Encoder → generate BCD for the given input line / assign code to the input line.

It is a combinational logic function that has 2^n input lines and n output lines.

The n output lines generate the binary code for the possible 2^n input lines,

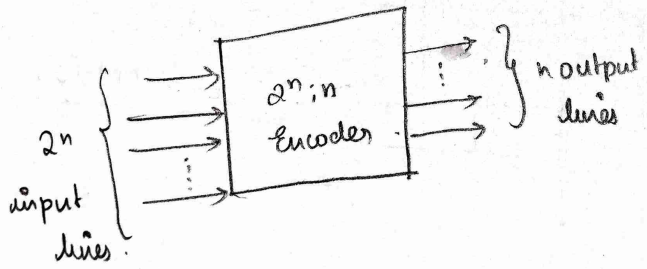
Input $- 2^n$.

Output $- n$.

Encoder $- 2^n : n$.

$m : n$

$m \leq 2^n$.



An encoder has a no. of input lines, only one of which input is activated at a given time and produces an n-bit output code,

Four to 2 line Binary coder, 4 input line
2 output line.

Truth table.

	Input				Output	
	I_3	I_2	I_1	I_0	B_1	B_0
0	0	0	0	1	0	0
1	0	0	1	0	0	1
2	0	1	0	0	1	0
3	1	0	0	0	1	1.

encode is gonna generate output for activated input line.

Active high output.
Active low output [0 - Active, 1 - inactive).

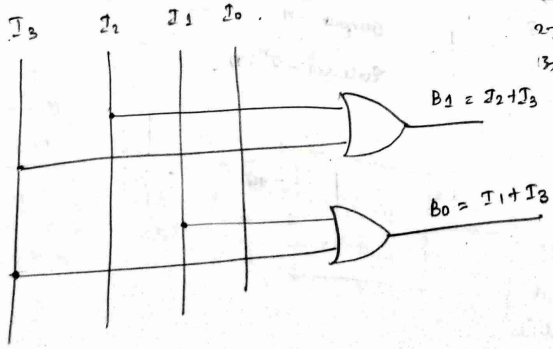
I_0 - 1 → 00.
I_1 - 1 → 01
I_2 → 1 → 10
I_3 → 1 → 11.

O/P B_1, B_0.

Logic Implementation,

Expression, $B_1 = I_2 + I_3$.
$B_0 = I_1 + I_3$.] → 2 OR gates.

0 → I_0 → 00.
1 → I_1 → 01
2 → I_2 → 10
3 → I_3 → 11.



Eight to three

Decimal	I_7	
0	0	
1	0	
2	0	
3	0	
4	0	
5	0	
6	0	
7	1.	

B_0
B_1
B_2

I_7
I_6
I_5
I_4

Eight to three line Binary Encoder. 8 → I/P, 3 → O/P.

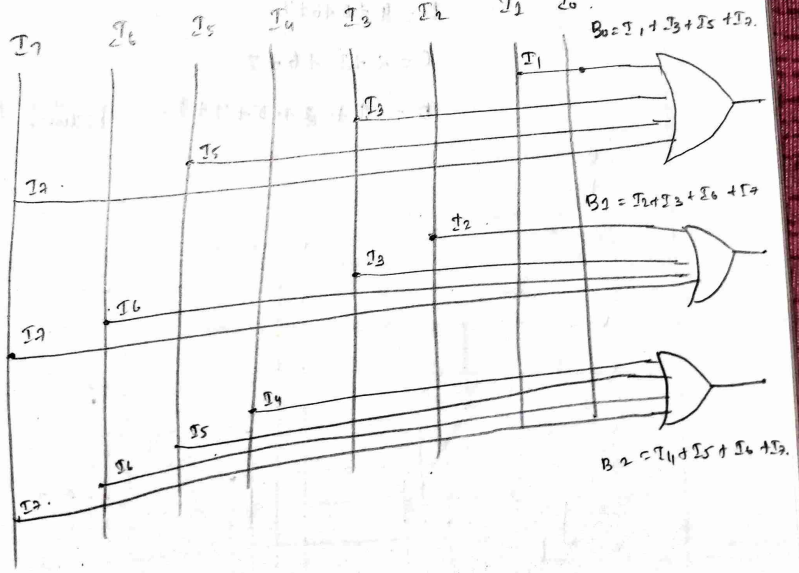
(Octal to Binary Encoder).

Decimal	Input. I_7	I_6	I_5	I_4	I_3	I_2	I_1	I_0	output. B_2	B_1	B_0
0	0	0	0	0	0	0	0	1	0	0	0
1	0	0	0	0	0	0	1	0	0	0	1
2	0	0	0	0	0	1	0	0	0	1	0
3	0	0	0	0	1	0	0	0	0	1	1
4	0	0	0	1	0	0	0	0	1	0	0
5	0	0	1	0	0	0	0	0	1	0	1
6	0	1	0	0	0	0	0	0	1	1	0
7	1	0	0	0	0	0	0	0	1	1	1

$B_0 = I_1 + I_3 + I_5 + I_7$.

$B_1 = I_2 + I_3 + I_6 + I_7$.

$B_2 = I_4 + I_5 + I_6 + I_7$.



Decimal to BCD Encoder,

Input → (0 to 9)

BCD → 4 output.

Truth table of decimal to BCD encoder.

	decimal input										BCD outputs			
	0	1	2	3	4	5	6	7	8	9	A	B	C	D
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	1	0	0	0	0	0	0	0	0	0	1	0
3	0	0	0	1	0	0	0	0	0	0	0	0	1	1
4	0	0	0	0	1	0	0	0	0	0	0	1	0	0
5	0	0	0	0	0	1	0	0	0	0	0	1	0	1
6	0	0	0	0	0	0	1	0	0	0	0	1	1	0
7	0	0	0	0	0	0	0	1	0	0	0	1	1	1
8	0	0	0	0	0	0	0	0	1	0	1	0	0	0
9	0	0	0	0	0	0	0	0	0	1	1	0	0	1

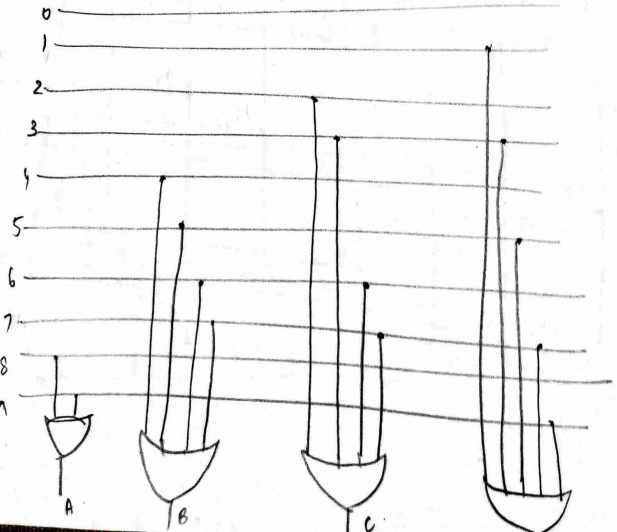
A = 8 + 9

B = 4 + 5 + 6 + 7.

C = 2 + 3 + 6 + 7.

D = 1 + 3 + 5 + 7 + 9.

Decimal to BCD encode.



Priority Encoder,

A priority encoder

If 2 or more inputs

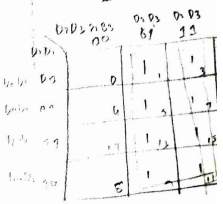
input having the

LSB

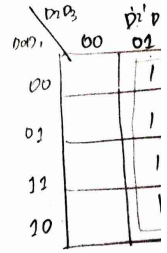
	I
D0	
1	
X	
X	
X	
0	

valid will be

$2^4 = 16$. (For X



$X = D_3 +$



Y

Priority Encoder,

A priority encoder is an encoder that includes the priority function. If 2 or more inputs are equal to 1 at the same time, the input having the highest priority will take precedence.

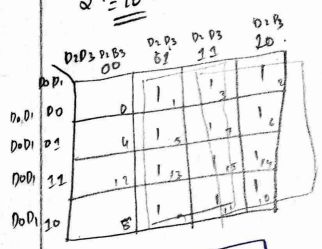
LSB

Inputs			MSD	Outputs		
D_0	D_1	D_2	D_3	x	y	V
1	0	0	0	0	0	1
x	1	0	0	0	1	1
x	x	1	0	1	0	1
x	x	x	1	1	1	1
0	0	0	0	0	0	0

→ valid

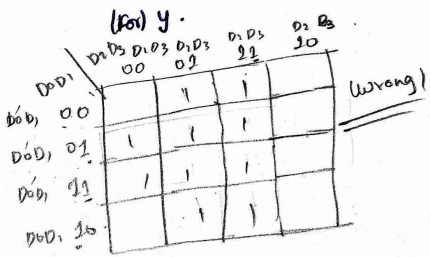
valid will be 0, when all the inputs are 0.

(For x)



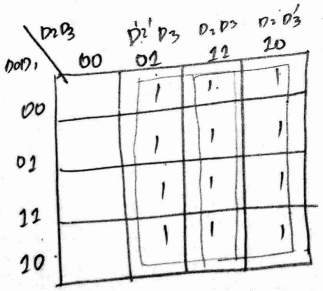
$x = D_3 + D_2$

(For y)

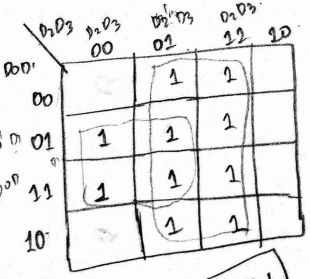


(wrong)

y,



$Y = D_3 + D_2$



$y = D_2 + D_1 D_3'$