Lab Report - 06

Course No: 206

Course Title: Digital Logic Design

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Lab-06

Name of Experiment: To check the operation of 2 to 4 line Decoder / 3 to 8 line Decoder and design circuit.

Equipment:

1. 3 input AND Gate
2. Not Gate
3. Logic probe
4. Logic State

Description: A decoder is a circuit that changes a code into a set of signals. It is called a decoder because it does the reverse of encoding, but we will began our study of ~~encoder~~ decoder.

A common type of decoder is the line decoder which taks an n-digit binary number and decodes into 2^n data lines. The simplest is the 2 to 4 Line decoders.

The truth table of 2 to 4 line decoders:

A	B	D_0	D_1	D_2	D_3
0	0	1	0	0	0
0	1	0	1	0	0
1	0	0	0	1	0
1	1	0	0	0	1

$D_0 = \bar{A}\bar{B}$

$D_1 = \bar{A}B$

$D_2 = A\bar{B}$

$D_3 = AB$

3 to 8 line Decoders

In 3 to 8 line decoders, it includes three inputs and eight outputs. Here the inputs are represented through [redacted], A, B, C. whereas the output are respresented through $D_0, D_1, D_2 - - D_7$

The selection of 8 output can be done based on three inputs.

Truth table of 3 to 8 line Decoder

A	B	C	D_0	D_1	D_2	D_3	D_4	D_5	D_6	D_7	
0	0	0	1	0	0	0	0	0	0	0	0
0	0	1	0	1	0	0	0	0	0	0	0
0	1	0	0	0	1	0	0	0	0	0	0
0	1	1	0	0	0	1	0	0	0	0	0
1	0	0	0	0	0	0	1	0	0	0	0
1	0	1	0	0	0	0	0	1	0	0	0
1	1	0	0	0	0	0	0	0	1	0	0
1	1	1	0	0	0	0	0	0	0	1	0

$D_0 = \bar{A}\bar{B}\bar{C}$

$D_1 = \bar{A}\bar{B}C$

$D_2 = \bar{A}B\bar{C}$

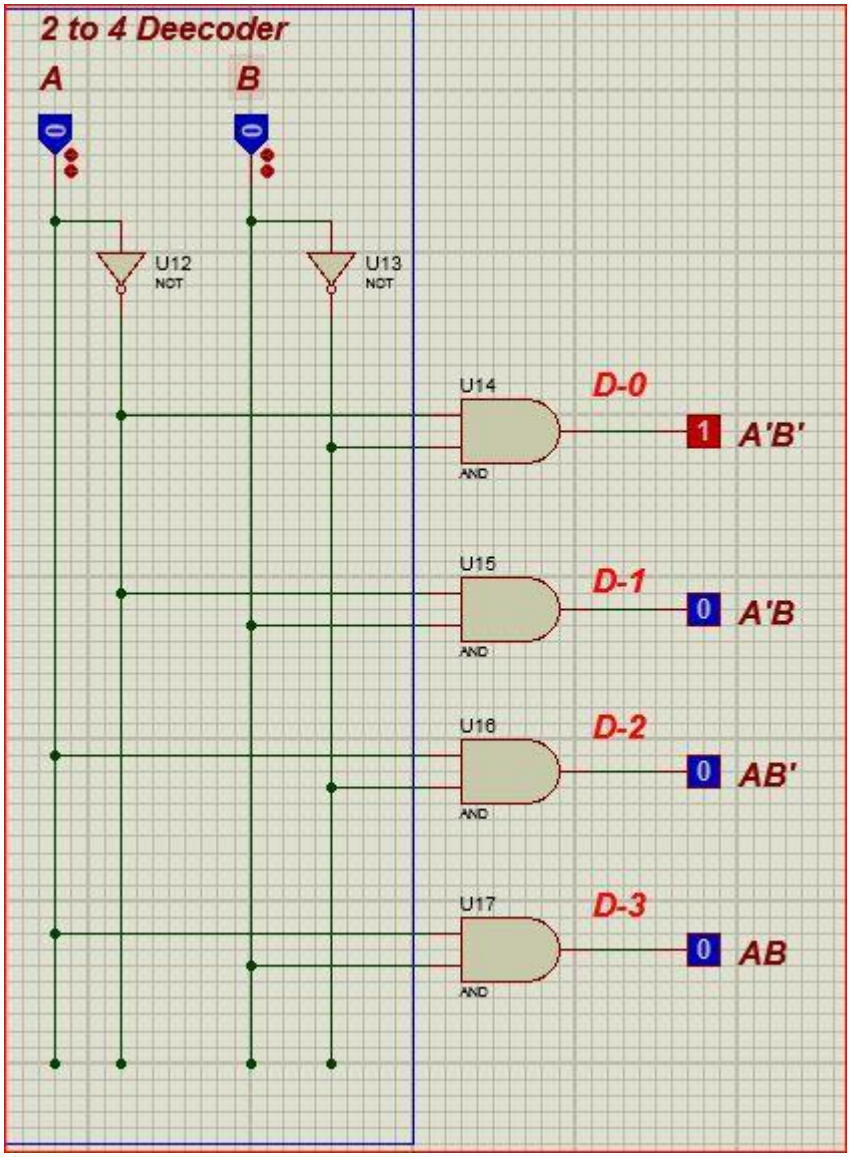
$D_3 = \bar{A}BC$

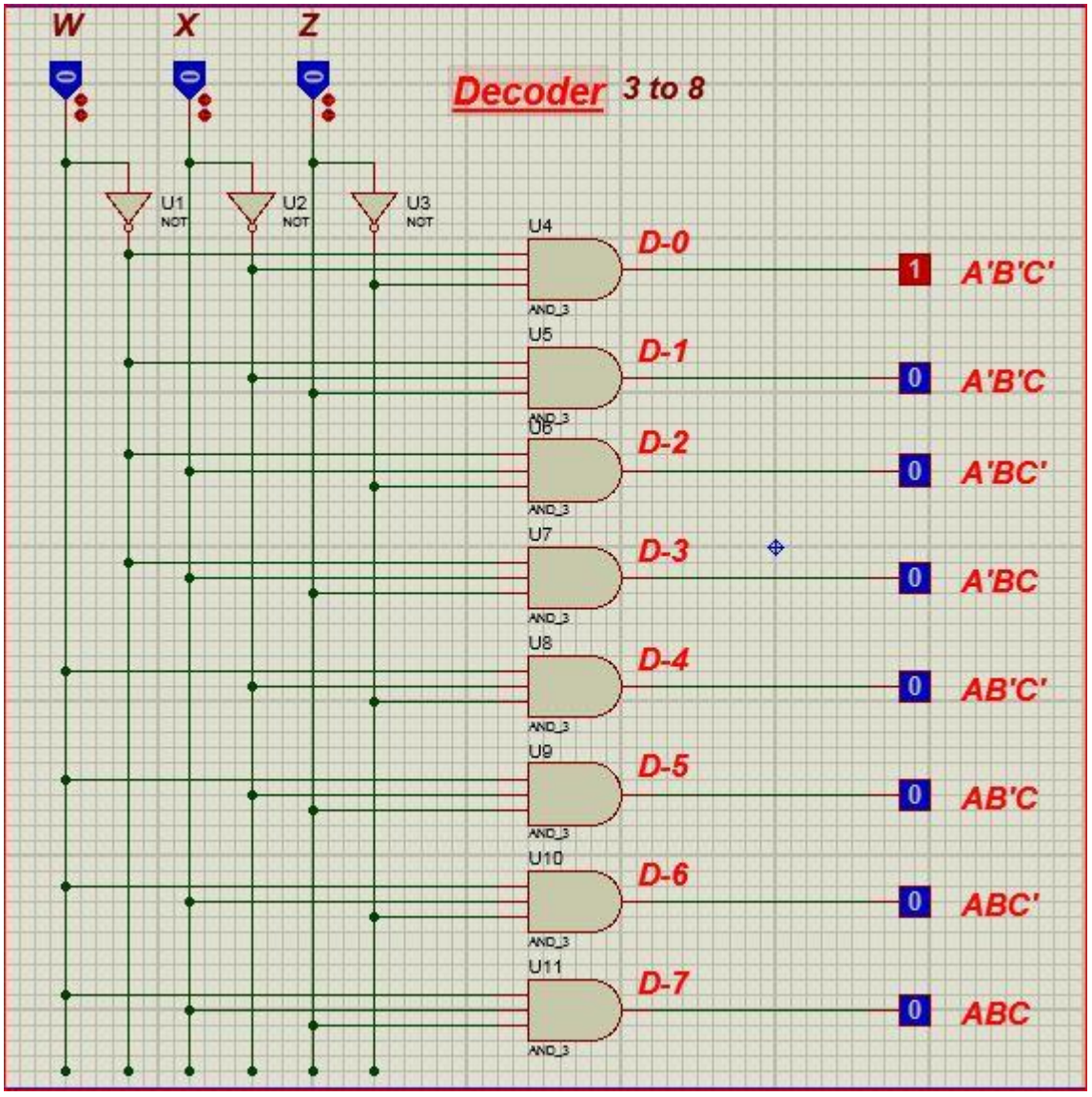
$D_4 = A\bar{B}\bar{C}$

$D_5 = A\bar{B}C$

$D_6 = AB\bar{C}$

$D_7 = ABC$


2 to 4 Deecoder
A
B
U12
NOT
U13
NOT
U14
AND
D-0
1
A'B'
U15
AND
D-1
0
A'B
U16
AND
D-2
0
AB'
U17
AND
D-3
0
AB


W
X
Z
Decoder 3 to 8
U1
NOT
U2
NOT
U3
NOT
U4
AND_3
D-0
1
A'B'C'
U5
AND_3
D-1
0
A'B'C
U6
AND_3
D-2
0
A'BC'
U7
AND_3
D-3
0
A'BC
U8
AND_3
D-4
0
AB'C'
U9
AND_3
D-5
0
AB'C
U10
AND_3
D-6
0
ABC'
U11
AND_3
D-7
0
ABC

Conclusion

① we have learnt that how to operate 2 to 4 line decoders.

② we have also learn't how to operate 3 to 8 line decoders.

③ we have learnt how to find out the relation between input and output of a decoders.

④ we have also learn't how to implement a circuit of decoders using Basic gates.