# Priority Encoder

- A priority encoder is an encoder that includes the priority function.

- The operation of priority encoder is such that if two or more inputs are equal to 1 at the same time ,the input having the highest priority will take the precedence.

- A valid output indicator , V is set to 1 only when one or more inputs are equal to 1. If all the inputs are 0, V is equal to 0.

| Inputs				Outputs		
D_0	D_1	D_2	D_3	Y_2	Y_1	V
0	0	0	0	X	X	0
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

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Parity Checkers

- Exclusive – OR gates are ideal for checking the parity of a binary number because they produce an output when the input has an odd number of 1's.

- Therefore, an even parity input to an exclusive- OR gate produces a low output, while an odd- parity input produces a high output.

- For example consider a 4 - bit number (WXYZ).Hence the output is 1 when the number of 1's in the inputs W, X, Y, Z is odd and 0 when the number of 1's in the inputs is even.

(a) 4-bit parity checker

1010110010001100

(b) 16-bit parity checker
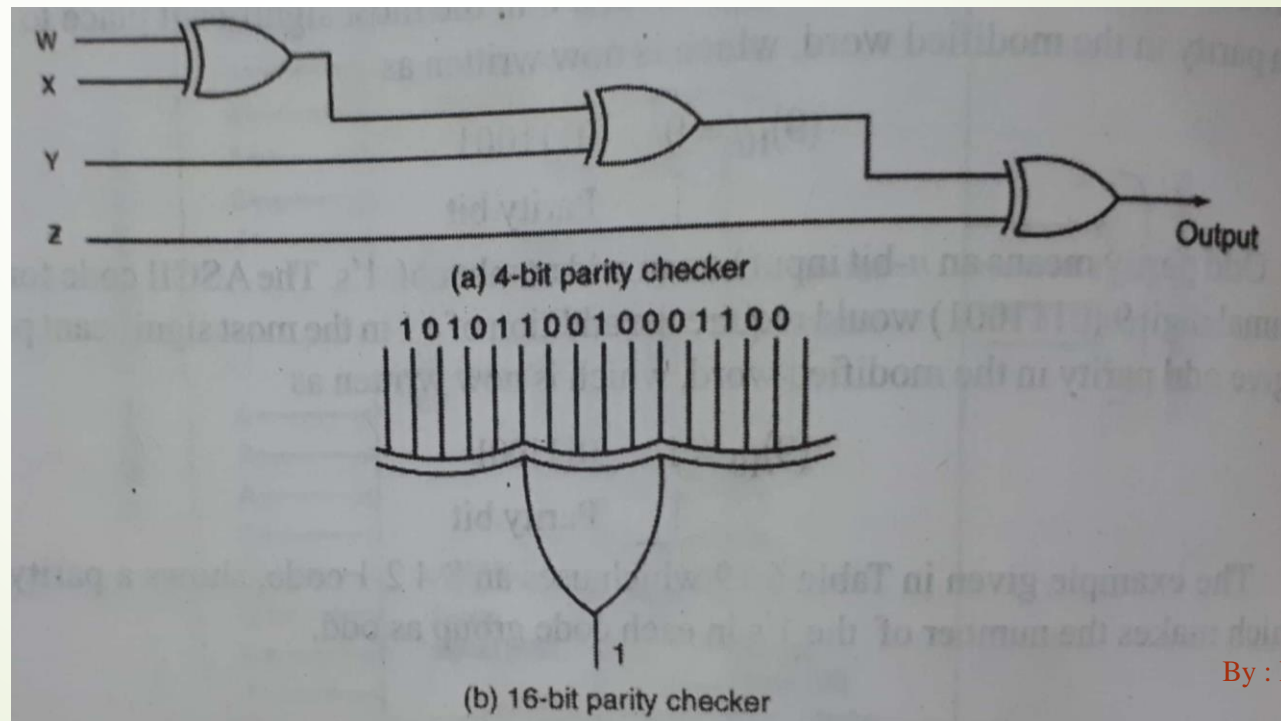
Parity Generation (Odd parity Generator)

- An Ex – NOR gate can be used to generate parity bits.

8-bit number

$X_7 X_6 X_5 X_4 X_3 X_2 X_1 X_0$

Instruction or data bits

X_8

9-bit number with odd parity
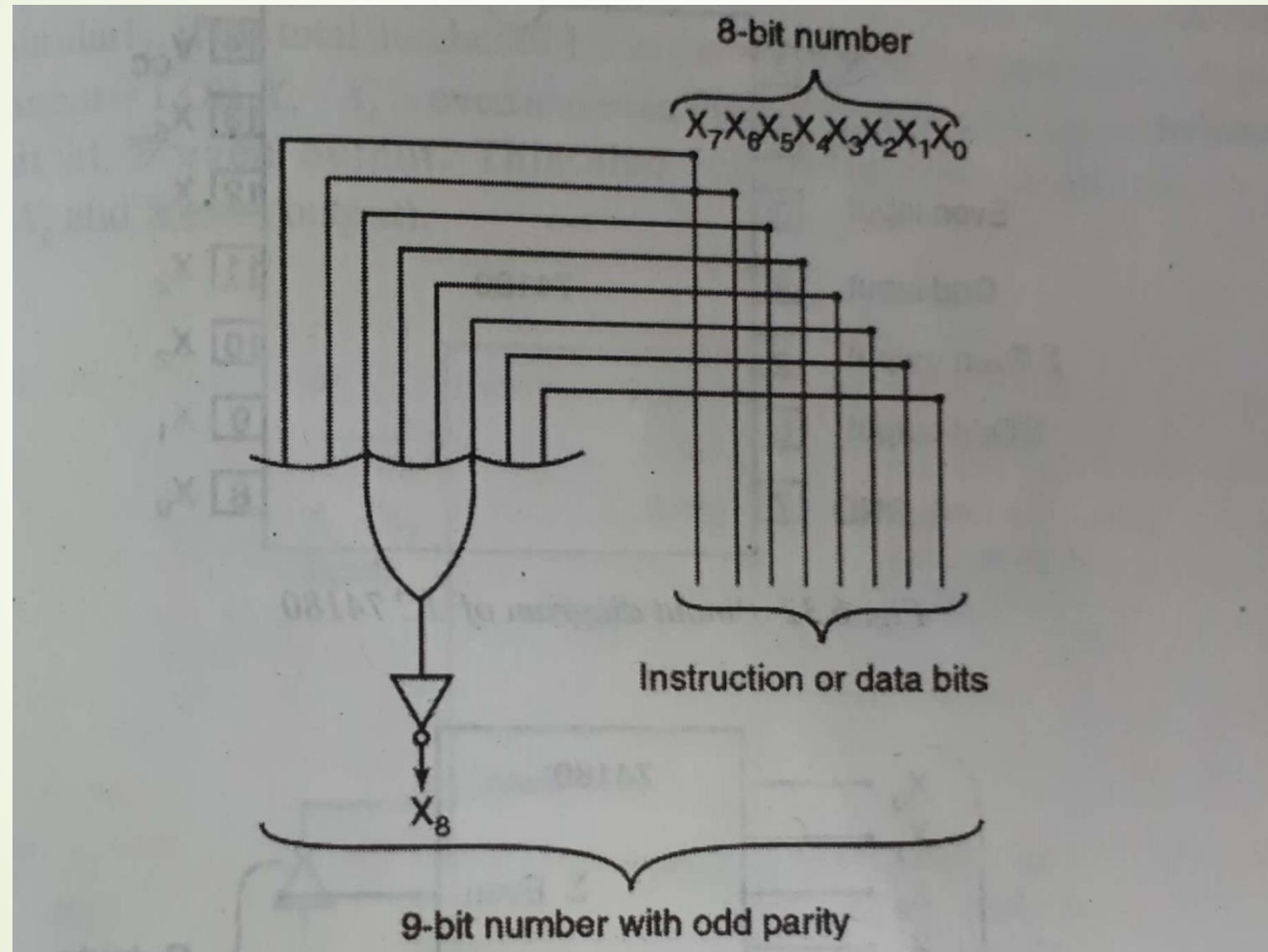
Magnitude Comparator

- A magnitude comparator is a combinational circuit that compares the magnitude of two numbers (A and B) and generates one of the following outputs : $A = B, A < B, A > B$.

- To implement the magnitude comparator, the Ex – NOR gates and AND gates are used.

- **Ex – NOR** gate can be used to find whether two binary digit are equal or not and the **AND** gates are used to find whether a binary digit is less than or greater than another bit.

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(a)

(b)

(c)