Veermata Jijabai Technological Institute

Digital Logic Design

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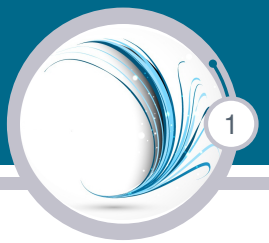
Content



Introduction
Getting Started

- Digital Logic Design is a core subject in the field of Computer Science.

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- It consists of some basic electronic circuits. These circuits (known as logic gates) when combined together give various types of logical circuits.

Basic Logic

High Level and Low Level

In digital electronics, we consider only two output levels. The High Level and the Low Level. In positive logic, High Level means +5V whereas Low Level means 0V. In negative logic, we have the High Level as 0V and Low Level as -5V.

Logic Gates

There are many basic logic gates. Each of them respond differently to a given set of input. They take one or two inputs and give output according to their defined logic. Depending upon the input and output we have the following logic gates used widely in Digital Logic Design as shown in subsequent slides.

AND GATE

The AND gate gives a high output only if all the inputs given are high. Even if one of the inputs is low, the output remains low.
AND function between two inputs A and B is given as A.B.

TRUTH TABLE FOR AND GATE

A	B	Op
0	0	0
0	1	0
1	0	0
1	1	1

OR GATE

The OR gate gives a high output if atleast one of the inputs given are high. Only if all the inputs is low, the output remains low.
OR function between two inputs A and B is given as A+B.

TRUTH TABLE FOR OR GATE

A	B	Op
0	0	0
0	1	1
1	0	1
1	1	1

NOT GATE

The NOT gate is also known as an inverter. It gives high output if the input is low and low output if the input is high.
NOT function for an input A is given as $\neg A$.

TRUTHTABLEFORNOTGATE

A	Op
0	1
1	0

NAND GATE

The NAND gate gives a low output only if all the inputs given are high. Even if one of the inputs is low, the output remains high. NAND function between two inputs A and B is the complement of the AND function.

TRUTH TABLE FOR NAND GATE

A	B	Op
0	0	1
0	1	1
1	0	1
1	1	0

NOR GATE

The NOR gate gives a low output if atleast one of the inputs given are high. Only if all the inputs is low, the output becomes high.
NOR function between two inputs A and B is the complement of the OR function.

TRUTH TABLE FOR NOR GATE

A	B	Op
0	0	1
0	1	0
1	0	0
1	1	0

XOR GATE

The XOR gate is a anti - coincident gate. It gives high output if the given inputs do not coincide which means they should be different. XOR function between two inputs A and B is given as $\neg AB + A\neg B$.

TRUTHTABLEFORXORGATE

A	B	Op
0	0	0
0	1	1
1	0	1
1	1	0

XNOR GATE

The XOR gate is a coincidence checking gate. It gives high output only if the given inputs coincide which means they should be the same.
XNOR function between two inputs A and B is given as $\neg A \neg B + AB$.$XNORfunctionisthenegationofXORfunction$.

TRUTHTABLEFORXNORGATE

A	B	Op
0	0	1
0	1	0
1	0	0
1	1	1

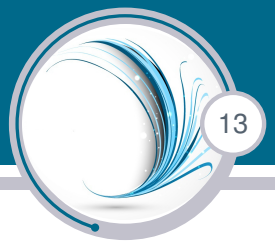
Conclusion

So we have come across all the different types of logic gates. These gates are the basic building blocks of every digital electronics stuff that we see around. From these basic gates, we create flip flops and so on. With these circuits we create microprocessors and other components of a computer. That's why studying **Digital Logic Design** is very important for Engineers.

Thank You!!

- Thanks a lot for listening to this presentation!!

Thank You!!



- Thanks a lot for listening to this presentation!!
- Doubts regarding this presentation are welcome :D