Paper 7, TDC Part-3 Chapter-1, Fundamental Concept of Digital **Electronics NOR Gate By: Mayank Mausam Assistant Professor (Guest Faculty) Department of Electronics** L.S. College, BRA Bihar University, **Muzaffarpur, Bihar**

In 3rd lectures we have discussed about "NAND" Gate and realization of basic gates using "NAND" gate.

In this lecture we will discuss about "NOR" gates and realization of basic gates using "NOR" gate.

• The NOR Logic : -

The NOR logic (operation) is a combination of two basic logics, the NOT & OR logics. This means that the output of the NOR gate is the inverted (complement) output of OR gate.

The NOR operation is defined as:- When all the inputs are at logic "0" then the output is at logic "1" else the output is at logic "0". The NOR Gate can have N numbers of inputs ($N \ge 2$) and One output.

The logical expression of NOR operation is given by

- $Y = \overline{A \text{ OR } B \text{ OR } C \text{ OR } \dots \text{ OR } N}$
- $Y = A + B + C + \dots + N$
- Symbol for NOR Gate : -



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Symbol shown in above figure is usually used to represent "NOR" gate.

A bubble on the output side of the "NOR" gate represent "NOT" operation.

- Logic Equation & Truth Table for NOR Gate : -
 - 2 input NOR Gate

Logic equation for 2 input NOR gate is:-

 $Y = \overline{A + B}$

Input (A)	Input (B)	Output (Y)		
0	0	1		
0	1	0		
1	0	0		
1	1	0		

Truth Table for 2- Input NOR Gate

3 input NOR Gate

Logic equation for 3 input NOR gate is:-

Y = A +B +C	Input (A)	Input (B)	Input (C)	Output (Y)
	0	0	0	1
	0	0	1	0
	0	1	0	0
	0	1	1	0
	1	0	0	0
	1	0	1	0
	1	1	0	0
	1	1	1	0
	Truth	Table for 3	Input NOR	Gate

Similarly the truth table of a NOR Gate with any numbers of input signals can be written. The output of a NOR Gate will be at logic "1 (High)" when all the input signals are at logic "0 (Low)" otherwise for any other combinations of inputs signal, the output will be at logic "0 (Low).

All three basic gates, "NOT", "OR" & "AND" gate can also be realized using "NOR" Gate

Similarly the truth table of a NOR Gate with any numbers of input signals can be written. The output of a NOR Gate will be at logic "1 (High)" when all the input signals are at logic "0 (Low)" otherwise for any other combinations of inputs signal, the output will be at logic "0 (Low).

All three basic gates, "NOT", "OR" & "AND" gate can also be realized using "NOR" Gate

Thank you

To be continued......