DIGITAL ELECTRONICS:
DECODER

SNS COLLEGE OF ENGINEERING

Kurumbapalayam (PO), Coimbatore – 641 107

An Autonomous Institution

Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

DECODERS

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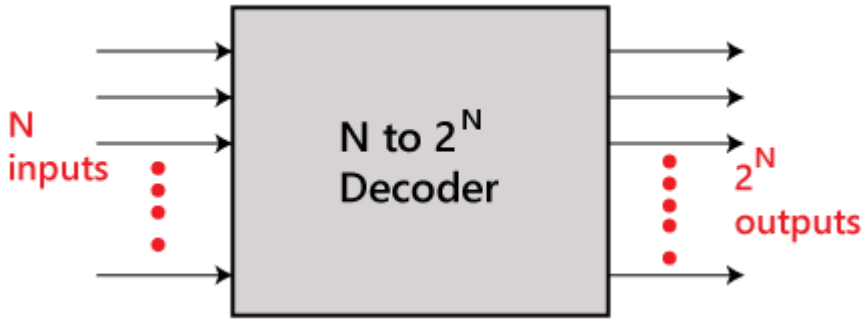
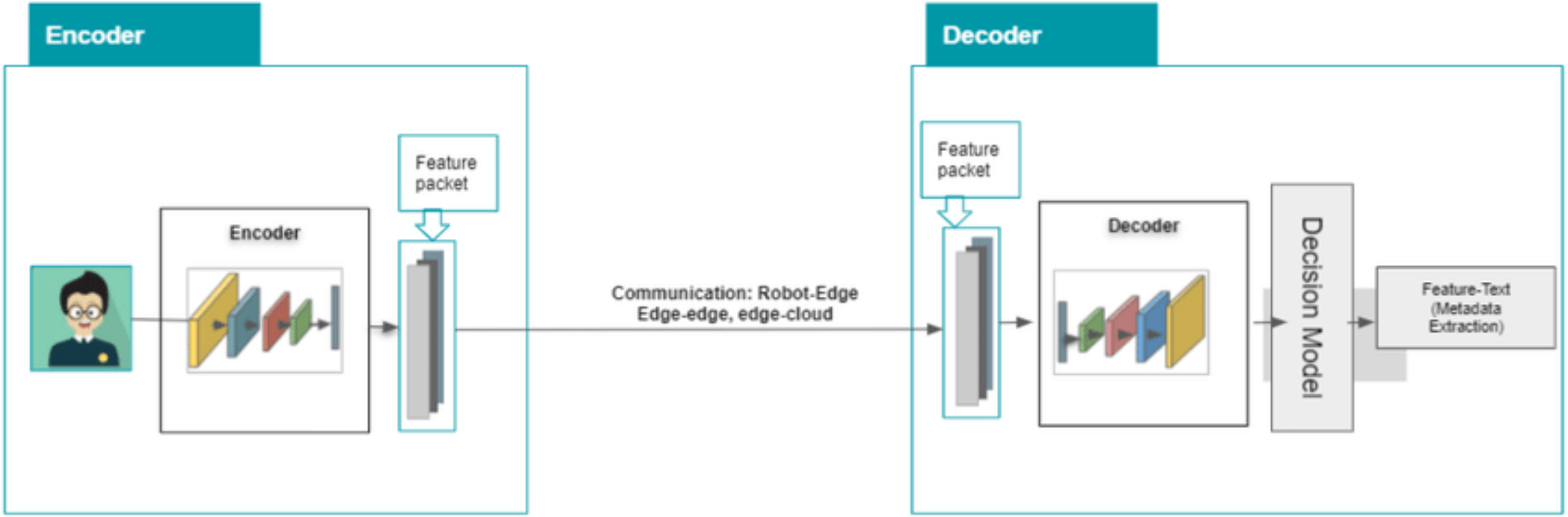
DECODERS

- ✓ The combinational circuit that change the binary information into 2N output lines is known as Decoders.
- ✓ The binary information is passed in the form of N input lines.
- ✓ The output lines define the 2N-bit code for the binary information.



APPLICATIONS

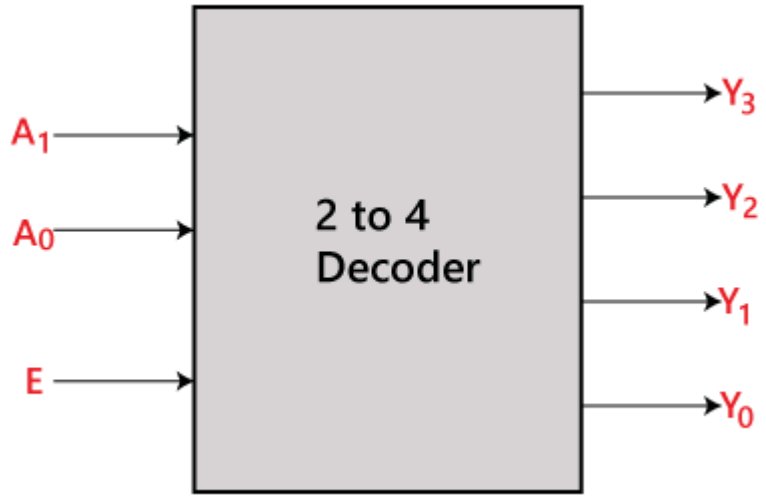


TYPES OF ENCODERS

- ✓ 2 to 4 Decoder
- ✓ 3 to 8 Decoder
- ✓ 4 to 16 Decoder

2:4 LINE DECODER

In the 2 to 4 line decoder, there is a total of three inputs, i.e., A0, and A1 and E and four outputs, i.e., Y0, Y1, Y2, and Y3. For each combination of inputs, when the enable 'E' is set to 1, one of these four outputs will be 1.



2: 4 LINE DECODER

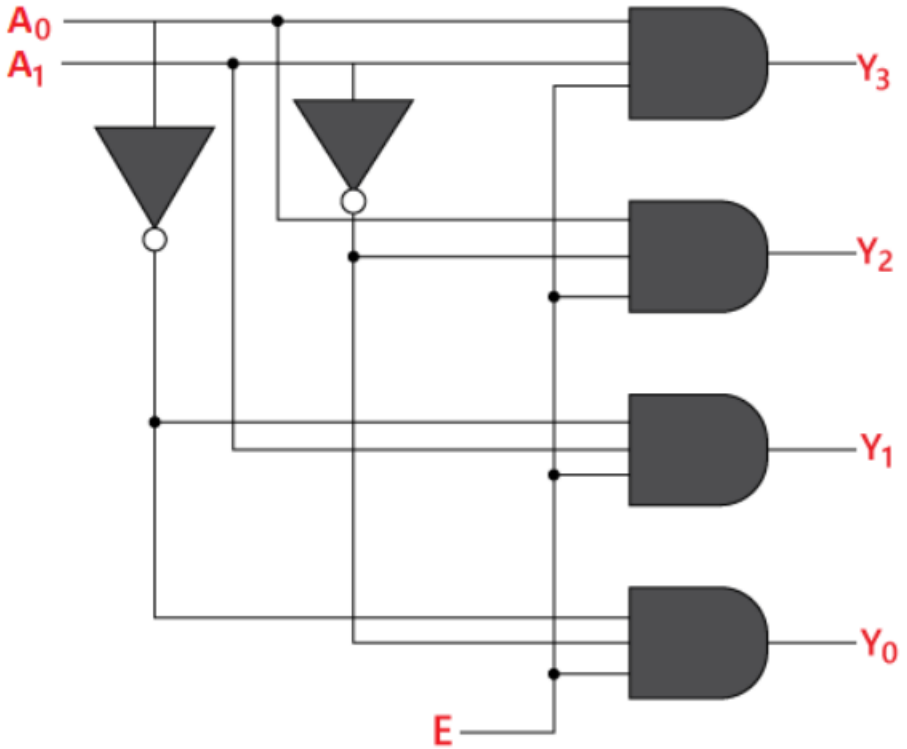
Enable	INPUTS		OUTPUTS			
E	A_1	A_0	Y_3	Y_2	Y_1	Y_0
0	X	X	0	0	0	0
1	0	0	0	0	0	1
1	0	1	0	0	1	0
1	1	0	0	1	0	0
1	1	1	1	0	0	0

$Y_3 = E.A_1.A_0$

$Y_2 = E.A_1.A_0'$

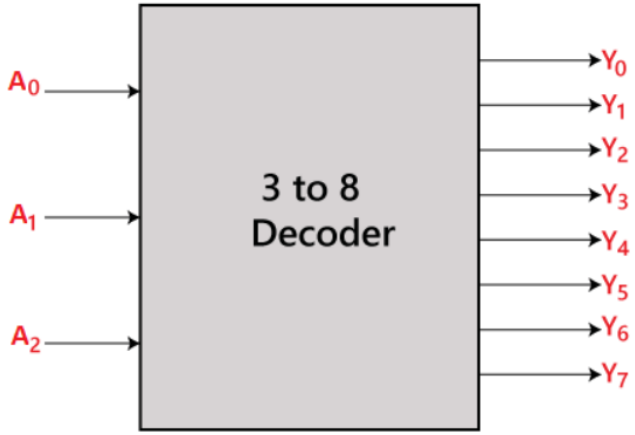
$Y_1 = E.A_1'.A_0$

$Y0 = E.A_1'.A_0'$



3: 8 LINE DECODER

The 3 to 8 line decoder is also known as Binary to Octal Decoder. In a 3 to 8 line decoder, there is a total of eight outputs, i.e., Y0, Y1, Y2, Y3, Y4, Y5, Y6, and Y7 and three outputs, i.e., A0, A1, and A2. This circuit has an enable input 'E'. Just like 2 to 4 line decoder, when enable 'E' is set to 1, one of these four outputs will be 1.



3:8 LINE DECODER

Enable	INPUTS			Outputs							
E	A_2	A_1	A_0	Y_7	Y_6	Y_5	Y_4	Y_3	Y_2	Y_1	Y_0
0	x	x	x	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	1
1	0	0	1	0	0	0	0	0	0	1	0
1	0	1	0	0	0	0	0	0	1	0	0
1	0	1	1	0	0	0	0	1	0	0	0
1	1	0	0	0	0	0	1	0	0	0	0
1	1	0	1	0	0	1	0	0	0	0	0
1	1	1	0	0	1	0	0	0	0	0	0
1	1	1	1	1	0	0	0	0	0	0	0

$Y_0 = A_0'.A_1'.A_2'$

$Y_1 = A_0.A_1'.A_2'$

$Y_2 = A_0'.A_1.A_2'$

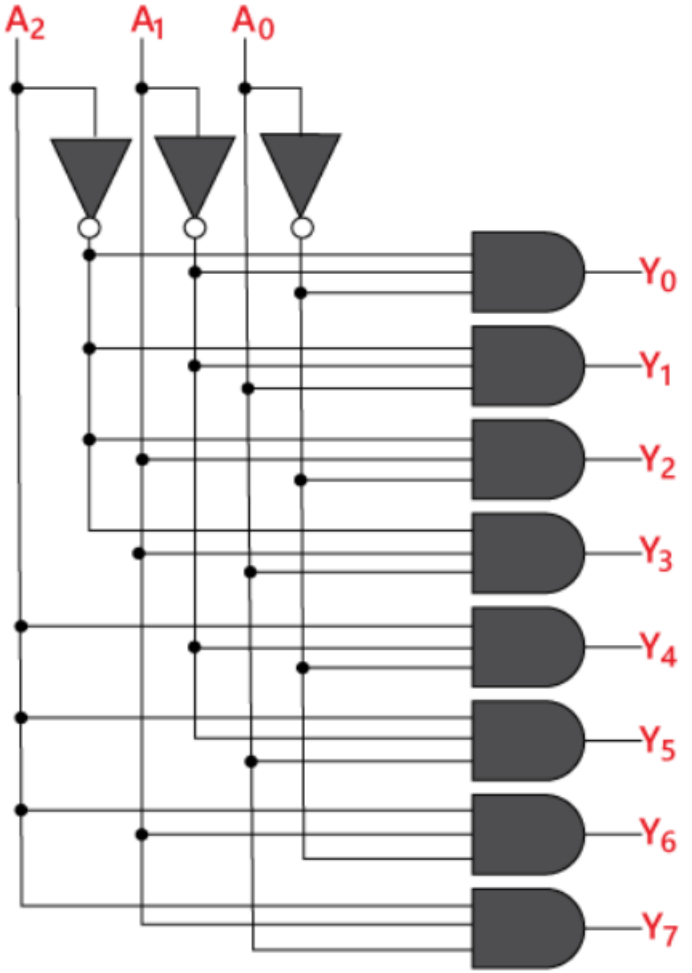
$Y_3 = A_0.A_1.A_2'$

$Y_4 = A_0'.A_1'.A_2$

$Y_5 = A_0.A_1'.A_2$

$Y_6 = A_0'.A_1.A_2$

$Y_7 = A_0.A_1.A_2$



Assessment

1. A 4 to 16 decoder has ____ number of inputs.

2. Write any two applications of Decoder.


Thank
you