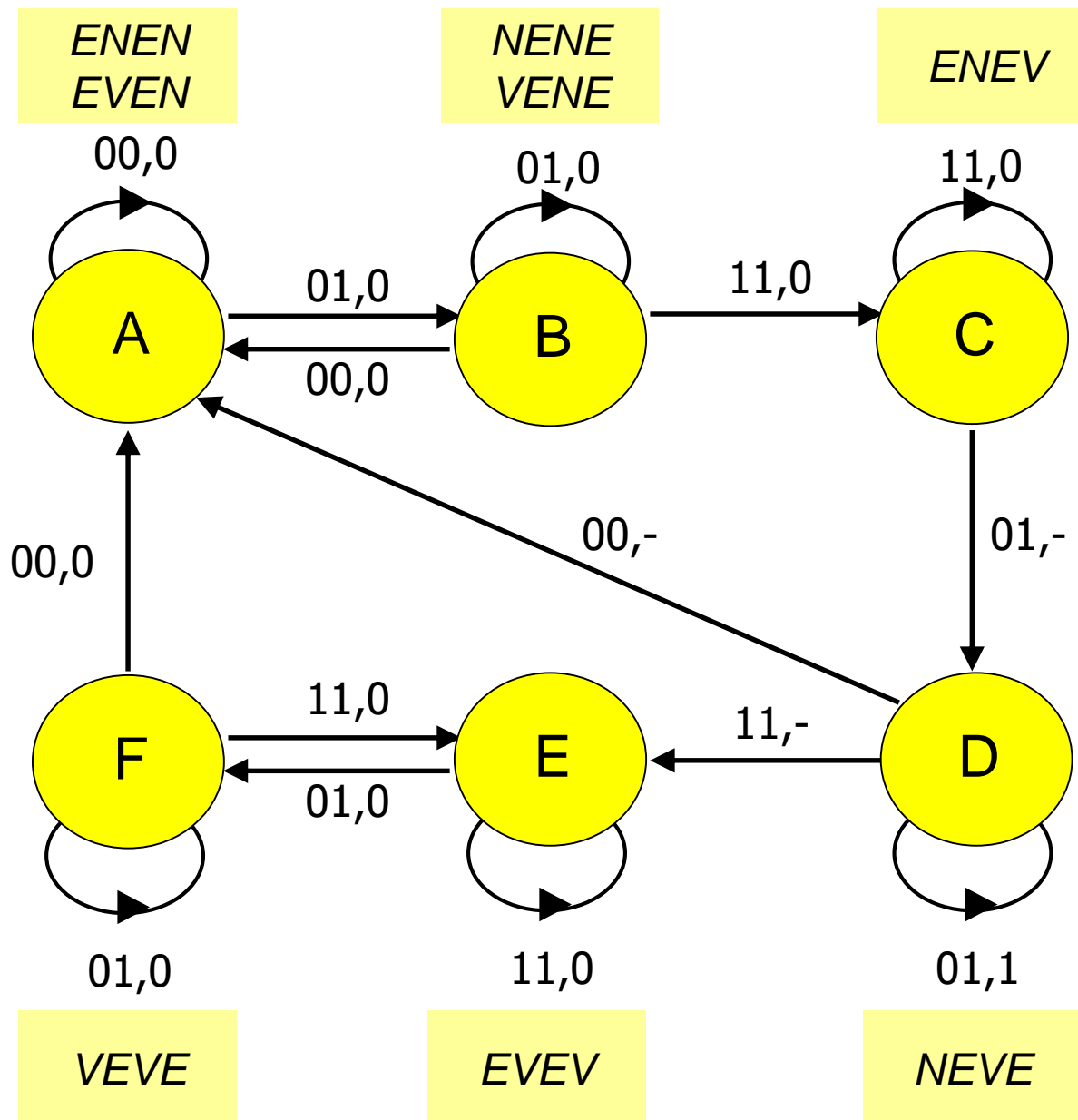


# Esercizio 1.1



# Esercizio 1.2 – Tabella triangolare e CMC

**AB**

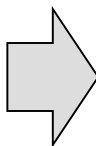
s.p.

	00	01	11	10
A	A,0	B,0	-,-	-,-
B	A,0	B,0	C,0	-,-
C	-,-	D,-	C,0	-,-
D	A,-	D,1	E,-	-,-
E	-,-	F,0	E,0	-,-
F	A,0	F,0	E,0	-,-

s.f., Z

B					
C	BD	BD			
D			CE		
E	BF	BF CE	DF	DF	
F	BF	CE	CE DF		
	A	B	C	D	E

AB, C, D, EF



a={AB}, b={C},  
c={D}, d={EF}

# Esercizio 1.2 – TdF automa minimo

		AB			
		00	01	11	10
s.p.	a=AB	a,0	a,0	b,0	-, -
	b = C	-, -	c, -	b,0	-, -
	c = D	a, -	c,1	d, -	-, -
	d = EF	a,0	d,0	d,0	-, -

s.f., Z

# Esercizio 1.3 – Grafo adiacenze e TdT

Z	0		1
0	<b>a</b>	→	<b>b</b>
	↑		↓
1	<b>d</b>	←	<b>c</b>

La transizione  $c \rightarrow a$  viene sostituita con una transizione multipla  $c \rightarrow d \rightarrow a$

		<b>AB</b>			
		<b>00</b>	<b>01</b>	<b>11</b>	<b>10</b>
<b>s.p.</b>	<b>a = 00</b>	<b>00,0</b>	<b>00,0</b>	<b>01,0</b>	<b>-, -</b>
	<b>b = 01</b>	<b>-, -</b>	<b>11, -</b>	<b>01,0</b>	<b>-, -</b>
	<b>c = 11</b>	<b>10, -</b>	<b>11,1</b>	<b>10, -</b>	<b>-, -</b>
	<b>d = 10</b>	<b>00,0</b>	<b>10,0</b>	<b>10,0</b>	<b>-, -</b>
		<b>s.f., Z</b>			

# Esercizio 1.4 – Mappe di Karnaugh

		AB			
		00	01	11	10
Y <sub>1</sub> Y <sub>0</sub>	00	0	0	0	-
	01	-	-	0	-
	11	-	1	-	-
	10	0	0	0	-

$$Z \text{ (SP)} = y_1 y_0$$

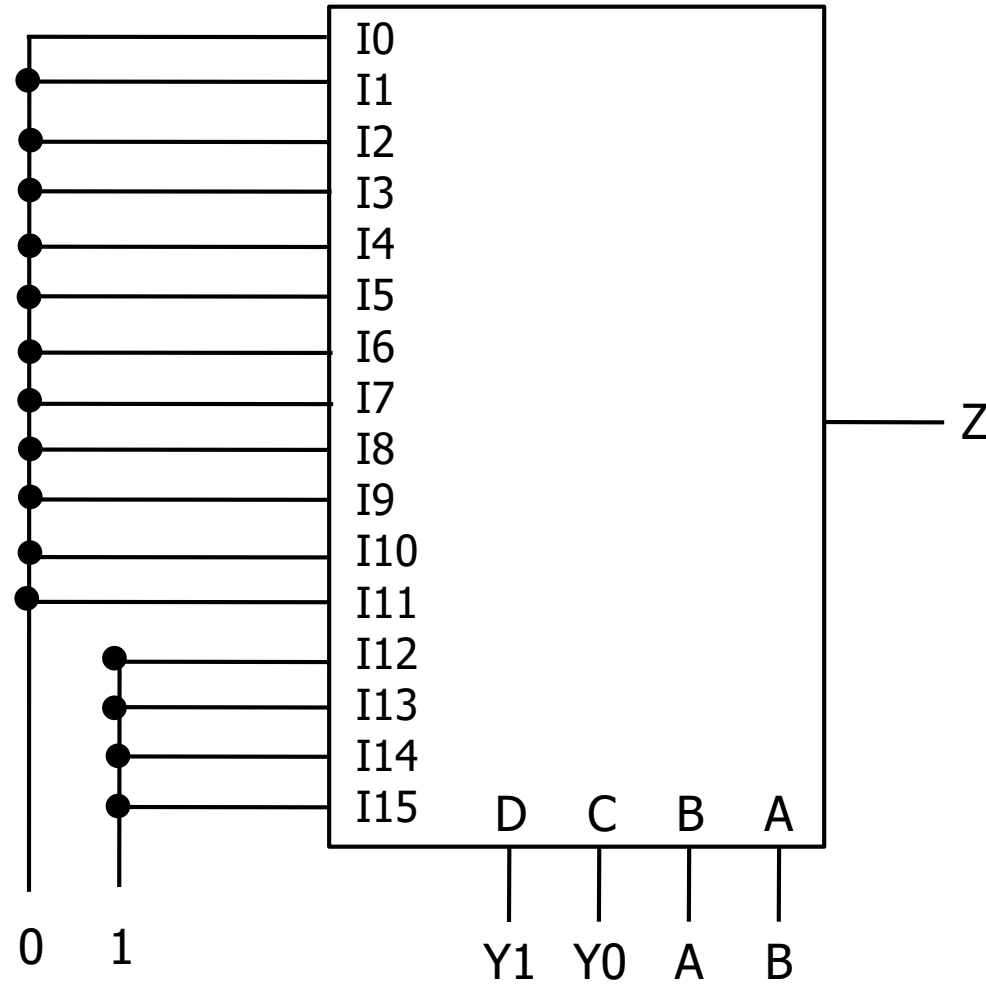
# Esercizio 1.4 – Mappe di Karnaugh

		AB			
		00	01	11	10
Y <sub>1</sub> Y <sub>0</sub>	00	0	0	1	-
	01	-	1	1	-
	11	0	1	0	-
	10	0	0	0	-

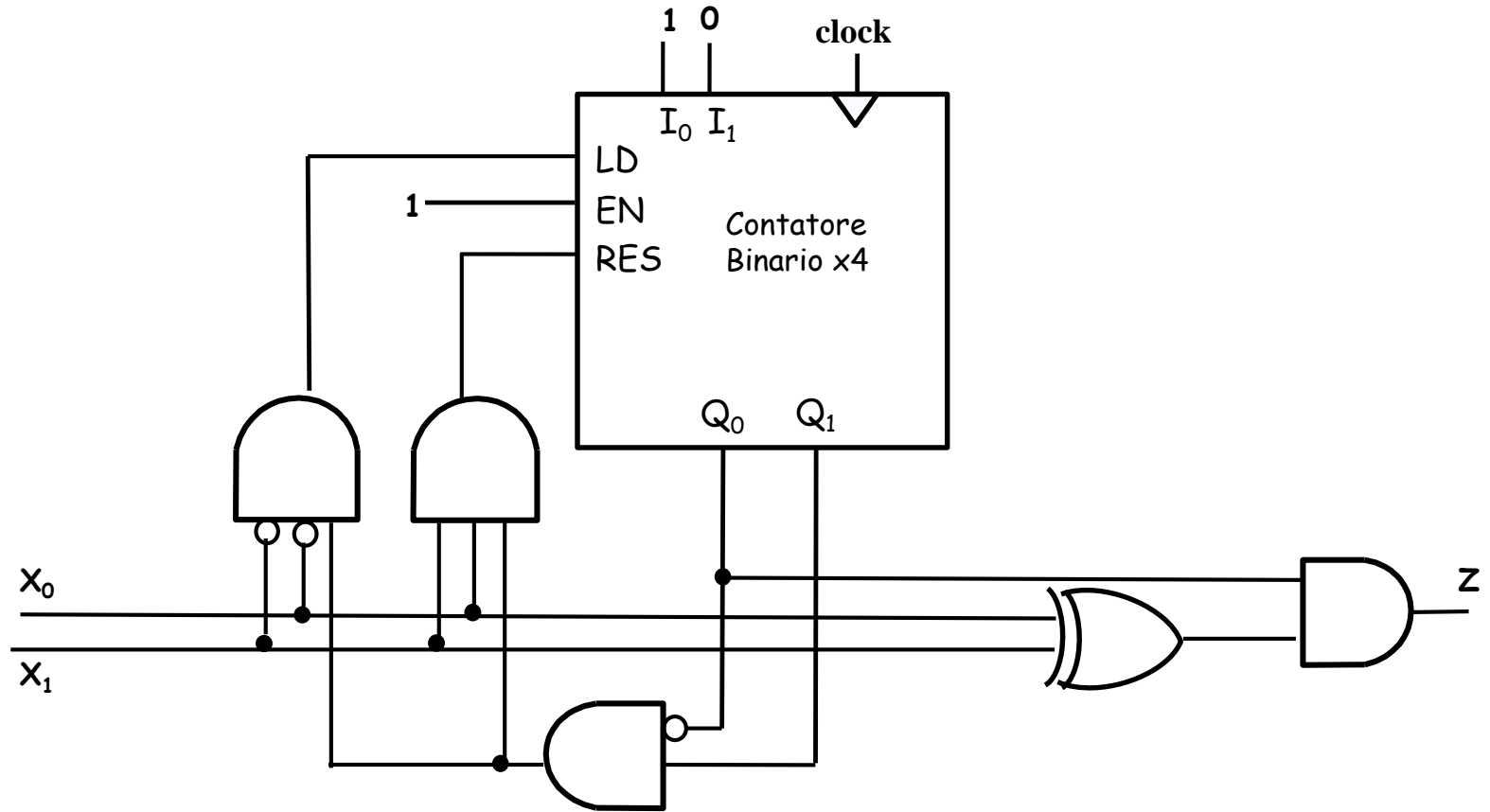
Y<sub>0</sub>

$$Y_0 \text{ (SP)} = A' B y_0 + y_1' y_0 + A y_1'$$

# Esercizio 1.5 – Sintesi con MUX



# Esercizio 2.1 – Espressioni



$$Z = ((X_1' X_0) + (X_1 X_0')) Q_0$$

$$= X_1' X_0 Q_0 + X_1 X_0' Q_0$$

$$LD = X_1' X_0' Q_1 Q_0'$$

$$EN = 1$$

$$RES = X_1 X_0 Q_1 Q_0'$$



# Esercizio 2.2 – Mappa per Z e LD

$$Z = X_1' X_0 Q_0 + X_1 X_0' Q_0$$

		$Q_1 Q_0$			
		00	01	11	10
$X_1 X_0$	00	0	0	0	0
	01	0	1	1	0
	11	0	0	0	0
	10	0	1	1	0

**Z**

$$LD = X_1' X_0' Q_1 Q_0'$$

		$Q_1 Q_0$			
		00	01	11	10
$X_1 X_0$	00	0	0	0	1
	01	0	0	0	0
	11	0	0	0	0
	10	0	0	0	0

**LD**

$I_1 I_0 = 01$  in ogni caso

# Esercizio 2.2 – Mappa per RES

$$RES = X_1 X_0 Q_1 Q_0'$$

		$Q_1 Q_0$			
		00	01	11	10
$X_1 X_0$	00	0	0	0	0
	01	0	0	0	0
	11	0	0	0	1
	10	0	0	0	0

**RES**

La mappa del segnale EN ha tutti i valori a 1

# Esercizio 2.2 – Tabella con EN,LD,RES,Z

		$X_1 X_0$			
		00	01	11	10
$(Q_1 Q_0)^n$	00	100,0	100,0	100,0	100,0
	01	100,0	100,1	100,0	100,1
	11	100,0	100,1	100,0	100,1
	10	110,0	100,0	101,0	100,0

$(EN,LD,RES)^n, Z^n$

$I_1 I_0 = 01$  in ogni caso

# Esercizio 2.3 – TdT e TdF

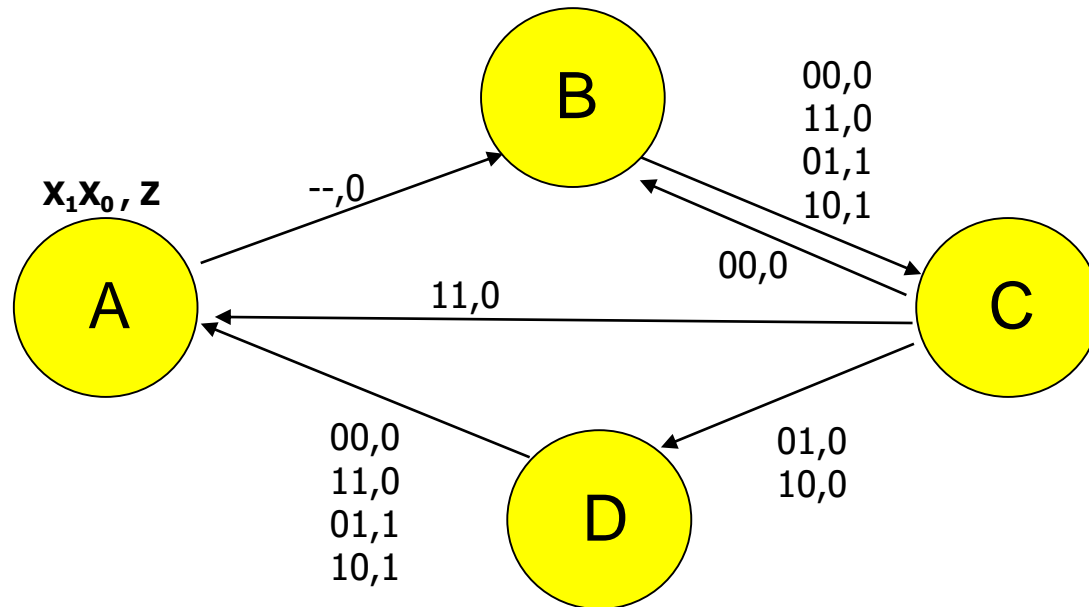
		$X_1 X_0$			
		00	01	11	10
$(Q_1 Q_0)^n$	00	01,0	01,0	01,0	01,0
	01	10,0	10,1	10,0	10,1
	11	00,0	00,1	00,0	00,1
	10	01,0	11,0	00,0	11,0

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

		$X_1 X_0$			
		00	01	11	10
s.p.	A=00	B,0	B,0	B,0	B,0
	B=01	C,0	C,1	C,0	C,1
	D=11	A,0	A,1	A,0	A,1
	C=10	B,0	D,0	A,0	D,0

s.f.,  $Z^n$

# Esercizio 2.4 e 2.5 – Grafo e comportamento



## Comportamento della rete:

Con ingresso 01 o 10 costanti, l'uscita assume valore 1 ogni 2 cicli di clock (divisore di frequenza)  
Sullo stato interno 10 (valore "2" di conteggio), il contatore si resetta se l'ingresso della rete assume valore 11, carica il valore 01 se l'ingresso assume il valore 00