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* Digital Circuit X
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CLASS-7
-Digital Electronics
FLIP FLOP & OTHERS

TODAY TARGET

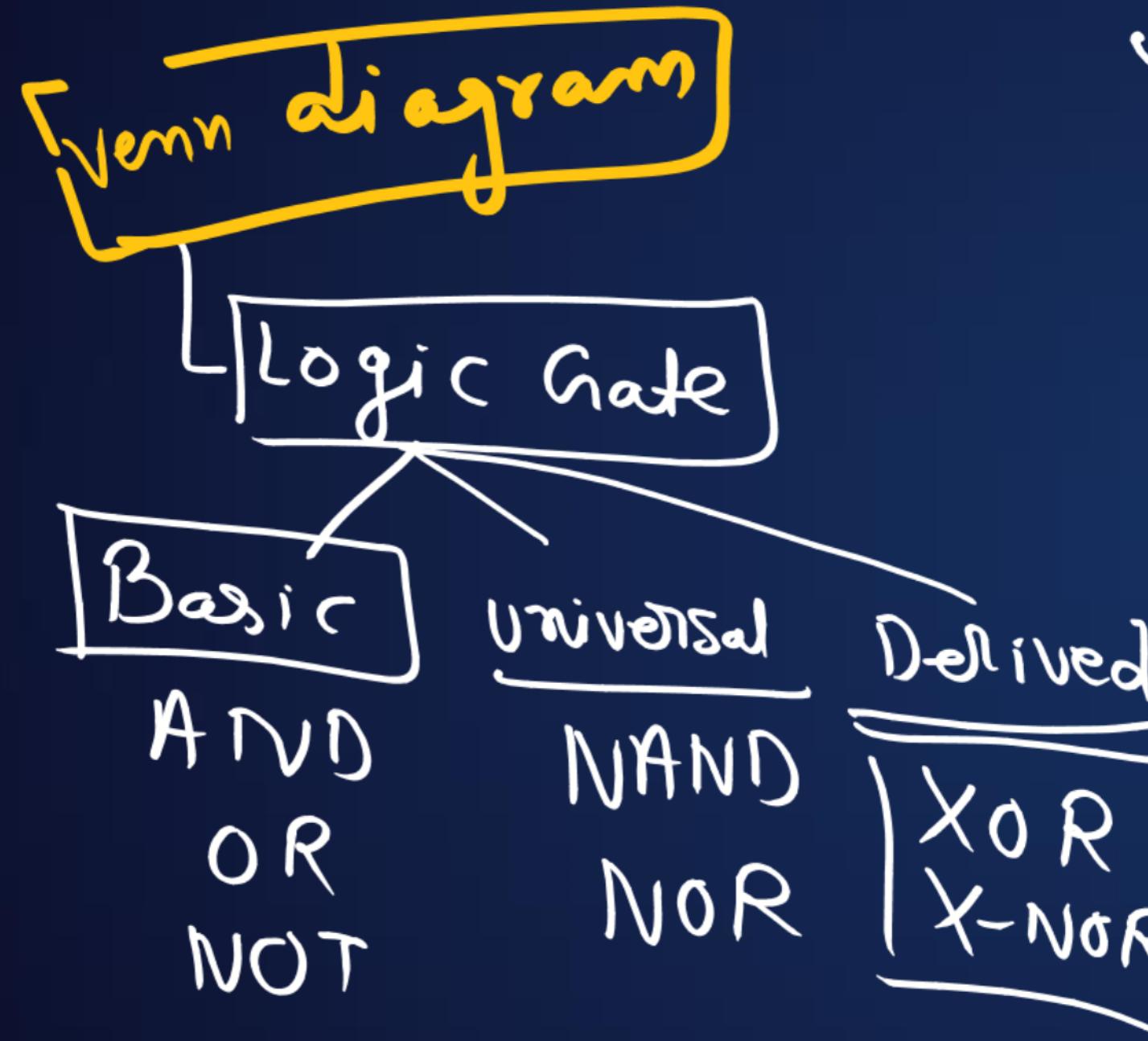
Digital circuit

FLIP FLOP AND OTHERS

Low next Pos

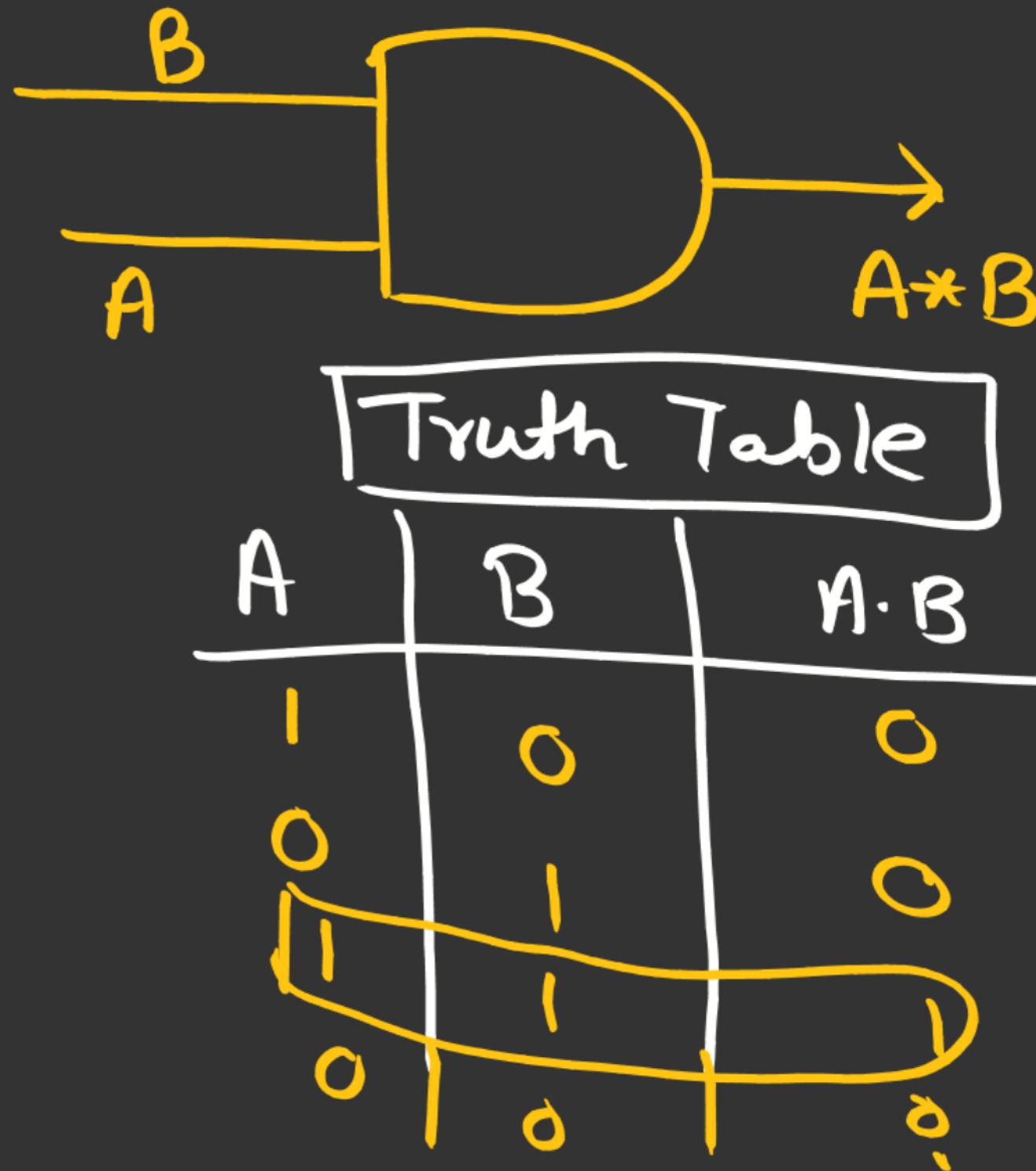
Unit 1: Digital Logic

- Data and number systems; Binary, Octal and Hexa decimal representation and their conversions ;BCD,ASCII, EBDIC, Gray codes and their conversions; Signed binary number representation with 1's and 2's complement methods, Binary arithmetic. Venn diagram, Boolean algebra; Various Logic gates-their truth tables and circuits; Representation in SOP and POS forms; Minimization of logic expressions by algebraic method, Kmap method
- Combinational circuits-Adder and Subtractor circuits;Applications and circuits of Encoder,Decoder, Comparator .Multiplexer, De-Multiplexe rand Parity Generator. Memory Systems:RAM .ROM, EPROM. EEROM, Design of combinational circuits-using KOM, Programming logic devices and gate arrays. (PLAs and PLDs)
- Sequential Circuits-Basic memory element-S-R, J-K,D and T Flip Flops, various types of Registers and counters and their design, Irregular counter, State table and state transition diagram, sequential circuits design methodology.
- Different types of A/D and D/A conversion techniques. Logic families TTL,ECL,MOS and CMOS, their operation and specifications.



Expression	Symbol	Venn diagram	Boolean algebra	Values		
				A	B	Output
AND			$A \cdot B$	0	0	0
OR			$A + B$	0	1	0
XOR			$A \oplus B$	0	0	0
NOT			\bar{A}	0	1	1
NAND			$\bar{A} \cdot \bar{B}$	0	0	1
NOR			$\bar{A} + \bar{B}$	0	1	0
XNOR			$\bar{A} \oplus \bar{B}$	0	0	1
BUF			A	0	1	0
						1

AND *



OR (+)



Truth Table

A	B	$A + B$
1	0	1
0	1	1
1	1	1
0	0	0



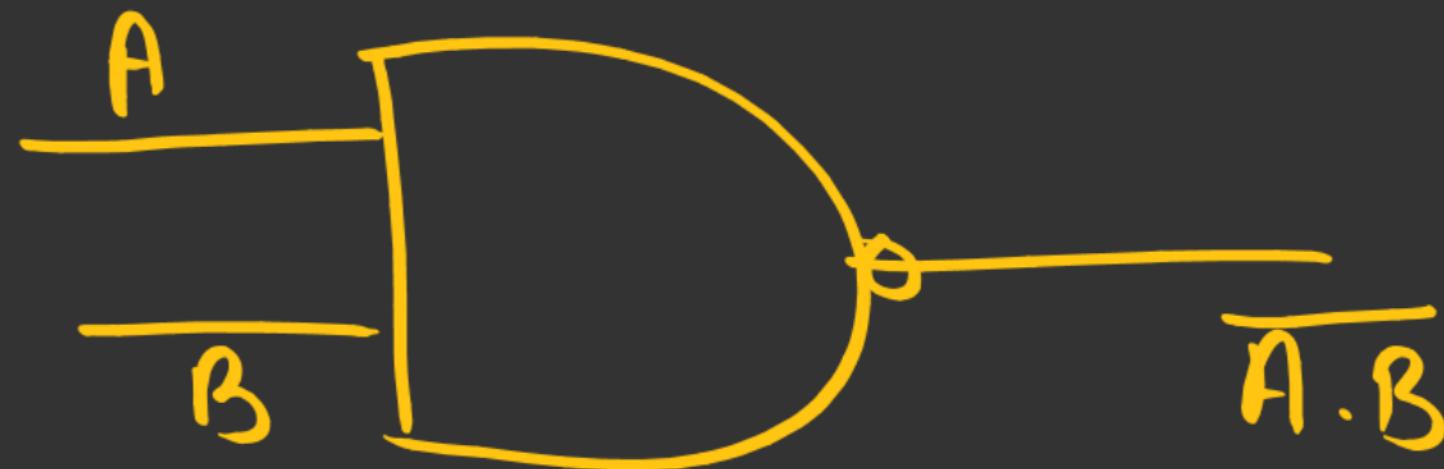
NOT



A	\bar{A}
1	0
0	1

* Compliment (Input)

INAND



A	B	$A \cdot B$	$\overline{A \cdot B}$
1	0	0	1
0	1	0	1
0	0	0	1

[NOR]



A	B	$A + B$	$\bar{A} + \bar{B}$
1	0	1	0
0	1	1	0
1	1	1	0
0	0	0	1

$\boxed{\text{XOR}}$

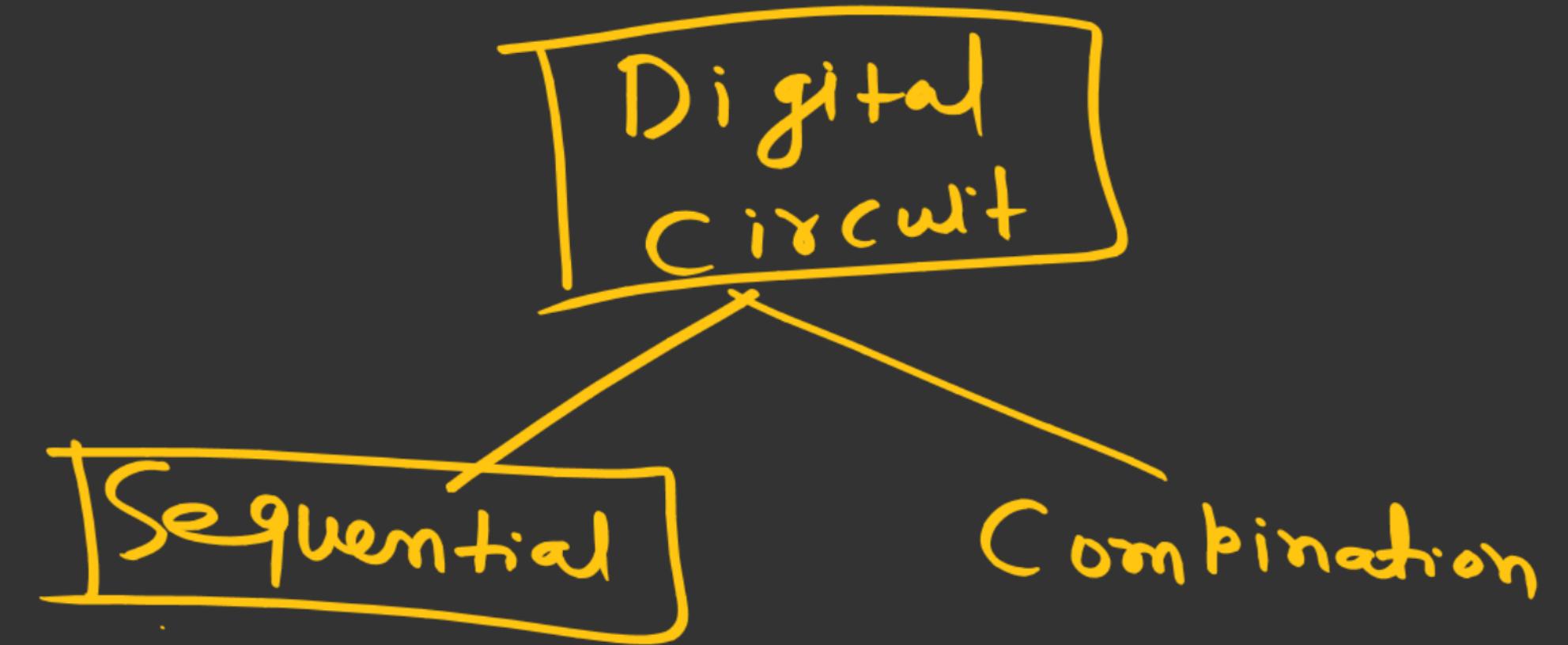


A	B	$A \oplus B$
1	0	1
0	1	1
1	1	0
0	0	0

X-NOR



A	B	$A \overline{\oplus} B$
1	0	0
0	1	0
1	1	1
0	0	1



Sequential

output is depend
on present as well
as previous input

- * Required feedback
- * Performance Slow
- * High complex
- * Flip-flop use

Combination

output is depend
on only Present
Input

- * Required no feedback
- * Performance fast
- * less complex
- * Logic gate

Kombination

- * Register
- * Counter
- * flip-flop

Multiplex

Demultiplexer

Adder

Subtractor

encoder

Decoder

etc

Logic gate — flip-flop

Combinational Logic Circuit

Programmed
Logic
Device

Arithmetic &
Logical Functions

Data
Transmission

Code
Converters

Adders
Subtractors
Comparitors
PLD's

Multiplexers
Demultiplexers
Encoders
Decoders

Binary
BCD
7-segment

Type of sequential circuit

There are two types of sequential circuit, synchronous and asynchronous.

Synchronous types use pulsed or level inputs and a clock input to drive the circuit (with restrictions on pulse width and circuit propagation).

Clock signal

flip-flop

Asynchronous sequential circuits do not use a clock signal as synchronous circuits do.

Counter
register

X

PLA

PLA stands for
Programmable Logic Array.

PLA speed is lower than
PAL.

The complexity of PLA is
high.

PLA has limited amount of
functions implemented.

The cost of PLA is also
high.

Programmable Logic Array
is less available.

PLA design may be built
using a programmable set
of AND gates and a
programmable set of OR
gates.

The flexibility of PLA is
high as compared to PAL.

It is less used than PAL.

PLA**PAL**

While PAL stands for Programmable Array Logic.

While PAL's speed is higher than PLA.

While PAL's complexity is less.

While PAL has a huge number of functions implemented.

While the cost of PAL is low.

While Programmable Array Logic is more available than
Programmable Logic Array.

P SAN

PAL design may be built using a programmable set of AND
and a fix set of OR gates

Flexibility of PAL is less.

While it is more used than PLA.

T P. S. AND
T P. S. OR

*Thank
you!*

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