Digital Logic Design, CT:01

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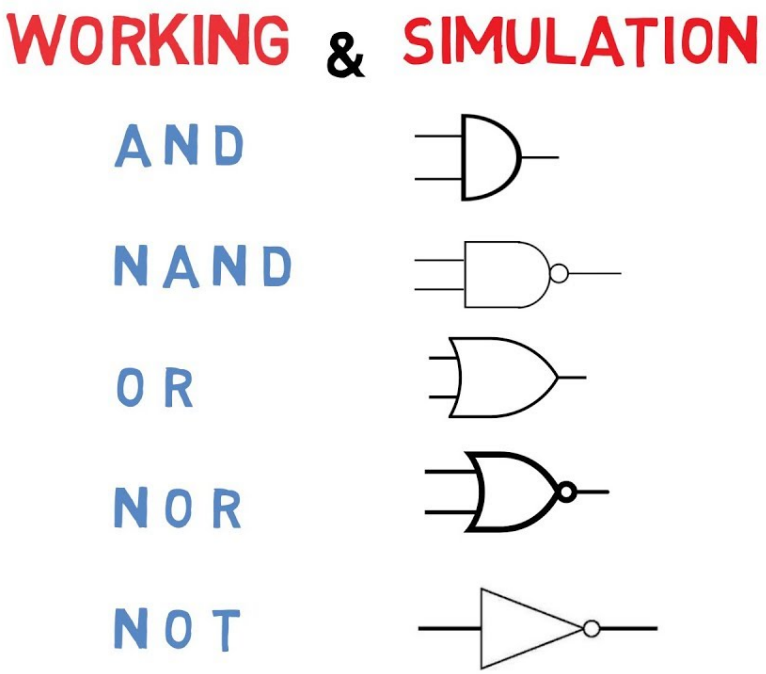
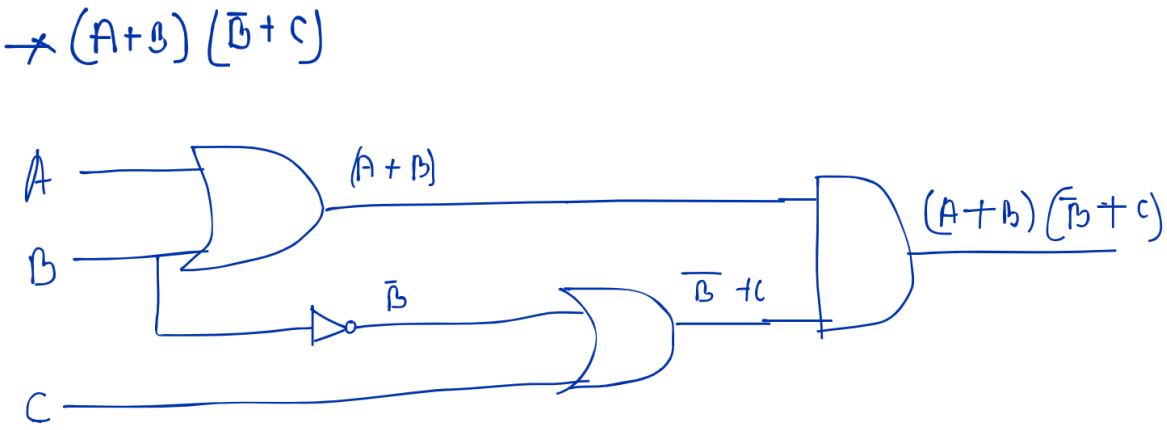
Tags	

Drawing Circuit Figure:

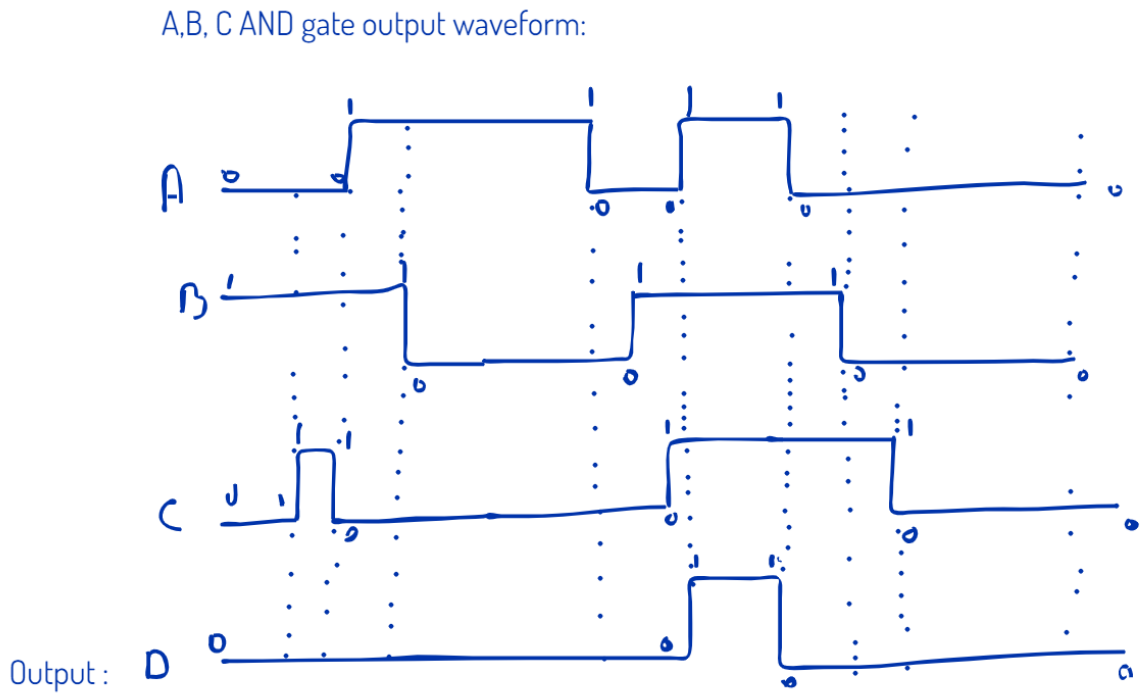


- + ⇒ OR
- * ⇒ AND



Writing output from input waveform :

https://www.youtube.com/watch?v=hkbFfFjZvv8&ab_channel=UndergradAcademy



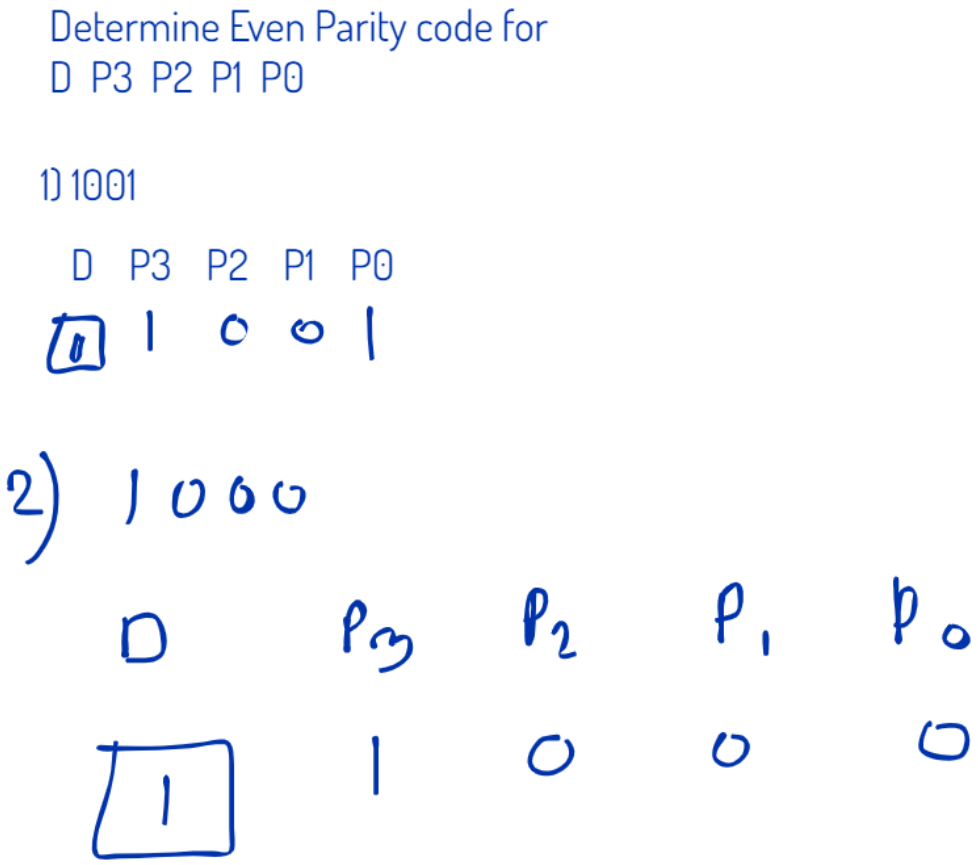
De Morgan's Law:

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

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

Parity:

1. Even Parity : Number of 1 is even, example : 101
2. Odd Parity : Number of 1 is odd, example : 100



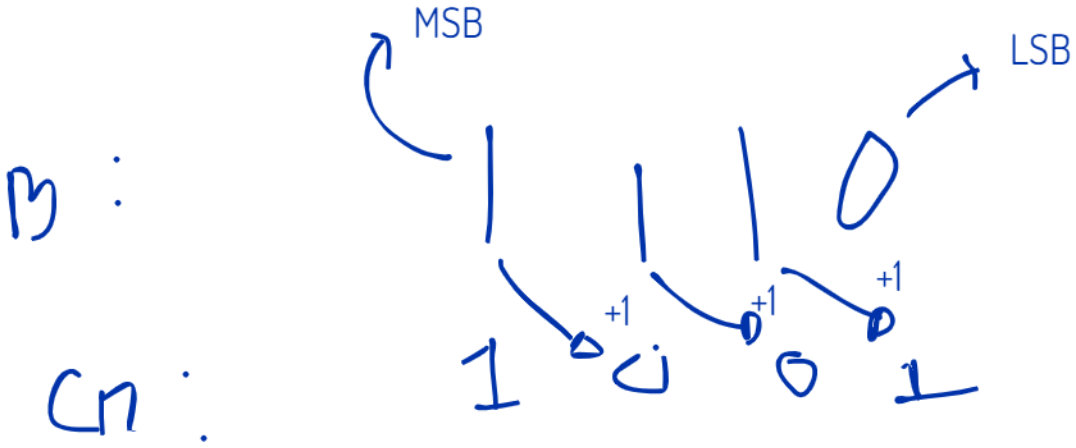
Binary to Gray Code Conversion

https://www.youtube.com/watch?v=cF-Q5j7RUEw&ab_channel=NesoAcademy

- Print the MSB as it is
- i th bit = $(i-1)$ bit + i th bit (Neglect the Carry)
- Repeat the process 2

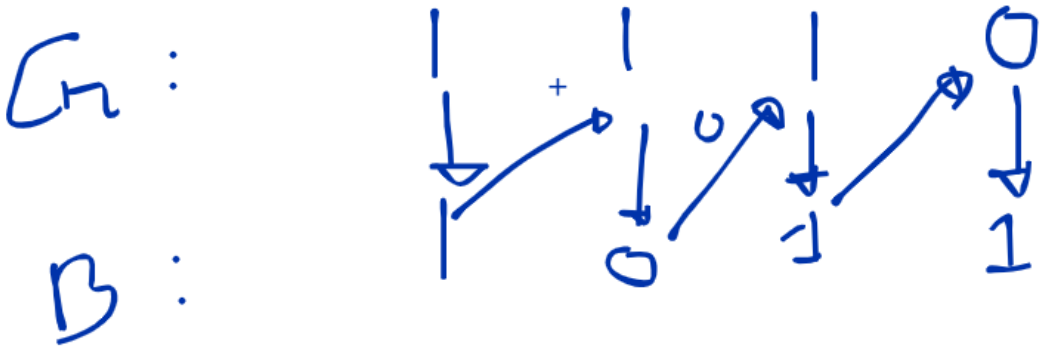
OR

- MSB = MSB
- i th bit = $(i)\ XOR\ (i-1)$



Binary to Gray Code:

- Print the MSB and Previous Sum = MSB
- i th bit = Previous Sum + i th bit (neglecting the carry)
- Update Previous Sum



Boolean Constants & Variables

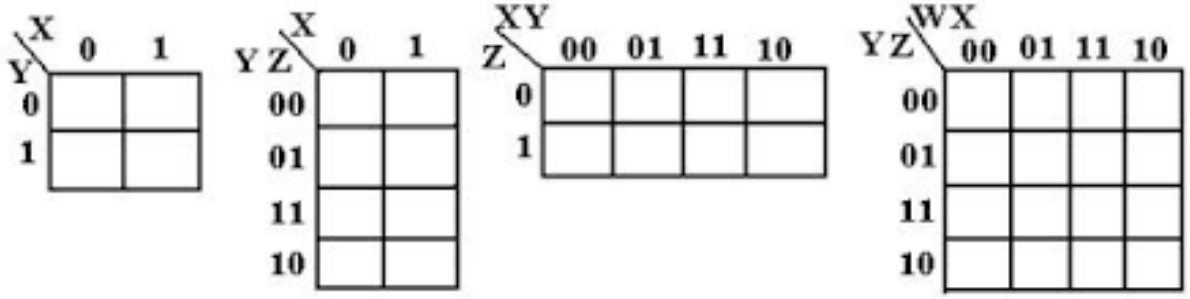
- $0/False \Rightarrow 0 - 0.8V$
- $1/True \Rightarrow\ 2 - 5V$

$$
\begin{aligned}
&(11) && x + (y + z) = (x + y) + z = x + y + z \\
&(12) && x(yz) = (xy)z = xyz \\
&(13a) && x(y + z) = xy + xz \\
&(13b) && (w + x)(y + z) = wy + xy + wz + xz \\
&(14) && x + xy = x \\
&(15a) && x + \bar{x}y = x + y \\
&(15b) && \bar{x} + xy = \bar{x} + y
\end{aligned}
$$

M-Graph:

https://www.youtube.com/watch?v=lw1STgKUpW0&ab_channel=ALLABOUTELECTRONICS

- We can always make the group of 2^n



Design Logic Circuit corresponding to the truth table

- Truth table → Expression → Simplification the expression
- Design Logic Circuit according to the simplified expression