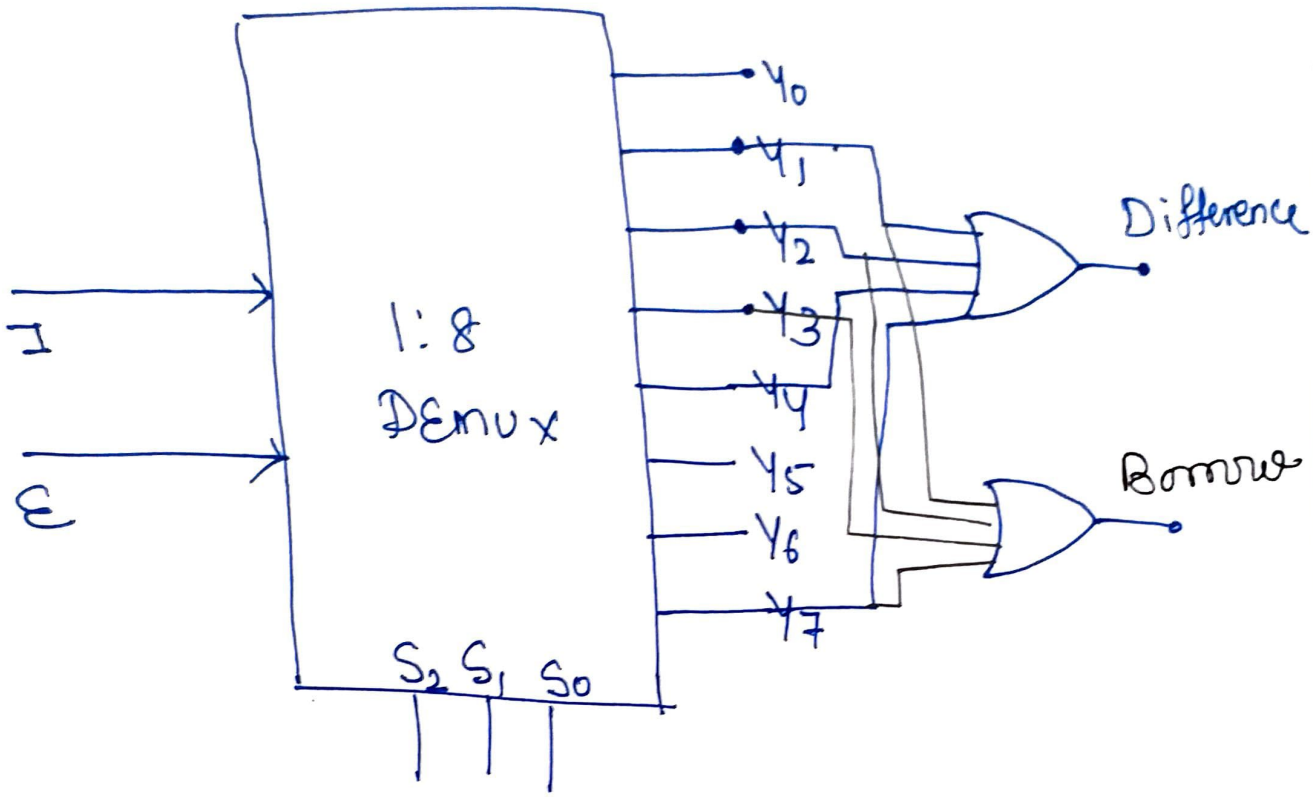
A	B	Bi	D	Bo
0	0	0	0	0
0	0	1	1	1
0	1	0	1	1
0	1	1	0	1
1	0	0	1	0
1	0	1	0	0
1	1	0	0	0
1	1	1	1	1

T.T of Full Subtractor

Standard SOP

$D = \Sigma m(1,2,4,7)$ $\quad B_o = \Sigma m(1,2,3,7)$

A S_2	B S_1	Bi S_0	Y_0	Y_1	Y_2	Y_3	Y_4	Y_5	Y_6	Y_7
0	0	0	1	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0
1	0	1	0	0	0	0	0	1	0	0
1	1	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	0	0	0	0	1

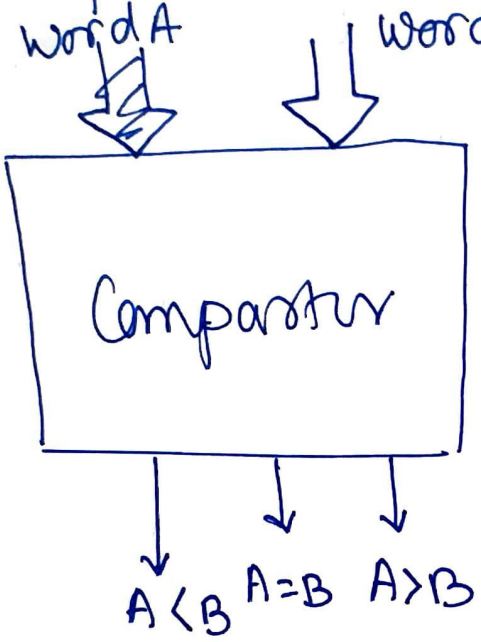


1:8 DEMUX

Q Implement full Adder by

2-Bit Comparator

↳ A digital Comparator is a Combinational Ckt designed to Compare two n-bit binary words

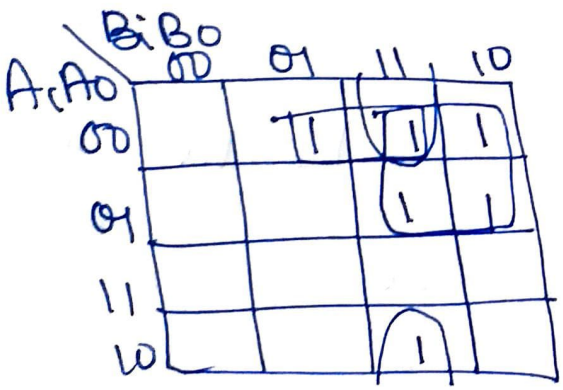


↳ Comparator has 3 OIPs (2 bit Magnitude Comparator

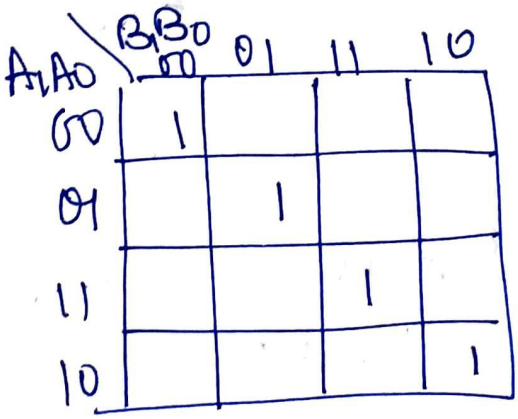
Inputs				A<B	A=B	A>B
A_1	A_0	B_1	B_0			
0	0	0	0	0	1	0
0	0	0	1	1	0	0
0	0	1	0	1	0	0
0	0	1	1	1	0	0
0	1	0	0	0	0	1
0	1	0	1	0	1	0
0	1	1	0	1	0	0
0	1	1	1	1	0	0
1	0	0	0	0	0	1
1	0	0	1	0	0	1
1	0	1	1	1	0	0

A_1	A_0	B_1	B_0	$A<B$	$A=B$	$A>B$
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

For $A<B$

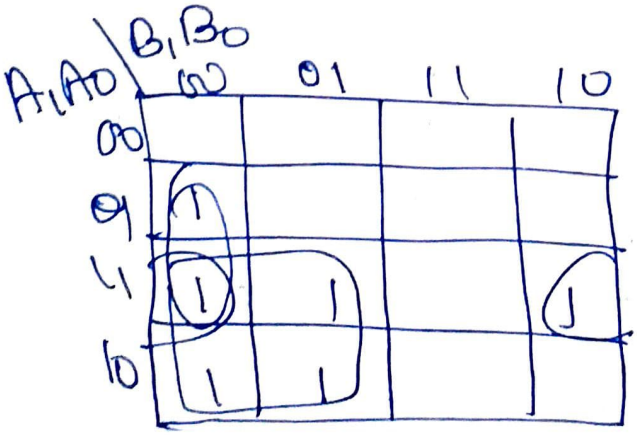


For $A=B$



$A<B = \bar{A}_1 B_1 + \bar{A}_1 \bar{A}_0 B_0 + \bar{A}_0 B_1 B_0$

$A=B \quad (A_1 \odot B_1)(A_0 \odot B_0)$



Implement this by gates.

$A>B = A_1 \bar{B}_1 + A_0 \bar{B}_1 B_0 + A_1 A_0 \bar{B}_0$