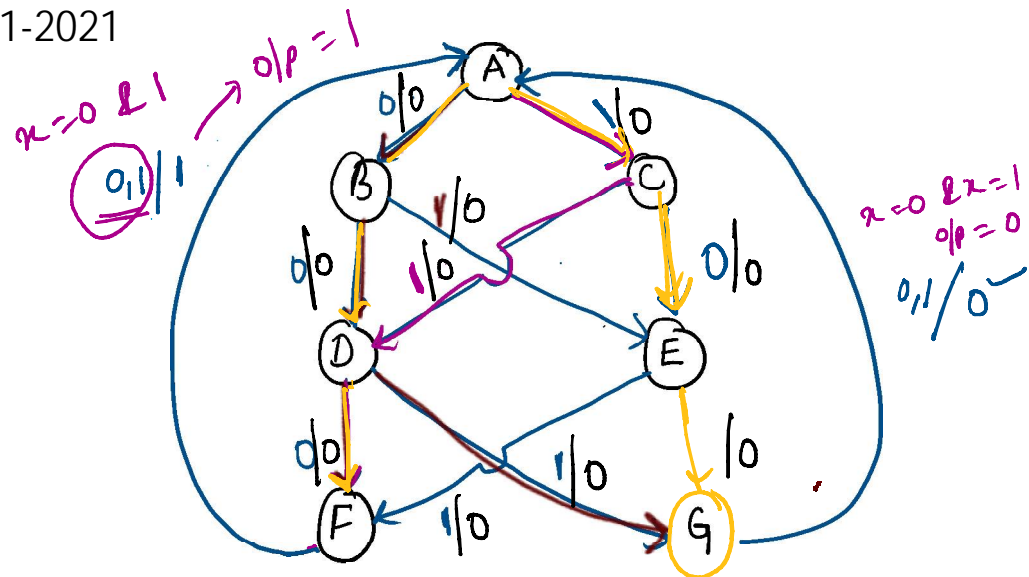


# Parity bit Generator-30-01-2021

a b c	Parity bit (odd)
000	1
001	0
010	0
011	1
100	0
101	1
110	1
111	0



State diagram

State assignments

$A = 000$   
 $B = 010$   
 $C = 011$  ✓  
 $D = 110$   
 $E = 111$   
 $F = 100$   
 $G = 101$

State Assignment

$000 = A$   
 $001 = B$   
 $010 = C$   
 $011 = D$   
 $100 = E$  ✓  
 $101 = F$   
 $110 = G$   
 ...

## State table

Present State	Next State		output	
	$x=0$	$x=1$	$x=0$	$x=1$
A	B	C	0	0
B	D	E	0	0
C	E	D	0	0
D	F	G	0	0
E	G	F	0	0
F	A	A	1	1
G	A	A	0	0

① Design odd parity bit generator  
sequential circuit using T flip flops

① Truth table for odd parity bit generator ✓

② State diagram ✓

③ State assignments ✓

④ State table using state assignments

⑤ Excitation table for odd parity generator

⑥ logic diagram

## State table using state Assignment

Present State	Next state $x=0$ $x=1$		output $x=0$ $x=1$	
000	001	010	0	0
001	011	100	0	0
010	100	011	0	0
011	101	<u>9</u> 110	0	0
100	<u>9</u> 110	101	0	0
<u>E</u> 101	000	000	1	1
110	000	000	0	0

$A = 000$   
 $B = 001$   
 $C = 010$   
 $D = 011$   
 $E = 100$   
 $F = 101$   
 $G = \underline{110}$

## T flip flop excitation table

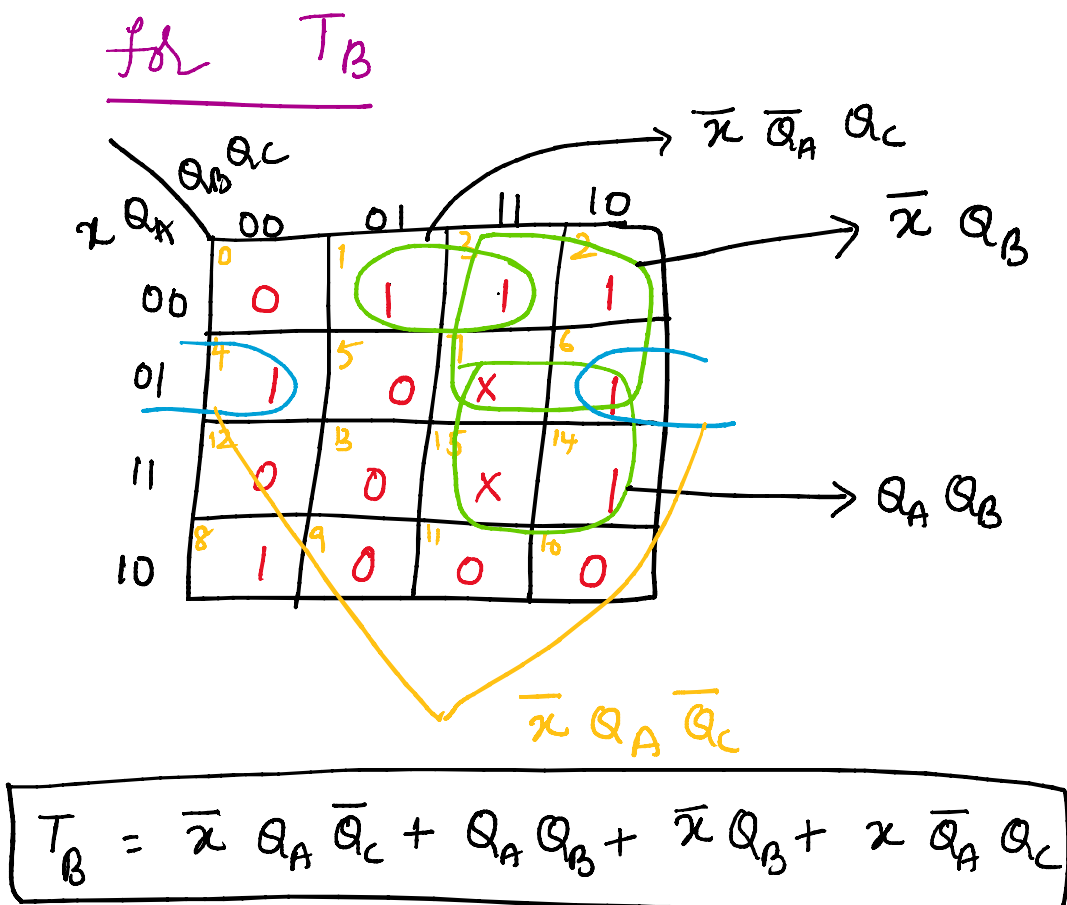
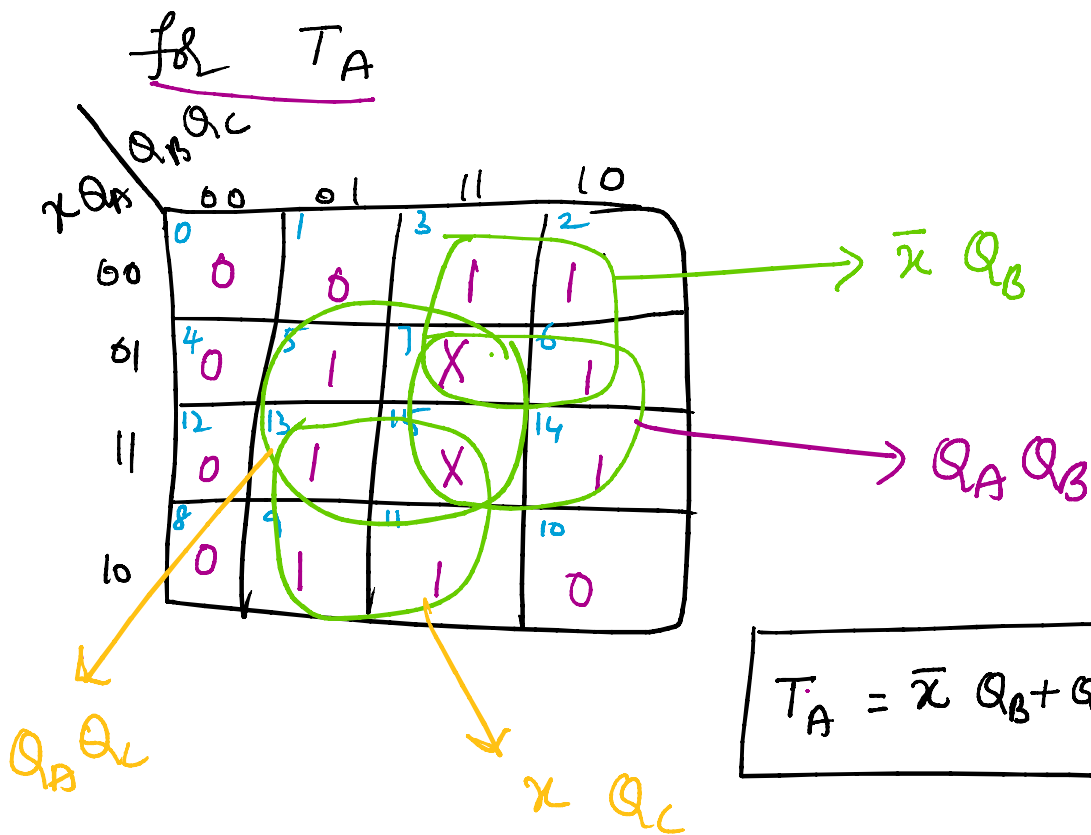
PS	NS	T
0	0	0
0	1	1
1	0	1
1	1	0

# Excitation table for odd parity bit generator

Input $x$	Present state			Next state			$T_A$	$T_B$	$T_C$	o/p
	$Q_A$	$Q_B$	$Q_C$	$Q_{A+1}$	$Q_{B+1}$	$Q_{C+1}$				
0 0	0	0	0	0	0	1	0	0	1	0
1 0	0	0	1	0	1	1	0	1	0	0
2 0	0	1	0	1	0	0	1	1	0	0
3 0	0	1	1	1	0	1	1	1	0	0
4 0	1	0	0	1	1	0	0	1	0	0
5 0	1	0	1	0	0	0	1	0	0	1
6 0	1	1	0	0	0	0	1	1	1	0
8 1	0	0	0	0	1	0	0	1	0	0
9 1	0	0	1	1	0	0	1	0	0	0
10 1	0	1	0	0	1	1	0	0	1	0
11 1	0	1	1	1	1	0	1	0	1	0
12 1	1	0	0	1	0	1	0	0	1	0
13 1	1	0	1	0	0	0	1	0	1	1
14 1	1	1	0	0	0	0	1	1	0	0

$A = 000$   
 $B = 001$   
 $C = 010$   
 $D = 011$   
 $E = 100$   
 $F = 101$   
 $G = 110$

7, 15 don't care



for  $T_c$

$Q_A \backslash Q_B Q_C$	00	01	11	10
00	1	0	0	0
01	0	0	X	1
11	1	1	X	0
10	0	0	1	1

$\rightarrow \bar{x} \bar{Q}_A \bar{Q}_B \bar{Q}_C$   
 $\rightarrow \bar{x} Q_A Q_B$   
 $\rightarrow x Q_A \bar{Q}_B$   
 $\rightarrow x \bar{Q}_A Q_B$

$$T_c = \bar{x} \bar{Q}_A \bar{Q}_B \bar{Q}_C + \bar{x} Q_A Q_B + x Q_A \bar{Q}_B + x \bar{Q}_A Q_B$$

for output

$Q_A \backslash Q_B Q_C$	00	01	11	10
00				
01		1	X	
11		1	X	
10				

$\rightarrow Q_A Q_C$

$$\text{output (Y)} = Q_A Q_C$$

# logic diagram

