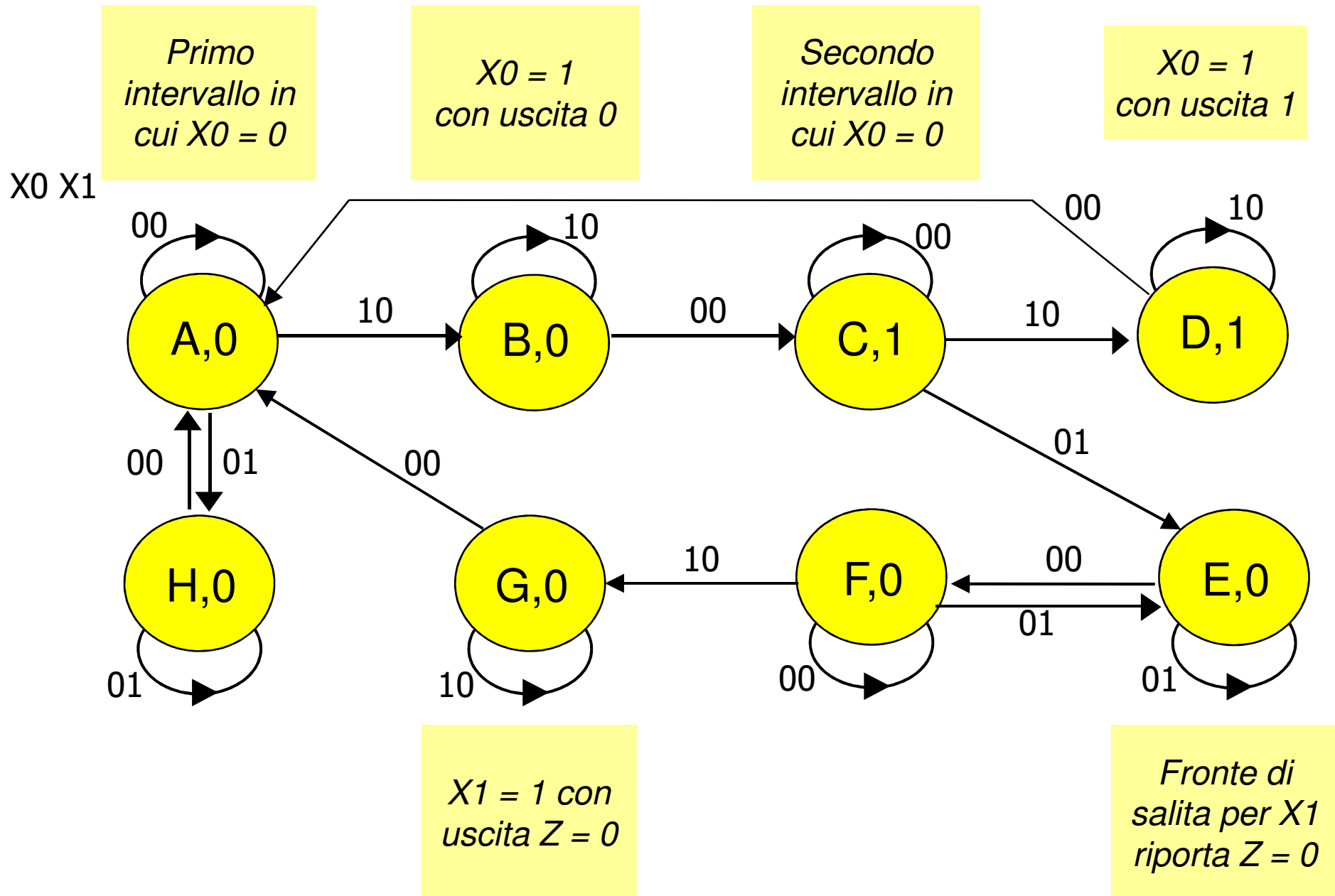


# Esercizio 1.1



# Esercizio 1.2 – Tabella triangolare e CMC

**X0 X1**

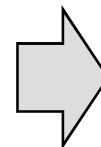
	00	01	11	10
A	A,0	H,0	-, -	B,0
B	C,-	-, -	-, -	B,0
C	C,1	E,-	-, -	D,1
D	A,-	-, -	-, -	D,1
E	F,0	E,0	-, -	-, -
F	F,0	E,0	-, -	G,0
G	A,0	-, -	-, -	G,0
H	A,0	H,0	-, -	-, -

**s.f., Z**

s.p.

B	AC						
C							
D			AC				
E	EH AF	CF		AF			
F	EH BG	CF BG					
G	BG	AC			AF	AF	
H		AC			AF	AF EH	
	A	B	C	D	E	F	G

AH, DH, EF, GH, B, C



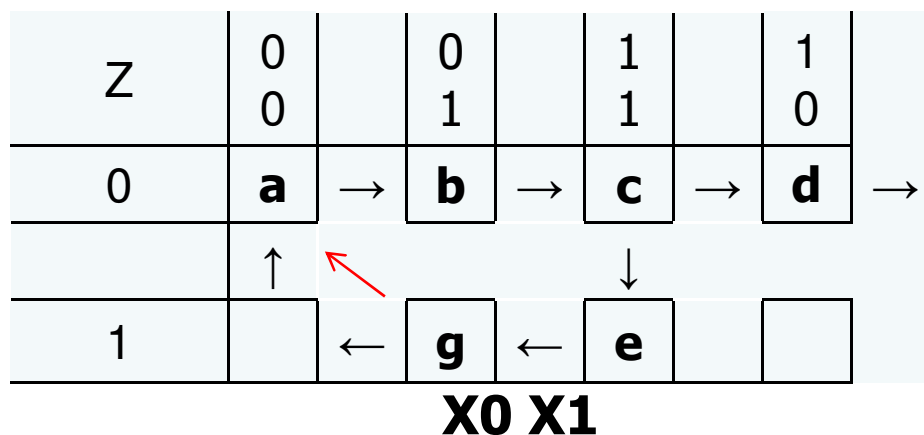
a={AH}, b={B}, c={C},  
d={D}, e={EF}, g={GH}

## Esercizio 1.2 – TdF automa minimo

		<b>X0 X1</b>			
		<b>00</b>	<b>01</b>	<b>11</b>	<b>10</b>
<b>s.p.</b>	<b>a=AH</b>	<b>a,0</b>	<b>a,0</b>	<b>-, -</b>	<b>b,0</b>
	<b>b</b>	<b>c, -</b>	<b>-, -</b>	<b>-, -</b>	<b>b,0</b>
	<b>c</b>	<b>c,1</b>	<b>e, -</b>	<b>-, -</b>	<b>d,1</b>
	<b>d</b>	<b>a, -</b>	<b>-, -</b>	<b>-, -</b>	<b>d,1</b>
	<b>e=EF</b>	<b>e,0</b>	<b>e,0</b>	<b>-, -</b>	<b>g,0</b>
	<b>g=GH</b>	<b>a,0</b>	<b>g,0</b>	<b>-, -</b>	<b>g,0</b>

**s.f., z**

## Esercizio 1.3 – TdT automa minimo



	00	01	11	10
<b>a = 000</b>	<b>000,0</b>	<b>000,0</b>	<b>-,-</b>	<b>001,0</b>
<b>b = 001</b>	<b>011,-</b>	<b>-,-</b>	<b>-,-</b>	<b>001,0</b>
<b>c = 011</b>	<b>011,1</b>	<b>111,-</b>	<b>-,-</b>	<b>010,1</b>
<b>d = 010</b>	<b>000,-</b>	<b>-,-</b>	<b>-,-</b>	<b>010,1</b>
<b>100</b>	<b>-,-</b>	<b>-,-</b>	<b>-,-</b>	<b>-,-</b>
<b>g = 101</b>	<b>000,0</b>	<b>101,0</b>	<b>-,-</b>	<b>101,0</b>
<b>e = 111</b>	<b>111,0</b>	<b>111,0</b>	<b>-,-</b>	<b>101,0</b>
<b>110</b>	<b>-,-</b>	<b>-,-</b>	<b>-,-</b>	<b>-,-</b>
		<b>Y<sub>2</sub> Y<sub>1</sub> Y<sub>0</sub>, Z</b>		

## Esercizio 1.3 – TdT automa minimo

	<b>X0 X1</b>			
	<b>00</b>	<b>01</b>	<b>11</b>	<b>10</b>
<b>a = 000</b>	<b>000,0</b>	<b>000,0</b>	<b>-,-</b>	<b>001,0</b>
<b>b = 001</b>	<b>011,-</b>	<b>-,-</b>	<b>-,-</b>	<b>001,0</b>
<b>c = 011</b>	<b>011,1</b>	<b>111,-</b>	<b>-,-</b>	<b>010,1</b>
<b>d = 010</b>	<b>000,-</b>	<b>-,-</b>	<b>-,-</b>	<b>010,1</b>
<b>100</b>	<b>000,0</b>	<b>-,-</b>	<b>-,-</b>	<b>-,-</b>
<b>g = 101</b>	<b>100,0</b>	<b>101,0</b>	<b>-,-</b>	<b>101,0</b>
<b>e = 111</b>	<b>111,0</b>	<b>111,0</b>	<b>-,-</b>	<b>101,0</b>
<b>110</b>	<b>-,-</b>	<b>-,-</b>	<b>-,-</b>	<b>-,-</b>

**Y<sub>2</sub> Y<sub>1</sub> Y<sub>0</sub>, Z**

**La corsa critica 101 -> 000 può essere risolta con una transizione multipla passando per lo stato inutilizzato 100.**

# Esercizio 1.4 – Sintesi SP variabili di stato

		X0 X1			
		00	01	11	10
Y1Y0	00	0	0	-	0
	01	1	-	-	0
	11	1	1	-	1
	10	0	0	-	1

$y_2 = 0$

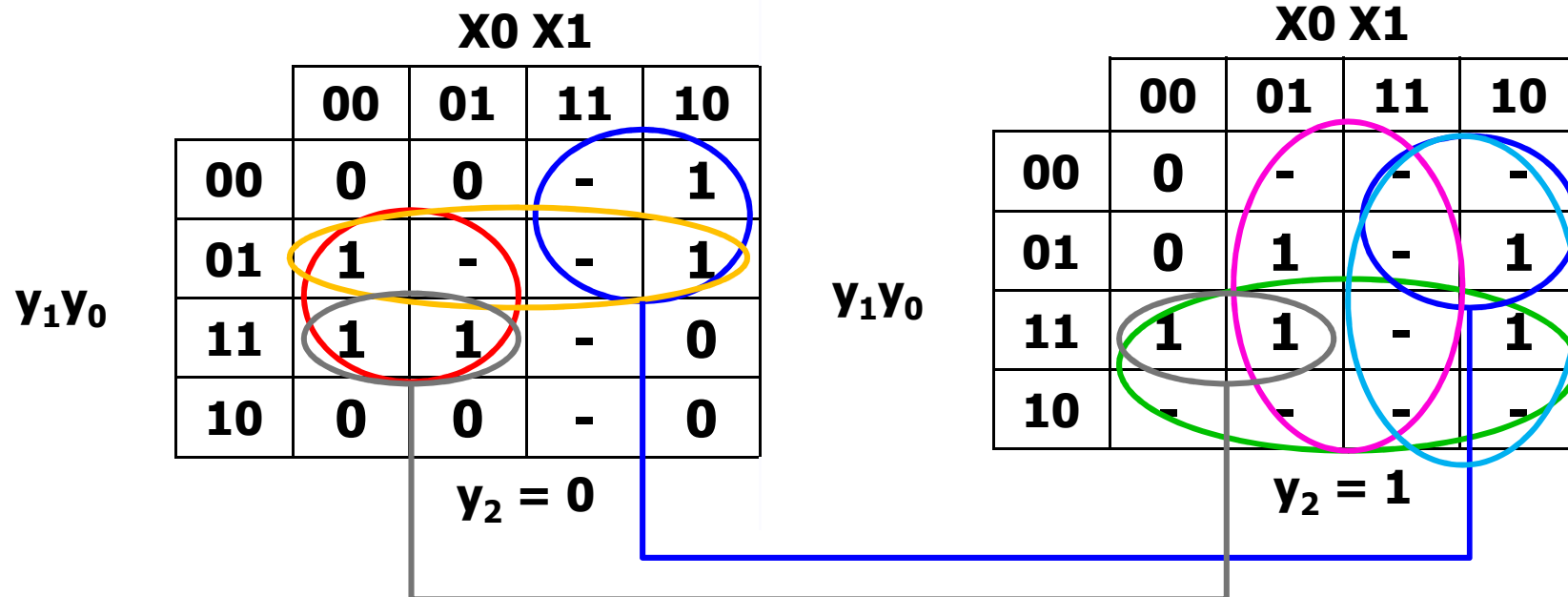
		X0 X1			
		00	01	11	10
Y1Y0	00	0	-	-	-
	01	0	0	-	0
	11	1	1	-	0
	10	-	-	-	-

$y_2 = 1$

$$Y1 (SP) = X0 y1 y2' + X0' y0 y2' + y2 y1 x1 + y2' x0' y1 + x0' y1 y0$$

Coperture ridondanti (RR arancio e fucsia)  
necessarie per evitare il fenomeno dell'alea statica

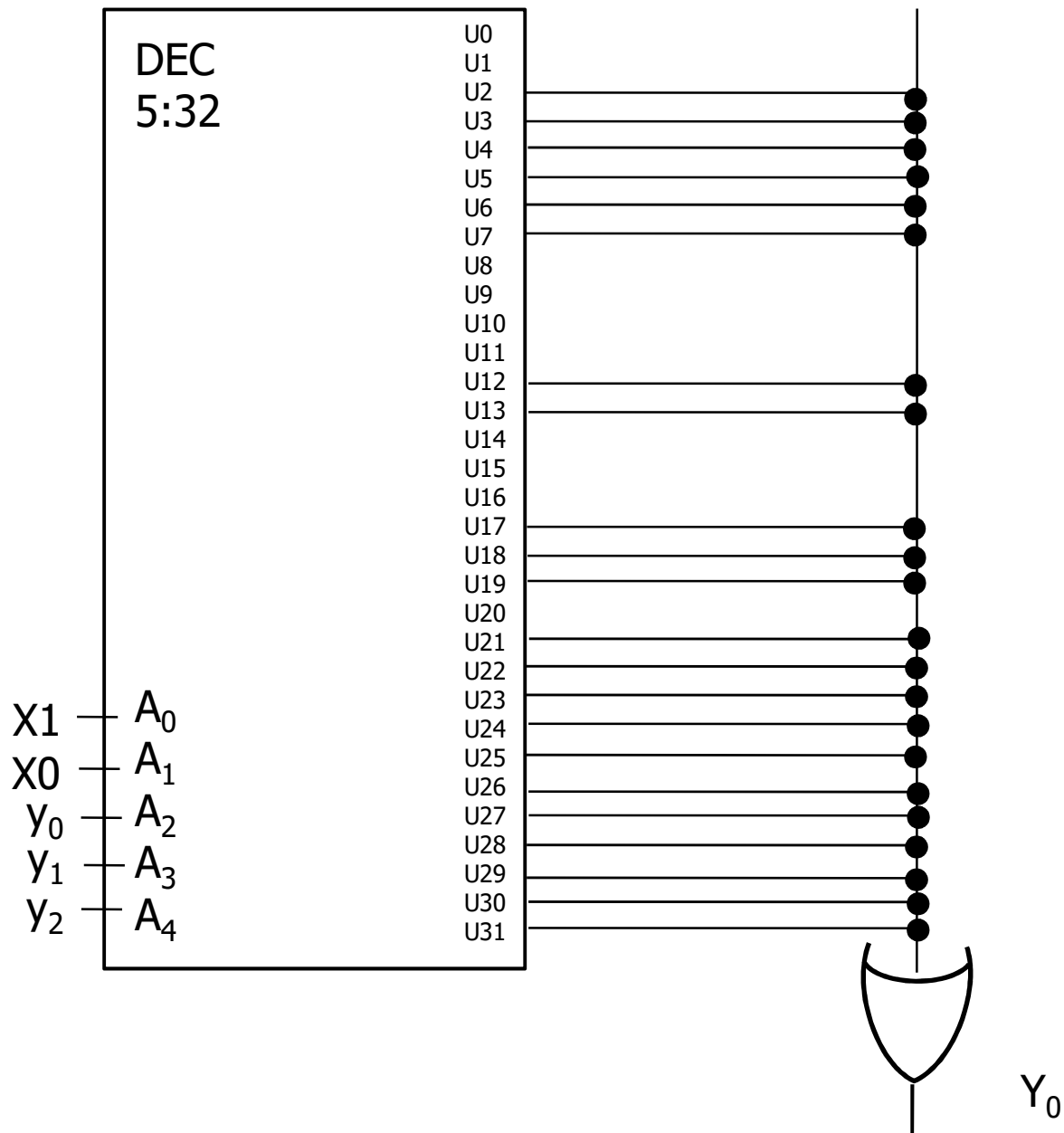
# Esercizio 1.4 – Sintesi SP variabili di stato



$$Y_0(SP) = X_0 y_1' + X_0' y_0 y_2' + y_2 y_1 + y_2 x_1 + y_2' y_1' y_0 + y_2 x_0 + y_1 y_0 x_0'$$

Coperture ridondanti (RR arancio, grigio, fucsia, azzurro) necessarie per evitare il fenomeno dell'alea statica

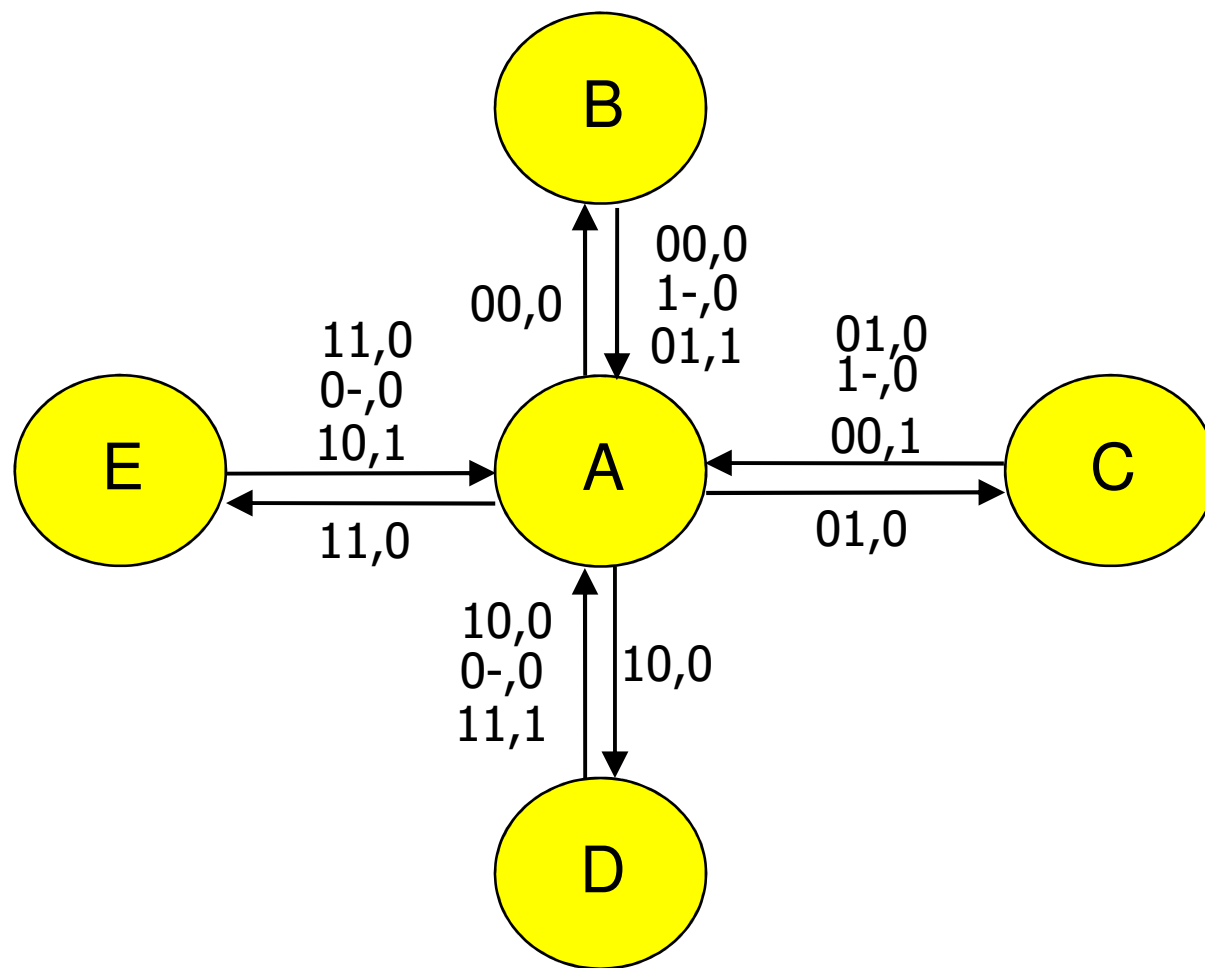
# Esercizio 1.5 – Sintesi con Decoder e OR





# Esercizio 2.1 – Grafo

X0 X1, Z



## Esercizio 2.2 – TdF e TdT

		X0 X1			
		00	01	11	10
s.p.	A	B,0	C,0	E,0	D,0
	B	A,0	A,1	A,0	A,0
	C	A,1	A,0	A,0	A,0
	D	A,0	A,0	A,1	A,0
	E	A,0	A,0	A,0	A,1

s.f., z

		X0 X1			
		00	01	11	10
Y <sub>2</sub> Y <sub>1</sub> Y <sub>0</sub>	000	001,0	010,0	100,0	011,0
	001	000,0	000,1	000,0	000,0
	010	000,1	000,0	000,0	000,0
	011	000,0	000,0	000,1	000,0
	100	000,0	000,0	000,0	000,1
	101	---,-	---,-	---,-	---,-
	111	---,-	---,-	---,-	---,-
	110	---,-	---,-	---,-	---,-

Y<sub>2</sub>Y<sub>1</sub>Y<sub>0</sub>, z

## Esercizio 2.3 – Sintesi con FF-JK

		X <sub>0</sub> X <sub>1</sub>			
		00	01	11	10
Y <sub>1</sub> Y <sub>0</sub>	00	1	0	0	1
	01	0	0	0	0
	11	0	0	0	0
	10	0	0	0	0

**y<sub>2</sub> = 0**

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

**y<sub>2</sub> = 1**

**Y<sub>0</sub>**

# Esercizio 2.3 – Sintesi con FF-JK

		X0 X1			
		00	01	11	10
Y1Y0	00	1	0	0	1
	01	-	-	-	-
	11	-	-	-	-
	10	0	0	0	0

$y_2 = 0$

		X0 X1			
		00	01	11	10
Y1Y0	00	0	0	0	0
	01	-	-	-	-
	11	-	-	-	-
	10	-	-	-	-

$y_2 = 1$

$$J_0 \text{ (SP)} = x_1' y_1' y_2'$$

		X0 X1			
		00	01	11	10
Y1Y0	00	-	-	-	-
	01	1	1	1	1
	11	1	1	1	1
	10	-	-	-	-

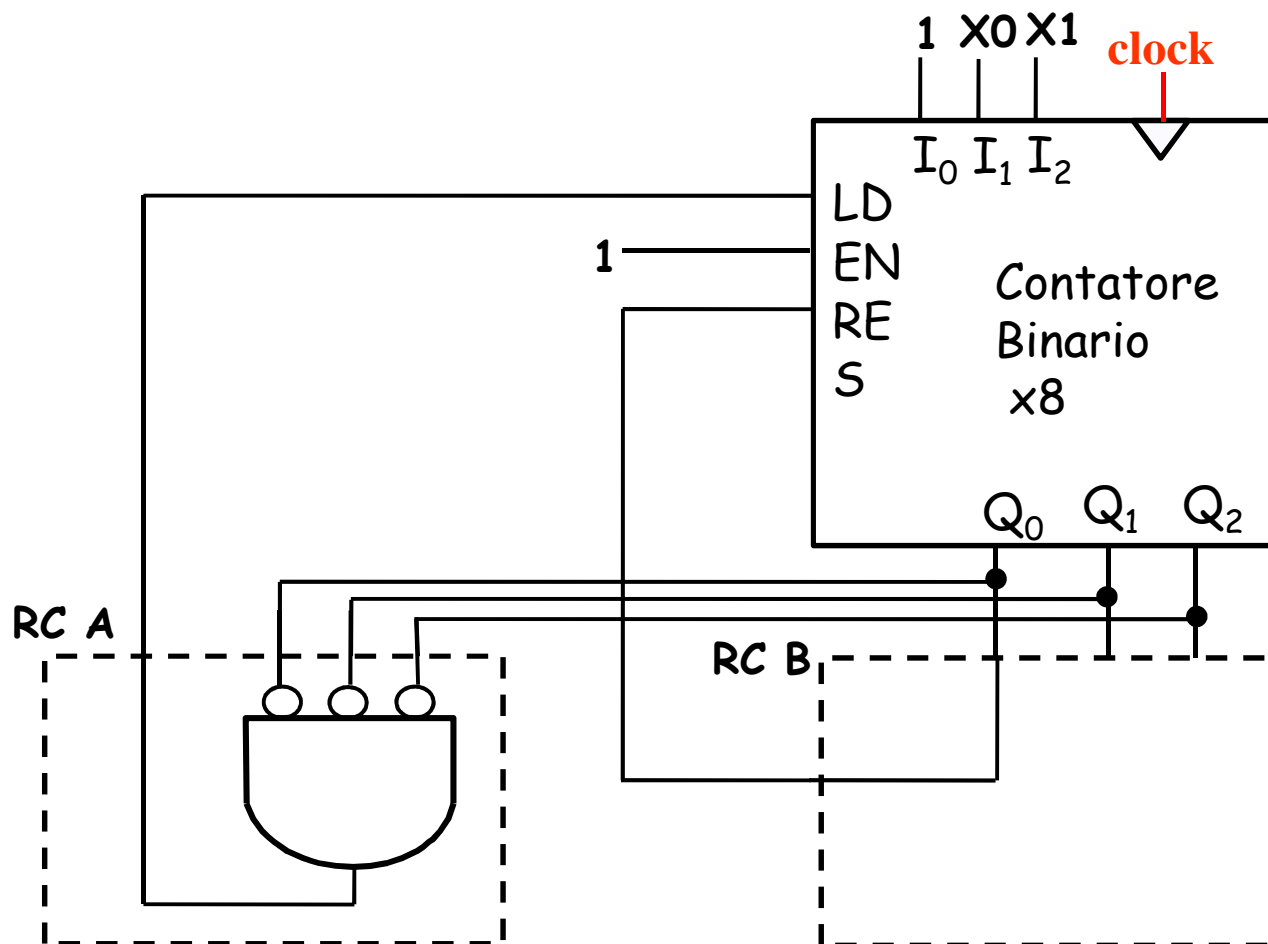
$y_2 = 0$

		X0 X1			
		00	01	11	10
Y1Y0	00	-	-	-	-
	01	-	-	-	-
	11	-	-	-	-
	10	-	-	-	-

$y_2 = 1$

$$K_0 \text{ (SP)} = 1$$

## Esercizio 2.4 – Sintesi LD e RES



S.P.	Q2Q1Q0
A	000
B	001
C	011
D	101
E	111

Il circuito utilizza la codifica degli stati come indicato in tabella (vincolata dal fatto che  $I_0 = 1$ )

Ogni qualvolta la rete si trova nello stato A, il contatore carica uno dei 4 stati B,C,D,E (a seconda del valore corrente di X0 e X1) attivando LD

Ogni qualvolta la rete è in B,C,D o E, al ciclo successivo si torna in A attivando RES