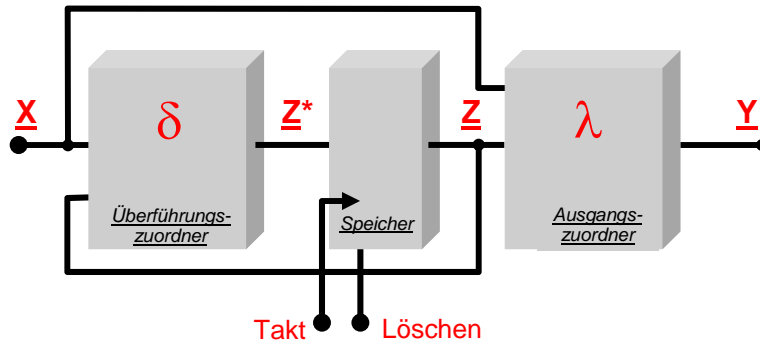


Mealy

$$A = A(X, Z, Y, \delta, \lambda)$$



δ	X_0	.	.	X_i	.	.	X_{n-1}
Z_0							
Z_1				.			
.				.			
.				.			
Z_i	.	.	.	$\delta(x_i, Z_i)$.	.	.
.				.			
.				.			
Z_{n-1}				.			

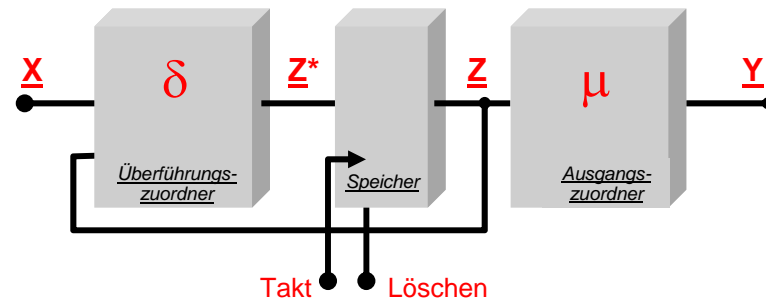
λ	X_0	.	.	X_i	.	.	X_{n-1}
Z_0							
Z_1				.			
.				.			
.				.			
Z_i	.	.	.	$\lambda(x_i, Z_i)$.	.	.
.				.			
.				.			
Z_{n-1}				.			

$$Z^{n+1} = \delta(X^n, Z^n)$$

$$Y^n = \lambda(X^n, Z^n)$$

$$A = A(X, Z, Y, \delta, \mu)$$

Moore



δ	X_0	.	.	X_i	.	.	X_{n-1}
Z_0							
Z_1				.			
.				.			
.				.			
Z_i	.	.	.	$\delta(x_i, Z_i)$.	.	.
.				.			
.				.			
Z_{n-1}				.			

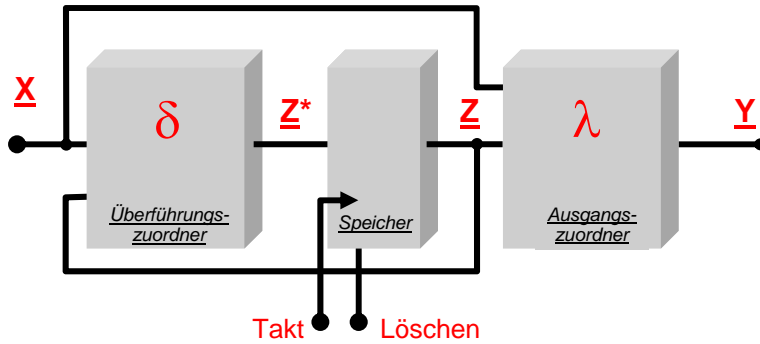
μ							
Z_0				.			
Z_1				.			
.				.			
.				.			
Z_i	.	.	.	$\mu(Z_i)$.	.	.
.				.			
.				.			
Z_{n-1}				.			

Änderungen an X werden an Y direkt wirksam!
Eine aktive Schaltflanke an Takt ist keine Voraussetzung für eine Ausgangsänderung.

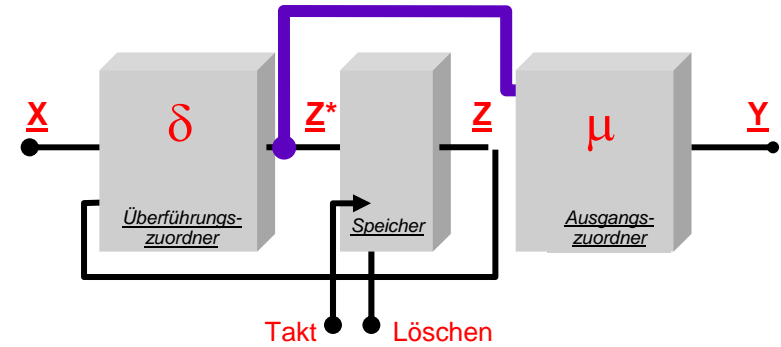
$$Z^{n+1} = \delta(X^n, Z^n)$$

$$Y^n = \mu(Z^n)$$

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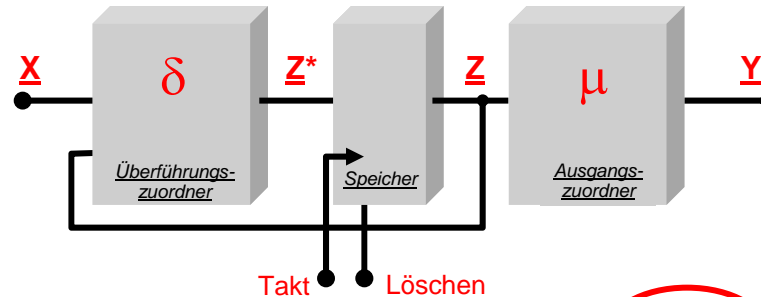
$$Z^{n+1} = \delta(X^n, Z^n) \quad Y^n = \lambda(X^n, Z^n)$$



$$Y^n = \mu(Z^{n+1}) = \mu(\delta(X^n, Z^n))$$

Zeitverschiebung des
Ausgangs um einen Takt !

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$$Z^{n+1} = \delta(X^n, Z^n) \quad Y^n = \mu(Z^n)$$

Erst nach einer aktiven
Schaltflanke an Takt sind
Änderungen an Y möglich !

Moore → Mealy

δ	X_0	X_1	X_2	μ
Z_0	Z_3	Z_1	Z_0	Y_1
Z_1	Z_2	Z_1	Z_2	Y_2
Z_2	Z_0	Z_3	Z_1	Y_0
Z_3	Z_0	Z_3	Z_3	Y_3

$$\lambda (X_i, Z_j) = \mu (\delta (X_i, Z_j))$$

δ	X_0	X_1	X_2
Z_0	Z_3	Z_1	Z_0
Z_1	Z_2	Z_1	Z_2
Z_2	Z_0	Z_3	Z_1
Z_3	Z_0	Z_3	Z_3

λ	X_0	X_1	X_2
Z_0			
Z_1			
Z_2			
Z_3			

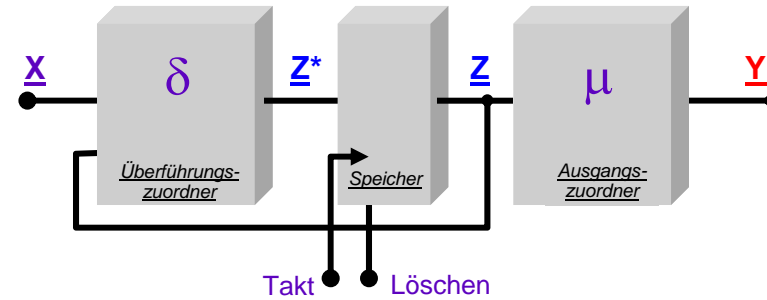
Moore \rightarrow Mealy

δ	X_0	X_1	X_2	μ
Z_0	Z_3	Z_1	Z_0	Y_1
Z_1	Z_2	Z_1	Z_2	Y_2
Z_2	Z_0	Z_3	Z_1	Y_0
Z_3	Z_0	Z_3	Z_3	Y_3

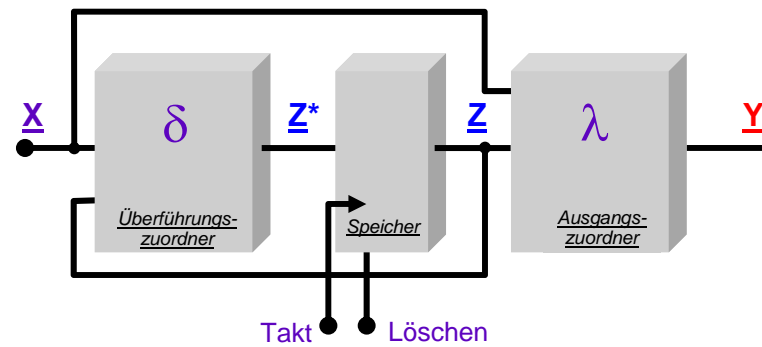
δ	X_0	X_1	X_2
Z_0	Z_3	Z_1	Z_0
Z_1	Z_2	Z_1	Z_2
Z_2	Z_0	Z_3	Z_1
Z_3	Z_0	Z_3	Z_3

λ	X_0	X_1	X_2
Z_0	Y_3	Y_2	Y_1
Z_1	Y_0	Y_2	Y_0
Z_2	Y_1	Y_3	Y_2
Z_3	Y_1	Y_3	Y_3

Moore



Mealy

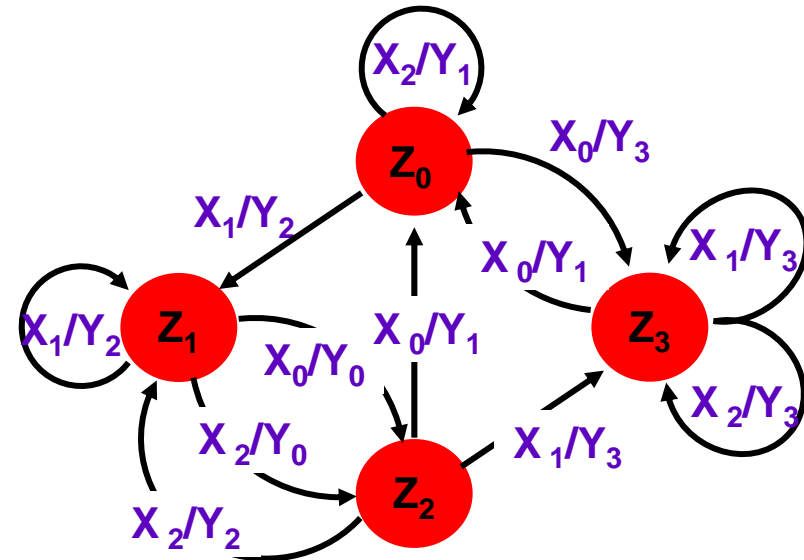
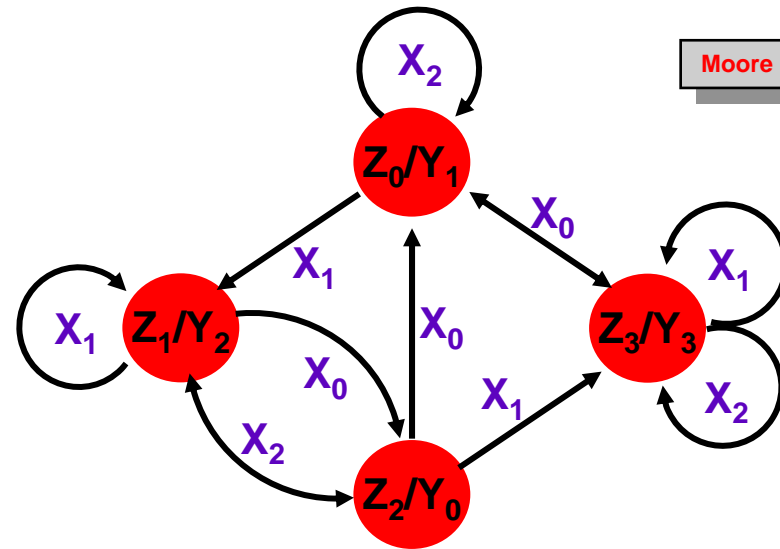


Moore \rightarrow Mealy

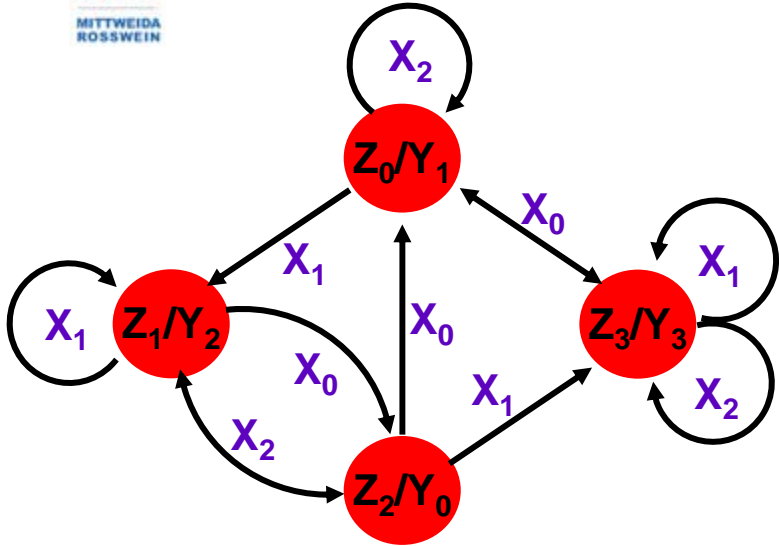
δ	X_0	X_1	X_2	μ
Z_0	Z_3	Z_1	Z_0	Y_1
Z_1	Z_2	Z_1	Z_2	Y_2
Z_2	Z_0	Z_3	Z_1	Y_0
Z_3	Z_0	Z_3	Z_3	Y_3

δ	X_0	X_1	X_2
Z_0	Z_3	Z_1	Z_0
Z_1	Z_2	Z_1	Z_2
Z_2	Z_0	Z_3	Z_1
Z_3	Z_0	Z_3	Z_3

λ	X_0	X_1	X_2
Z_0	Y_3	Y_2	Y_1
Z_1	Y_0	Y_2	Y_0
Z_2	Y_1	Y_3	Y_2
Z_3	Y_1	Y_3	Y_3

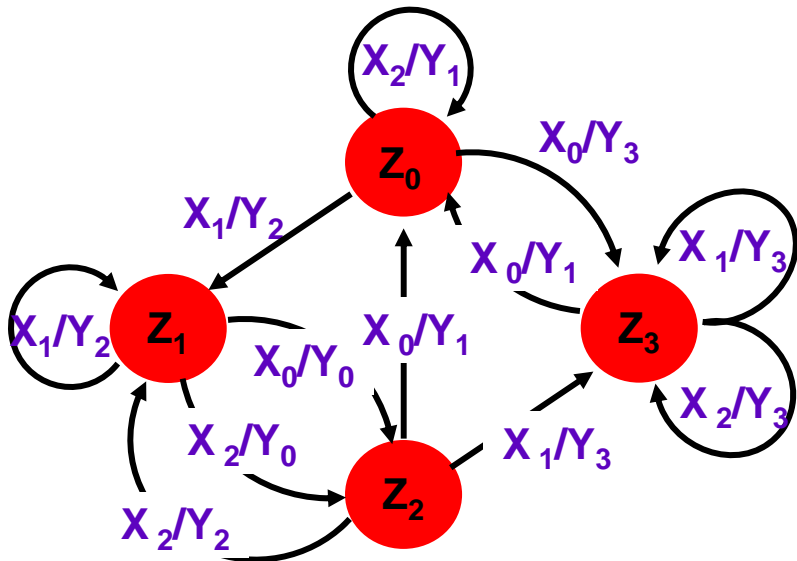


Moore → Mealy



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	X ₀	X ₀	X ₁	X ₂	X ₀	X ₁	X ₀	X ₂	X ₁	X ₀	X ₁
Z ₀	Z ₃	Z ₀	Z ₁	Z ₂	Z ₀	Z ₁	Z ₂	Z ₁	Z ₁	Z ₂	Z ₃
	Y ₃	Y ₁	Y ₂	Y ₀	Y ₁	Y ₂	Y ₀	Y ₂	Y ₂	Y ₀	Y ₃

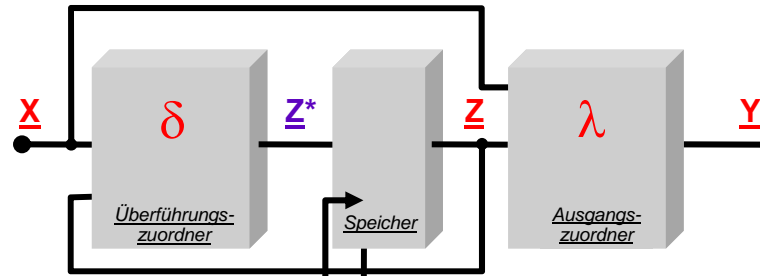


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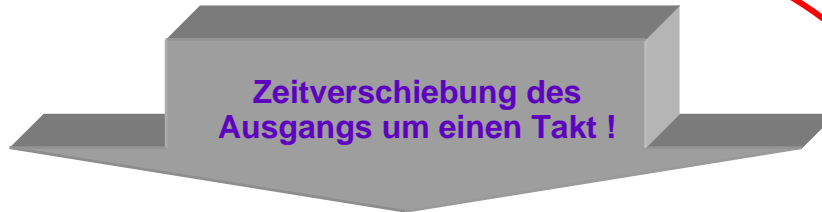
	X ₀	X ₀	X ₁	X ₂	X ₀	X ₁	X ₀	X ₂	X ₁	X ₀	X ₁
Z ₀	Z ₃	Z ₀	Z ₁	Z ₂	Z ₀	Z ₁	Z ₂	Z ₁	Z ₁	Z ₂	Z ₃
	Y ₃	Y ₁	Y ₂	Y ₀	Y ₁	Y ₂	Y ₀	Y ₂	Y ₂	Y ₀	Y ₃

Mealy → Moore

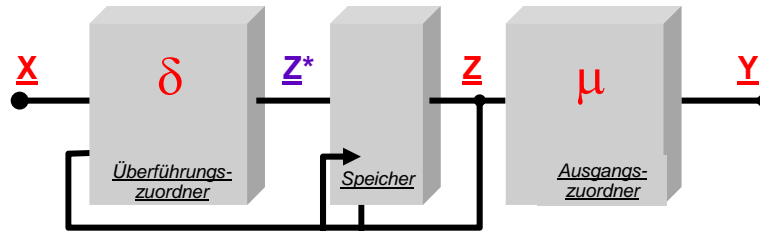
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$$Z^{n+1} = \delta(X^n, Z^n) \quad Y^n = \mu(Z^n) = \mu(\delta(X^n, Z^n))$$



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$$Z^{*n+1} = \delta^*(X^n, Z^{*n-1}) \quad Y^n = \mu(Z^{*n-1})$$

Bei der Mealy --> Moore-Umwandlung beziehen wir uns auf den vorhergehenden Zustand !

Zur besseren Unterscheidung bezeichnen wir die Zustände des gewandelten Mooreautomaten mit Z* !

δ	X_0	X_1	X_2
Z_0	Z_3	Z_1	Z_0
Z_1	Z_2	Z_1	Z_2
Z_2	Z_0	Z_3	Z_1
Z_3	Z_0	Z_3	Z_3

λ	X_0	X_1	X_2
Z_0	Y_3	Y_2	Y_1
Z_1	Y_0	Y_2	Y_0
Z_2	Y_1	Y_3	Y_2
Z_3	Y_1	Y_3	Y_3

$Z_0^* = [X_0, Z_0]$
$Z_1^* = [X_0, Z_1]$
$Z_2^* = [X_0, Z_2]$
$Z_3^* = [X_0, Z_3]$
$Z_4^* = [X_1, Z_0]$
$Z_5^* = [X_1, Z_1]$
$Z_6^* = [X_1, Z_2]$
$Z_7^* = [X_1, Z_3]$
$Z_8^* = [X_2, Z_0]$
$Z_9^* = [X_2, Z_1]$
$Z_{10}^* = [X_2, Z_2]$
$Z_{11}^* = [X_2, Z_3]$

$$\mu^*(Z^{*n}) = \lambda(X^n, Z^{n-1})$$

$$Z^{*n} = \delta^*(X^n, Z^{*n-1})$$

$$Z^{*n} = [X^n, \delta(X^n, Z^{n-1})]$$

Jedem Paar $[X_i, Z_j]$ wird ein Zustand Z_j^* zugeordnet.
 Z_j^* ist die Menge der Zustände des gesuchten Mooreautomaten.

Mealy → Moore

$Z_0^* = [X_0, Z_0]$
$Z_1^* = [X_0, Z_1]$
$Z_2^* = [X_0, Z_2]$
$Z_3^* = [X_0, Z_3]$
$Z_4^* = [X_1, Z_0]$
$Z_5^* = [X_1, Z_1]$
$Z_6^* = [X_1, Z_2]$
$Z_7^* = [X_1, Z_3]$
$Z_8^* = [X_2, Z_0]$
$Z_9^* = [X_2, Z_1]$
$Z_{10}^* = [X_2, Z_2]$
$Z_{11}^* = [X_2, Z_3]$

δ^*	X_0'	X_1'	X_2'	μ^*
Z_0^*				
Z_1^*				
Z_2^*				
Z_3^*				
Z_4^*				
Z_5^*				
Z_6^*				
Z_7^*				
Z_8^*				
Z_9^*				
Z_{10}^*				
Z_{11}^*				

Mealy → Moore

$$\mu^*(Z^{*n}) = \lambda(X^n, Z^{n-1})$$

$$Z_0^* = [X_0, Z_0]$$

$$Z_1^* = [X_0, Z_1]$$

$$Z_2^* = [X_0, Z_2]$$

$$Z_3^* = [X_0, Z_3]$$

$$Z_4^* = [X_1, Z_0]$$

$$Z_5^* = [X_1, Z_1]$$

$$Z_6^* = [X_1, Z_2]$$

$$Z_7^* = [X_1, Z_3]$$

$$Z_8^* = [X_2, Z_0]$$

$$Z_9^* = [X_2, Z_1]$$

$$Z_{10}^* = [X_2, Z_2]$$

$$Z_{11}^* = [X_2, Z_3]$$

λ	X_0	X_1	X_2
Z_0	Y_3	Y_2	Y_1
Z_1	Y_0	Y_2	Y_0
Z_2	Y_1	Y_3	Y_2
Z_3	Y_1	Y_3	Y_3

δ^*	X_0	X_1	X_2	μ^*
Z_0^*				
Z_1^*				
Z_2^*				
Z_3^*				
Z_4^*				
Z_5^*				
Z_6^*				
Z_7^*				
Z_8^*				
Z_9^*				
Z_{10}^*				
Z_{11}^*				

Mealy → Moore

$$\mu^*(Z^{*n}) = \lambda(X^n, Z^{n-1})$$

$$Z_0^* = [X_0, Z_0]$$

$$Z_1^* = [X_0, Z_1]$$

$$Z_2^* = [X_0, Z_2]$$

$$Z_3^* = [X_0, Z_3]$$

$$Z_4^* = [X_1, Z_0]$$

$$Z_5^* = [X_1, Z_1]$$

$$Z_6^* = [X_1, Z_2]$$

$$Z_7^* = [X_1, Z_3]$$

$$Z_8^* = [X_2, Z_0]$$

$$Z_9^* = [X_2, Z_1]$$

$$Z_{10}^* = [X_2, Z_2]$$

$$Z_{11}^* = [X_2, Z_3]$$

λ	X_0	X_1	X_2
Z_0	Y_3	Y_2	Y_1
Z_1	Y_0	Y_2	Y_0
Z_2	Y_1	Y_3	Y_2
Z_3	Y_1	Y_3	Y_3

δ^*	X_0	X_1	X_2	μ^*
Z_0^*				Y_3
Z_1^*				Y_0
Z_2^*				Y_1
Z_3^*				Y_1
Z_4^*				Y_2
Z_5^*				Y_2
Z_6^*				Y_3
Z_7^*				Y_3
Z_8^*				Y_1
Z_9^*				Y_0
Z_{10}^*				Y_2
Z_{11}^*				Y_3

$$\delta^*(X_0', Z_0^*) = [X_0, \delta(X_0, Z_0)] = [X_0, Z_3] = Z_3$$

Mealy \rightarrow Moore

δ^*	X_0'	X_1'	X_2'	μ^*
Z_0^*				Y_3
Z_1^*				Y_0
Z_2^*				Y_1
Z_3^*				Y_1
Z_4^*				Y_2
Z_5^*				Y_2
Z_6^*				Y_3
Z_7^*				Y_3
Z_8^*				Y_1
Z_9^*				Y_0
Z_{10}^*				Y_2
Z_{11}^*				Y_3

- $Z_0^* = [X_0, Z_0]$
- $Z_1^* = [X_0, Z_1]$
- $Z_2^* = [X_0, Z_2]$
- $Z_3^* = [X_0, Z_3]$
- $Z_4^* = [X_1, Z_0]$
- $Z_5^* = [X_1, Z_1]$
- $Z_6^* = [X_1, Z_2]$
- $Z_7^* = [X_1, Z_3]$
- $Z_8^* = [X_2, Z_0]$
- $Z_9^* = [X_2, Z_1]$
- $Z_{10}^* = [X_2, Z_2]$
- $Z_{11}^* = [X_2, Z_3]$

δ	X_0	X_1	X_2
Z_0	Z_3	Z_1	Z_0
Z_1	Z_2	Z_1	Z_2
Z_2	Z_0	Z_3	Z_1
Z_3	Z_0	Z_3	Z_3

Mealy → Moore

δ^*	X_0'	X_1'	X_2'	μ^*
Z_0^*	Z_3	Z_7	Z_{11}	Y_3
Z_1^*	Z_2	Z_6	Z_{10}	Y_0
Z_2^*	Z_0	Z_4	Z_8	Y_1
Z_3^*	Z_0	Z_4	Z_8	Y_1
Z_4^*	Z_1	Z_5	Z_9	Y_2
Z_5^*	Z_1	Z_5	Z_9	Y_2
Z_6^*	Z_3	Z_7	Z_{11}	Y_3
Z_7^*	Z_3	Z_7	Z_{11}	Y_3
Z_8^*	Z_0	Z_4	Z_8	Y_1
Z_9^*	Z_2	Z_6	Z_{10}	Y_0
Z_{10}^*	Z_1	Z_5	Z_9	Y_2
Z_{11}^*	Z_3	Z_7	Z_{11}	Y_3

	δ^*	X_0'	X_1'	X_2'	μ^*			
Z_a	Z_2^*	Z_0	$-Z_d$	Z_4	$-Z_b$	Z_8	$-Z_a$	Y_1
	Z_3^*	Z_0	$-Z_d$	Z_4	$-Z_b$	Z_8	$-Z_a$	Y_1
	Z_8^*	Z_0	$-Z_d$	Z_4	$-Z_b$	Z_8	$-Z_a$	Y_1
Z_b	Z_4^*	Z_1	$-Z_c$	Z_5	$-Z_b$	Z_9	$-Z_c$	Y_2
	Z_5^*	Z_1	$-Z_c$	Z_5	$-Z_b$	Z_9	$-Z_c$	Y_2
	Z_{10}^*	Z_1	$-Z_c$	Z_5	$-Z_b$	Z_9	$-Z_c$	Y_2
Z_c	Z_1^*	Z_2	$-Z_a$	Z_6	$-Z_a$	Z_{10}	$-Z_b$	Y_0
	Z_9^*	Z_2	$-Z_a$	Z_6	$-Z_a$	Z_{10}	$-Z_b$	Y_0
Z_d	Z_0^*	Z_3	$-Z_a$	Z_7	$-Z_d$	Z_{11}	$-Z_d$	Y_3
	Z_6^*	Z_3	$-Z_a$	Z_7	$-Z_d$	Z_{11}	$-Z_d$	Y_3
	Z_7^*	Z_3	$-Z_a$	Z_7	$-Z_d$	Z_{11}	$-Z_d$	Y_3
	Z_{11}^*	Z_3	$-Z_a$	Z_7	$-Z_d$	Z_{11}	$-Z_d$	Y_3

δ	X_0	X_1	X_2	μ
Z_0	Z_3	Z_1	Z_0	Y_1
Z_1	Z_2	Z_1	Z_2	Y_2
Z_2	Z_0	Z_3	Z_1	Y_0
Z_3	Z_0	Z_3	Z_3	Y_3

Lösung !