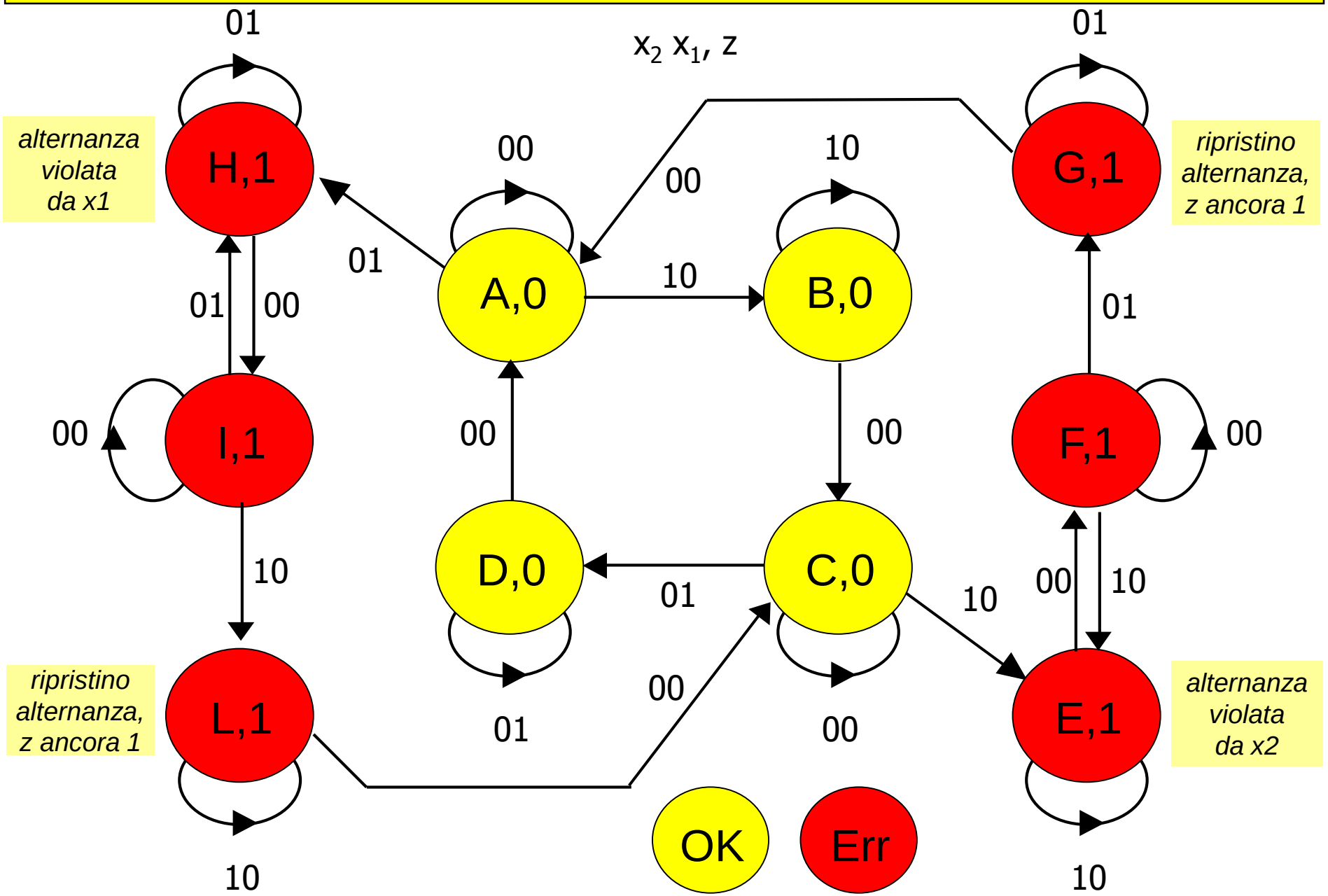
Esercizio 1.1



Esercizio 1.2 – TdF automa primitivo

s.p. \ $x_2 x_1$	00	01	11	10
A	A,0	H,-	-,-	B,0
B	C,0	-,-	-,-	B,0
C	C,0	D,0	-,-	E,-
D	A,0	D,0	-,-	-,-
E	F,1	-,-	-,-	E,1
F	F,1	G,1	-,-	E,1
G	A,-	G,1	-,-	-,-
H	I,1	H,1	-,-	-,-
I	I,1	H,1	-,-	L,1
L	C,-	-,-	-,-	L,1

s.f., z

Esercizio 1.2 – TdF minima

CMC = {A}, {B}, {C}, {D}, {EF}, {G}, {HI}, {L}

s.p.

	$x_2 x_1$ 00	01	11	10
A	A,0	h,-	-,-	B,0
B	C,0	-,-	-,-	B,0
C	C,0	D,0	-,-	e,-
D	A,0	D,0	-,-	-,-
e=EF	e,1	G,1	-,-	e,1
G	A,-	G,1	-,-	-,-
h=HI	h,1	h,1	-,-	L,1
L	C,-	-,-	-,-	L,1

s.f., z

Esercizio 1.3

y2\y1y0	00		01		11		10	
0	**A**	→	**B**	→	**C**	→	**D**	→
	↓			↗	↓			↗
1	**h**	→	**L**		**e**	→	**G**	

Possibili corse critiche:
L->C, risolvibile passando per B
G->A, risolvibile passando per D

s.p.

	x_2 x_1 00	01	11	10
A	**A,0**	**h,-**	**-,-**	**B,0**
B	**C,0**	**-,-**	**-,-**	**B,0**
C	**C,0**	**D,0**	**-,-**	**e,-**
D	**A,0**	**D,0**	**-,-**	**-,-**
e=EF	**e,1**	**G,1**	**-,-**	**e,1**
G	***D,-***	**G,1**	**-,-**	**-,-**
h=HI	**h,1**	**h,1**	**-,-**	**L,1**
L	***B,-***	**-,-**	**-,-**	**L,1**

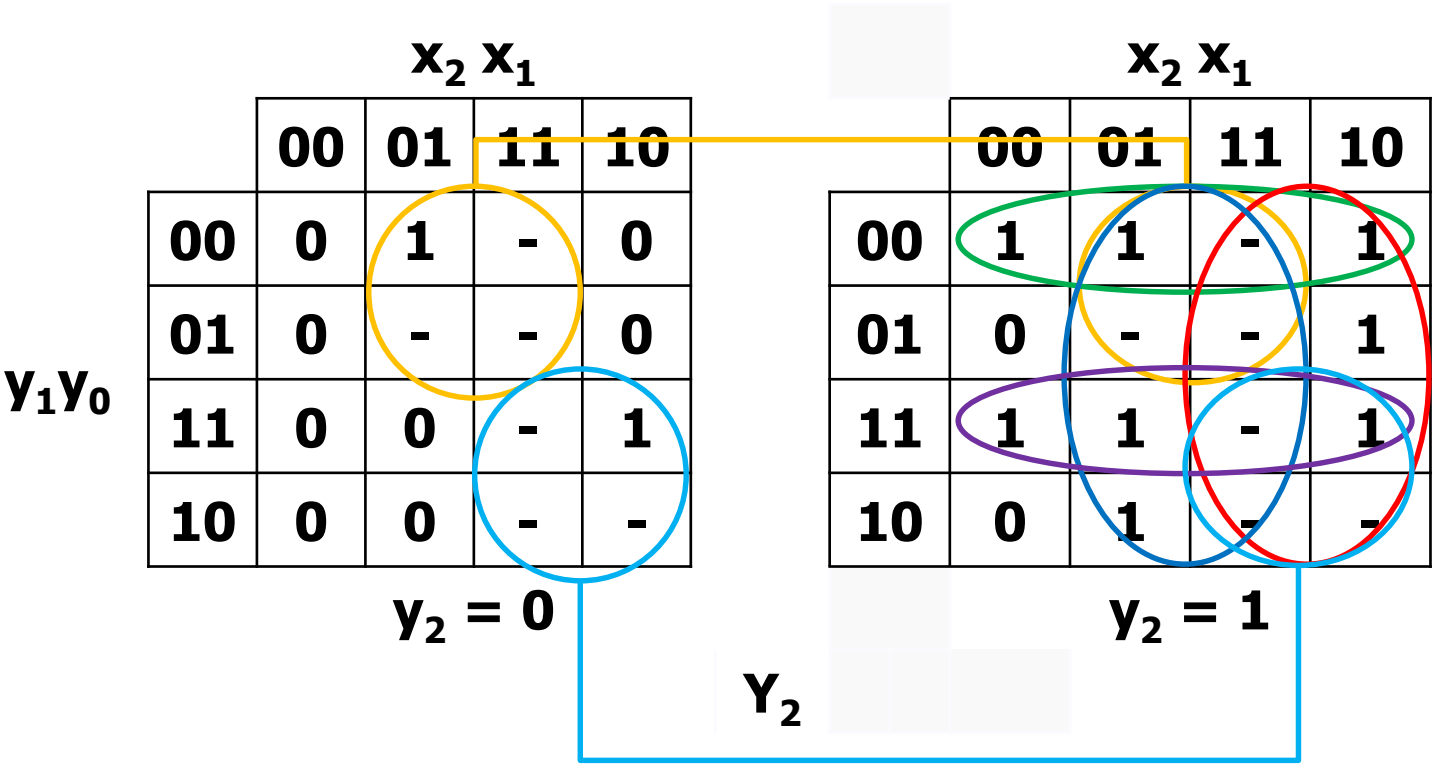
s.f., z

Esercizio 1.3 - TdT

$y_2\ y_1\ y_0$	$x_2\ x_1$ = 00	01	11	10
A=000	000,0	100,-	-,-	001,0
B=001	011,0	-,-	-,-	001,0
C=011	011,0	010,0	-,-	111,-
D=010	000,0	010,0	-,-	-,-
h=100	100,1	100,1	-,-	101,1
L=101	001,-	-,-	-,-	101,1
e=111	111,1	110,1	-,-	111,1
G=110	010,-	110,1	-,-	-,-

$Y_2Y_1Y_0$, z

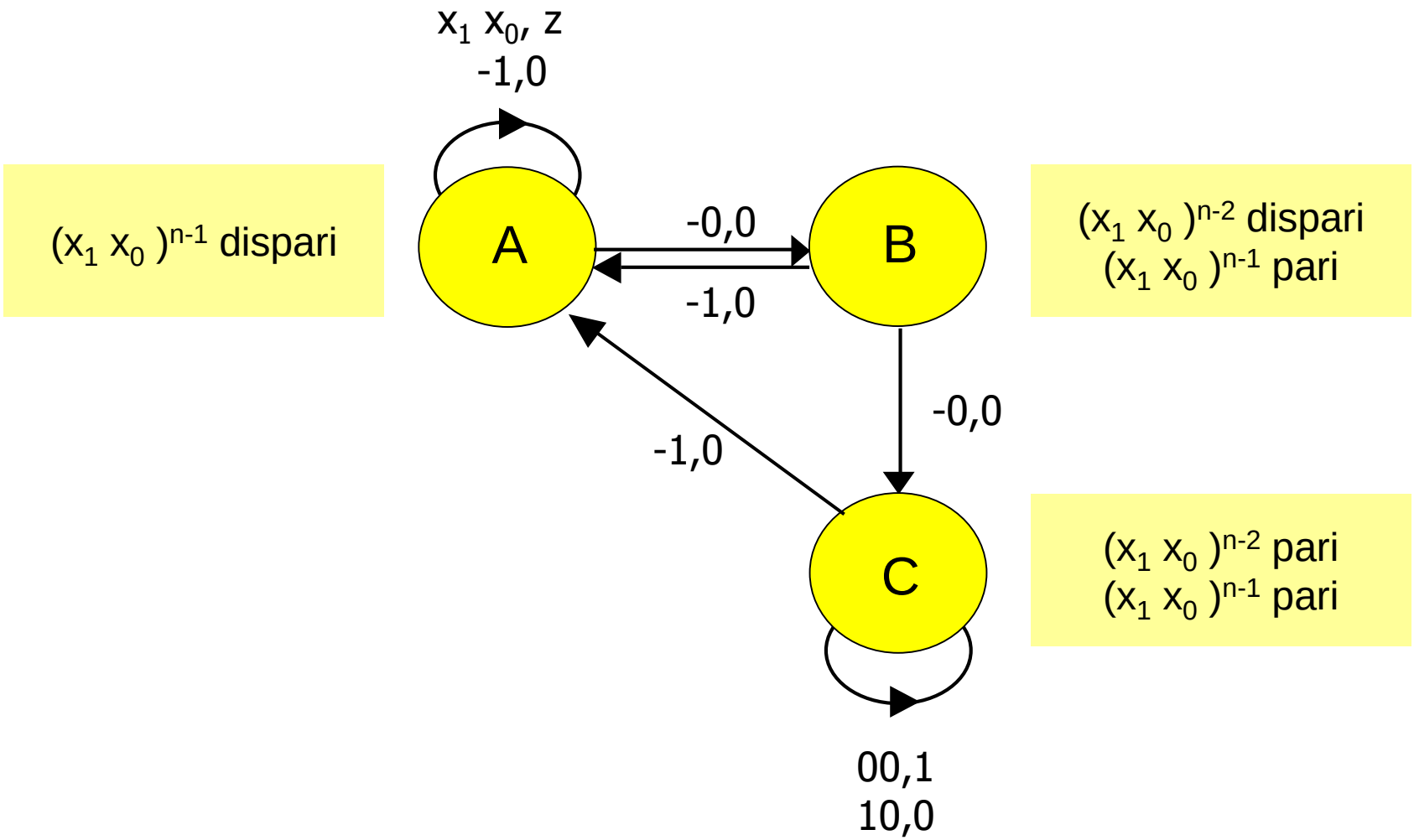
Esercizio 1.4 – Sintesi combinatoria



Y_2 (SP) = $y_2 x_2 + y_1' x_1 + y_1 x_2 + y_2 x_1 + y_2 y_1 y_0 + y_2 y_1' y_0'$

Y_2 (NAND) = $(y_2 \uparrow x_2) \uparrow (y_1' \uparrow x_1) \uparrow (y_1 \uparrow x_2) \uparrow (y_2 \uparrow x_1) \uparrow$
$(y_2 \uparrow y_1 \uparrow y_0) \uparrow (y_2 \uparrow y_1' \uparrow y_0')$

Esercizio 2.1



Esercizio 2.2 – TdF e TdT

s.p.	$x_1\,x_0$ = 00	01	11	10
A	B,0	A,0	A,0	B,0
B	C,0	A,0	A,0	C,0
C	C,1	A,0	A,0	C,0

s.f., z

$(Q_1\,Q_0)^n$	$x_1\,x_0$ = 00	01	11	10
A=00	01,0	00,0	00,0	01,0
B=01	11,0	00,0	00,0	11,0
C=11	11,1	00,0	00,0	11,0
10	--,-	--,-	--,-	--,-

$(Q_1\,Q_0)^{n+1}$, z^n

Esercizio 2.3 – Sintesi combinatoria

Q_1Q_0 \ x_1x_0	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	0	0	0
10	-	-	-	-

z

z (SP) = $x_0' x_1' Q_1$

z (PS) = $x_0' x_1' Q_1$

Q_1Q_0 \ x_1x_0	00	01	11	10
00	0	0	0	0
01	0	0	0	0
11	1	0	0	0
10	-	-	-	-

z

Esercizio 2.4 – Flip flop JK

Q_1

Q_1Q_0 \ x_1x_0	00	01	11	10
00	0	0	0	0
01	1	0	0	1
11	1	0	0	1
10	-	-	-	-

J_1

Q_1Q_0 \ x_1x_0	00	01	11	10
00	0	0	0	0
01	1	0	0	1
11	-	-	-	-
10	-	-	-	-

K_1

Q_1Q_0 \ x_1x_0	00	01	11	10
00	-	-	-	-
01	-	-	-	-
11	0	1	1	0
10	-	-	-	-

J_1 (PS) = $Q_0\, x_0'$

K_1 (PS) = x_0

Esercizio 2.4 – Flip flop JK

Q_0

Q_1Q_0 \ x_1x_0	00	01	11	10
00	1	0	0	1
01	1	0	0	1
11	1	0	0	1
10	-	-	-	-

J_0

Q_1Q_0 \ x_1x_0	00	01	11	10
00	1	0	0	1
01	-	-	-	-
11	-	-	-	-
10	-	-	-	-

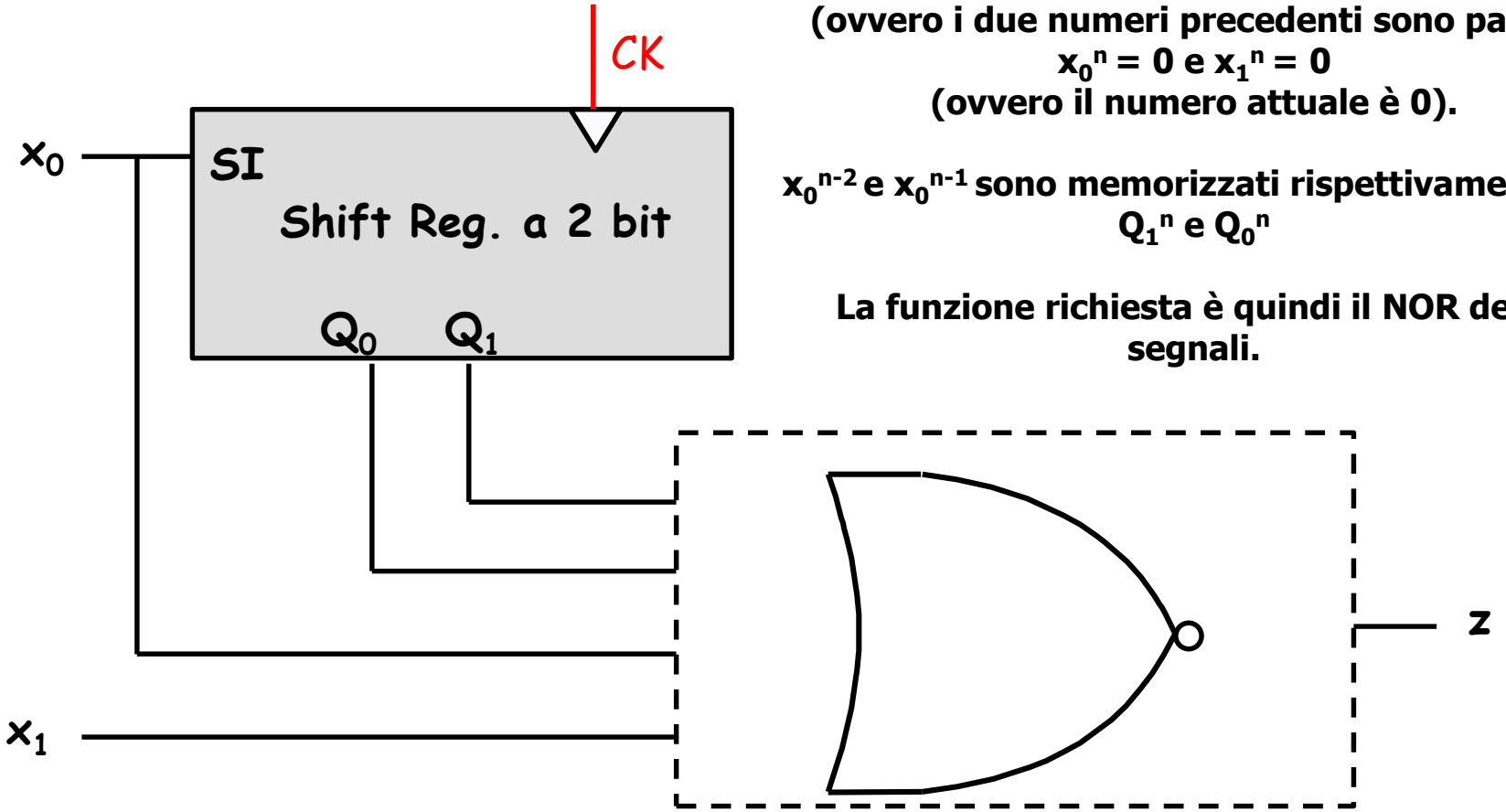
K_0

Q_1Q_0 \ x_1x_0	00	01	11	10
00	-	-	-	-
01	0	1	1	0
11	0	1	1	0
10	-	-	-	-

J_0 (PS) = x_0'

K_0 (PS) = x_0

Esercizio 2.5 – Sintesi con Shift Register



Uscita è 1 quando
$x_0^{n-2} = 0$ e $x_0^{n-1} = 0$
(ovvero i due numeri precedenti sono pari) e
$x_0^n = 0$ e $x_1^n = 0$
(ovvero il numero attuale è 0).

x_0^{n-2} e x_0^{n-1} sono memorizzati rispettivamente in Q_1^n e Q_0^n

La funzione richiesta è quindi il NOR dei 4 segnali.