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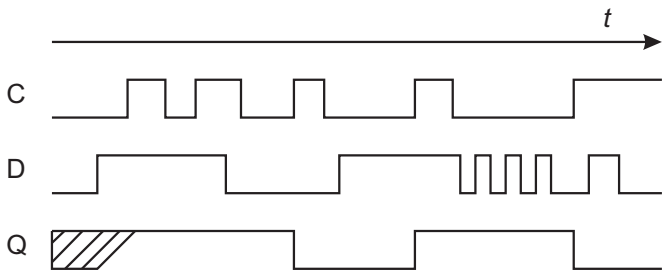
Theoretisches Aufgabenblatt 4

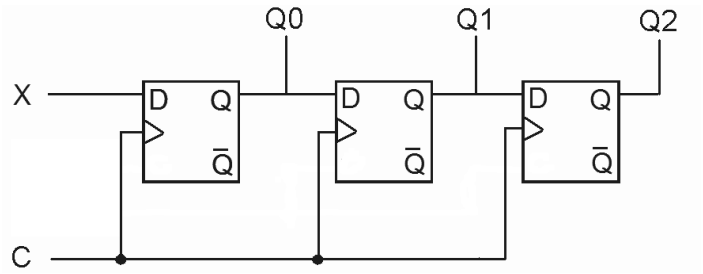
Abgabetermin: 15.11.-17.11.2014

1. Which type of clocking is used in the D-Flip-Flop? The timing diagram of the Flip-Flop's signal is shown below:



2. Describe the difference between Mealy- and Moore-Automatas?

3. Construct a table of state transitions of the following logic circuit.



Which mathematical operation is implemented in this circuit?

4. Construct an automaton implementing a switchable 2-bit counter. On input $E = 0$ the counter will count upwards, on $E = 1$ it shall count downwards.

   a) Construct the state graph based on Figure 1

   b) Complete the binary state transition table (Tabelle 1).

   c) The automaton shall be implemented using D-Flip-Flops. Infer the boolean function from the state transition table.

   d) Simplify the boolen function.

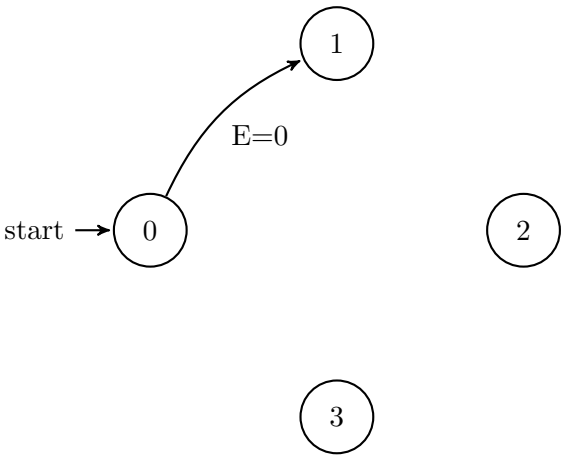


Abbildung 1: State transition graph

Tabelle 1: Binary state transition table

Input	current State		next State	
x	F	G	F'	G'
0				
1				
0				
1				
0				
1				
0				
1				

5. Construct an automaton implementing the control of a traffic light. The automaton uses one input e_0 as well as three outputs y_0, y_1, y_2 representing the three traffic light colors green, yellow and red. Provide reasons, why you chose a Mealey- or Moore-Automaton! Use the provided thruth tables (1(a) and 1(b)). Welche Bausteine könnten

(a) Output table

x_1	x_0	Y	y_2	y_1	y_0
0	0	Rot	1	0	0
0	1	Rot-Gelb	1	1	0
1	0	Grün	0	0	1
1	1	Gelb	0	1	0

(b) Zustandsübergangstabelle

e_0	x_1	x_0	x_1'	x_0'
0	x	x	x_1	x_0
1	0	0	0	1
1	0	1	1	0
1	1	0	1	1
1	1	1	0	0

für die Umsetzung des Automaten verwendet werden?