Lista 06

①

a)

Qa	Qb	Qc	Da	Db	Dc
0	0	0	x	x	x
0	0	1	1	0	0
0	1	0	0	0	1
0	1	1	0	1	0
1	0	0	0	1	1
1	0	1	x	x	x
1	1	0	x	x	x
1	1	1	x	x	x

Qa \ QbQc	00	01	11	10
0	x	1	0	0
1	0	x	x	x

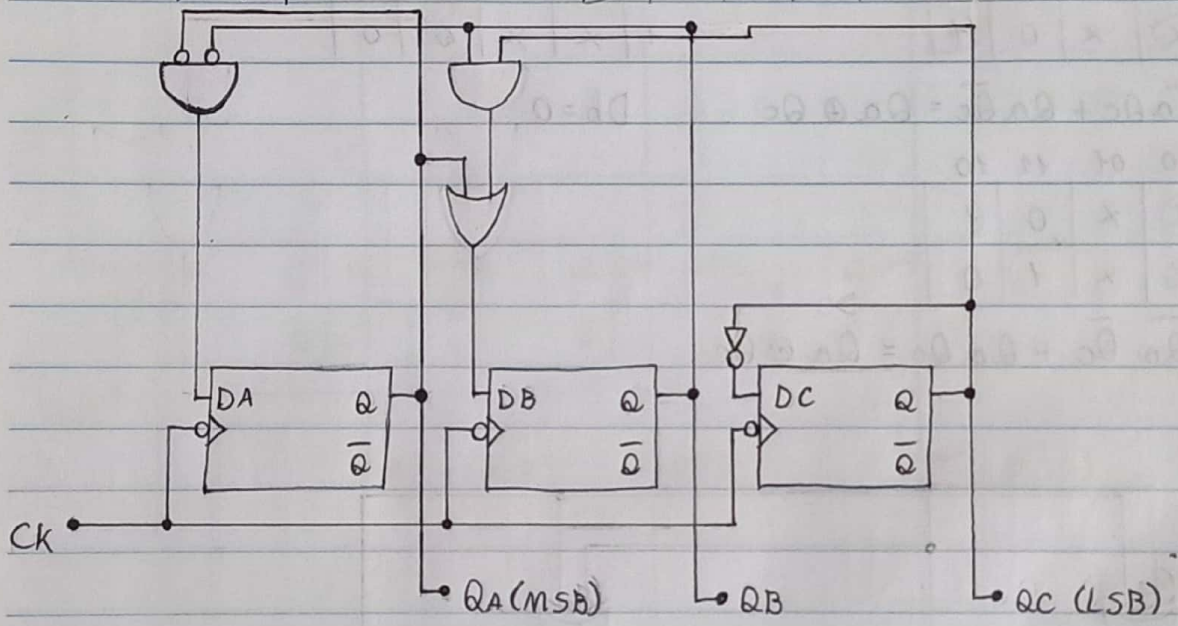
$Da = \overline{Qa}\,\overline{Qb}$

Qa \ QbQc	00	01	11	10
0	x	0	1	0
1	1	x	x	x

$Db = Qa + Qb\,Qc$

Qa \ QbQc	00	01	11	10
0	x	0	0	1
1	1	x	x	x

$Dc = \overline{Qc}$



b)

Qa	Qb	Qc	Da	Db	Dc	Ta	Tb	Tc
0	0	0	x	x	x	x	x	x
0	0	1	x	x	x	x	x	x
0	1	0	0	1	1	0	0	1
0	1	1	1	1	1	1	0	0
1	0	0	x	x	x	x	x	x
1	0	1	x	x	x	x	x	x
1	1	0	0	1	0	1	0	0
1	1	1	1	1	0	0	0	1

Qb Qc

Qa \	00	01	11	10
0	x	x	1	0
1	x	x	0	1

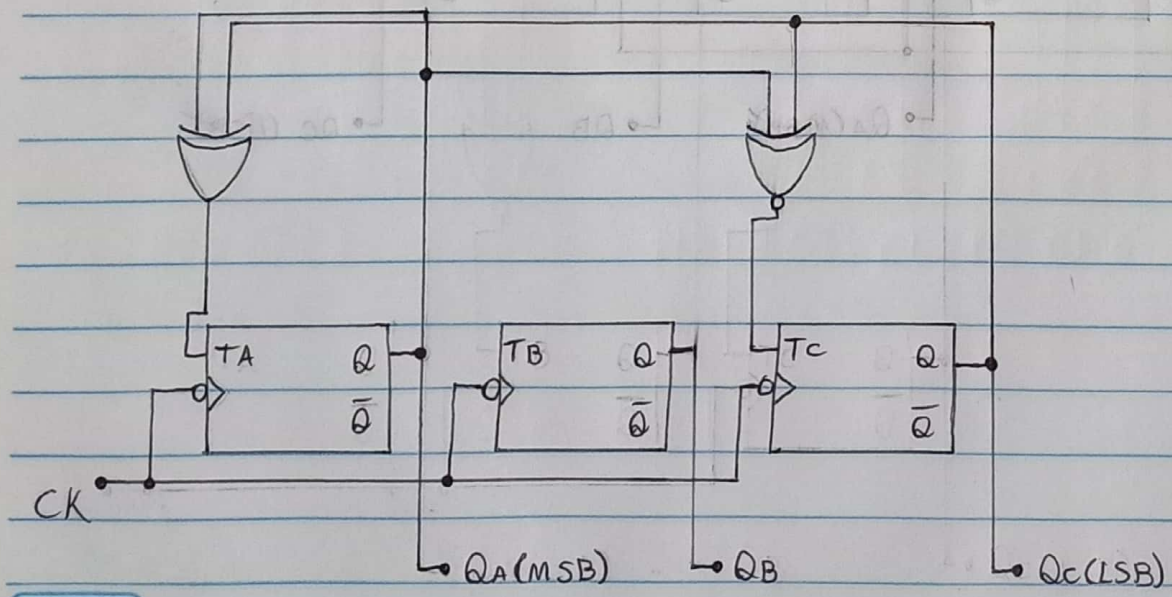
$Da = \bar{Q}a\,Qc + Qa\,\bar{Qc} = Qa \oplus Qc$

\	00	01	11	10
0	x	x	0	0
1	x	x	0	0

$Db = 0$

\	00	01	11	10
0	x	x	0	1
1	x	x	1	0

$Dc = \bar{Qa}\,\bar{Qc} + Qa\,Qc = Qa \odot Qc$



c)

Q_a	Q_b	Q_c	D_a	D_b	D_c
0	0	0	x	x	x
0	0	1	x	x	x
0	1	0	1	0	1
0	1	1	x	x	x
1	0	0	1	1	0
1	0	1	1	0	0
1	1	0	0	1	0
1	1	1	x	x	x

Q_bQ_c

Q_a	00	01	11	10
0	x	x	x	1
1	1	1	x	0

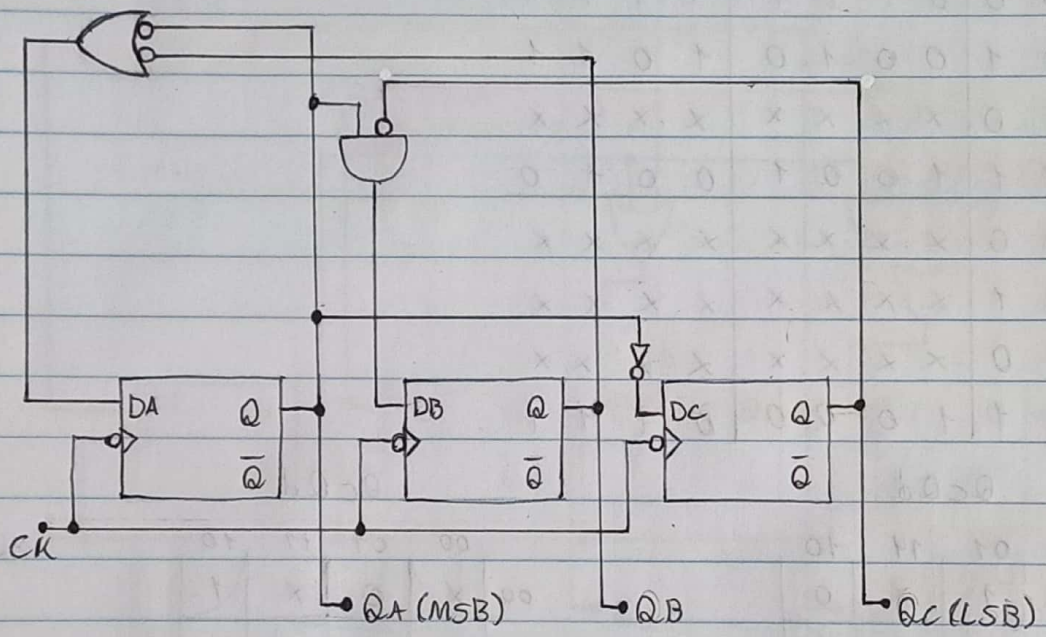
$D_a = \overline{Q_a} + \overline{Q_b}$

Q_a	00	01	11	10
0	x	x	x	0
1	1	0	x	1

$D_b = Q_a\overline{Q_c}$

Q_a	00	01	11	10
0	x	x	x	1
1	0	0	x	0

$D_C = \overline{Q_a}$



d)

$Q_aQ_bQ_cQ_d$	$D_aD_bD_cD_d$	$T_aT_bT_cT_d$
0 0 0 0	x x x x	x x x x
0 0 0 1	1 0 1 1	1 0 1 0
0 0 1 0	0 1 1 0	0 1 0 0
0 0 1 1	x x x x	x x x x
0 1 0 0	x x x x	x x x x
0 1 0 1	x x x x	x x x x
0 1 1 0	1 1 1 1	1 0 0 1
0 1 1 1	0 0 0 1	0 1 1 0
1 0 0 0	0 1 1 1	1 1 1 1
1 0 0 1	0 0 1 0	1 0 1 1
1 0 1 0	x x x x	x x x x
1 0 1 1	1 0 0 1	0 0 1 0
1 1 0 0	x x x x	x x x x
1 1 0 1	x x x x	x x x x
1 1 1 0	x x x x	x x x x
1 1 1 1	1 0 0 0	0 1 1 1

Q_cQ_d

Q_aQ_b	00	01	11	10
00	x	1	x	0
01	x	x	0	1
11	x	x	0	x
10	1	1	0	x

$T_a = \bar{Q}_c + Q_b\bar{Q}_d$

Q_cQ_d

Q_aQ_b	00	01	11	10
00	x	0	x	1
01	x	x	1	0
11	x	x	1	x
10	1	0	0	x

$T_b = \bar{Q}_b\bar{Q}_d + Q_bQ_d = Q_b \odot Q_d$

d)

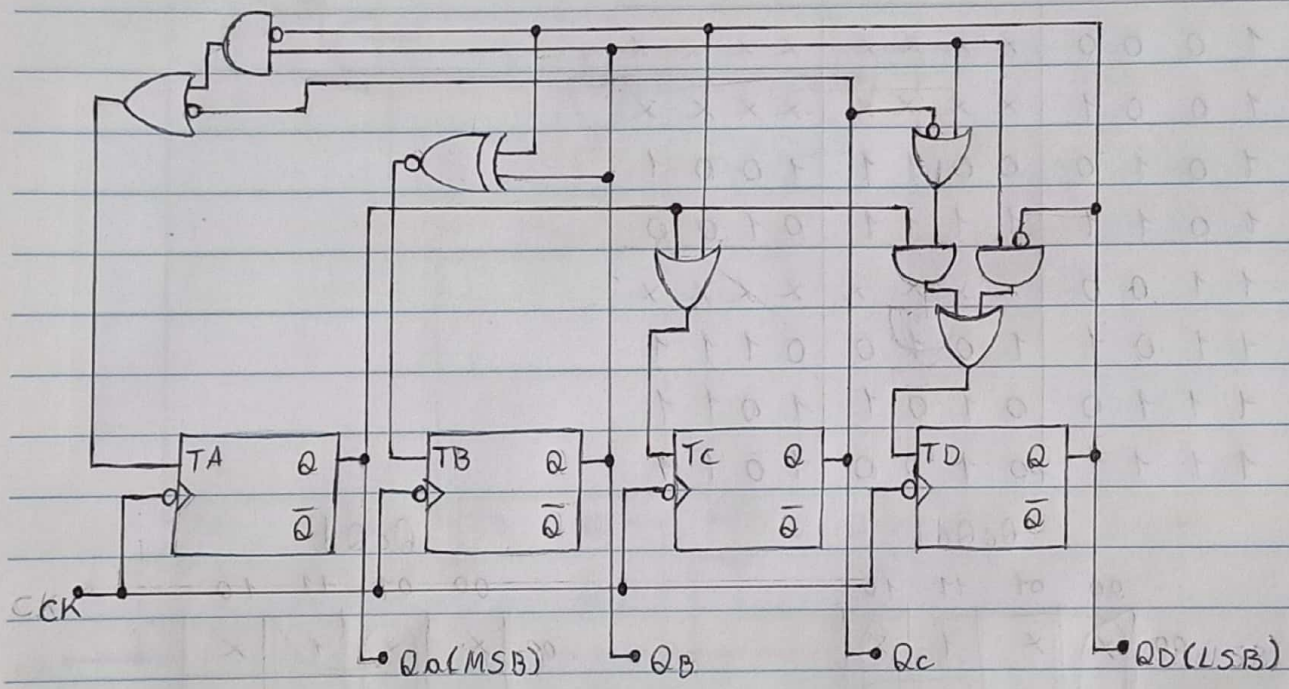
QaQb \ QcQd	00	01	11	10
00	X	1	X	0
01	X	X	1	0
11	X	X	1	X
10	1	1	1	X

$T_C = Q_a + Q_d$

QaQb \ QcQd	00	01	11	10
00	X	0	X	0
01	X	X	0	1
11	X	X	1	X
10	1	1	0	X

$T_d = Q_b \bar{Q_d} + Q_a Q_b + Q_a \bar{Q_c}$

$T_d = Q_a (Q_b + \bar{Q_c}) + Q_b \bar{Q_d}$



e)

Qa Qb Qc Qd	Da Db Dc Dd	Ta Tb Tc Td
0 0 0 0	x x x x	x x x x
0 0 0 1	x x x x	x x x x
0 0 1 0	x x x x	x x x x
0 0 1 1	1 1 1 0	1 1 0 1
0 1 0 0	1 1 0 1	1 0 0 1
0 1 0 1	1 0 1 1	1 1 1 0
0 1 1 0	x x x x	x x x x
0 1 1 1	x x x x	x x x x
1 0 0 0	x x x x	x x x x
1 0 0 1	x x x x	x x x x
1 0 1 0	0 0 1 1	1 0 0 1
1 0 1 1	1 1 1 1	0 1 0 0
1 1 0 0	x x x x	x x x x
1 1 0 1	1 0 1 0	0 1 1 1
1 1 1 0	0 1 0 1	1 0 1 1
1 1 1 1	0 1 0 0	1 0 1 1

QcQd

QaQb	00	01	11	10
00	x	x	1	x
01	1	1	x	x
11	x	0	1	1
10	x	x	0	1

$Ta = \overline{Qa} + \overline{Qd} + QbQc$

QcQd

QaQb	00	01	11	10
00	x	x	1	x
01	0	1	x	x
11	x	1	0	0
10	x	x	1	0

$Tb = \overline{Qc}Qd + \overline{Qb}Qd$

$Tb = Qd(\overline{Qb} + \overline{Qc})$

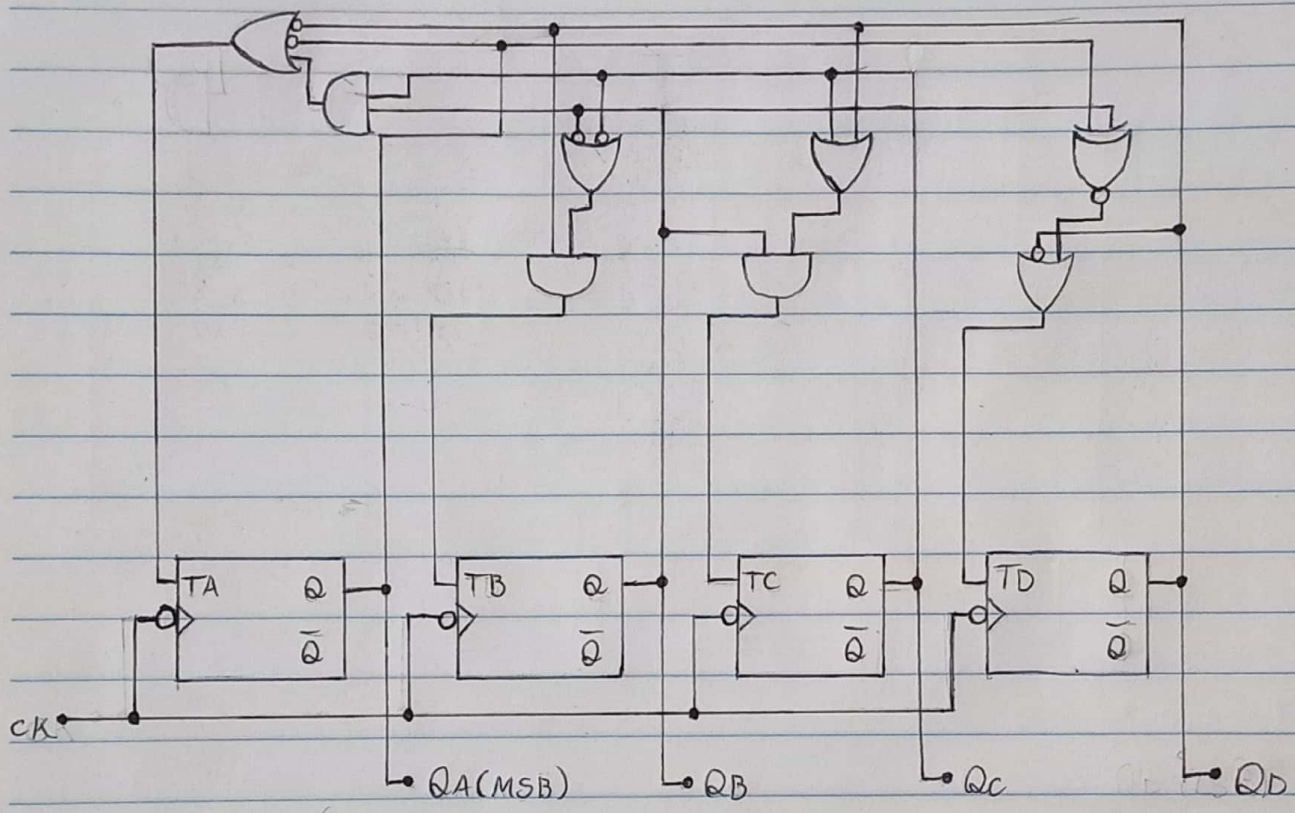
e)

QaQb \ QcQd	00	01	11	10
00	X	X	0	X
01	0	1	X	X
11	X	1	1	1
10	X	X	0	0

$TC = Qb\,Qd + Qb\,Qc$

$Tc = Qb(Qc + Qd)$

QaQb \ QcQd	00	01	11	10
00	X	X	1	X
01	1	0	X	X
11	X	1	1	1
10	X	X	0	1

$TD = \overline{Qa}\,\overline{Qb} + Qa\,Qb + \overline{Qd}$

$TD = Qa \odot Qb + \overline{Qd}$