Digitaltechnik und VHDL

50 P / 25 P sachlich

1 a) 71.72_8 HEX, DEC und BIN

111001.11101000_2

HEX $39.E8_{16}$

DEC $32+16+8+1 \cdot \frac{1}{2}+\frac{1}{4}+\frac{1}{8}+\frac{1}{32}$

57.90625_{10}

0,5
+ 0,25
0,125 0.06125
0,03125
0,90625

b) $01101010 : 16_{10}$

$4X \Rightarrow 0000\_0110$

c) 33 - 37

33	00100001	-37	
-37	+1101_1011		00100101
			-> 1101_1010
negative	11111100		+1
			1101_1011
back	00000011		
	+1		
	0000_0100		

$= 4$

2/

a) $\overline{xy + xy \cdot \overline{x \cdot y}}$

$\overline{xy + xy \cdot (\bar{x} + \bar{y})}$

$\overline{xy + xy\bar{x} + xy\bar{y}}$

$\overline{xy} = \overline{xy + xy \cdot 1} = \overline{xy}$ ✓

b) $asc + as + (\overline{\overline{ac} \cdot a} + \overline{\overline{ac}} \cdot a)$

$asc + as + (\bar{a} + \bar{c})a + ac$

$asc + as + \bar{a}a + \bar{c}a + ac$

$asc + as + a(\bar{c} + c)$

$asc + as + a$

$a(\underbrace{sc + s + 1}_{1})$

a

c)

cd / as	00	01	11	10
00	0	0	0	1
01	0	1	x	0
11	0	1	0	0
10	0	0	0	1

tel : uppsitt

$t' = \bar{s}\bar{c} + sc + cd$

$t = \overline{\bar{s}\bar{c} + sc + cd}$

$= \overline{\bar{s}\bar{c}} \cdot \overline{sc} \cdot \overline{cd}$

$= (s + c) \cdot (\bar{s} + \bar{c})(\bar{c} + \bar{d})$

3]

	x = 0	x = 1	z
start	start	1st	1
1st	start	2nd	1
2nd	1st	3rd	0
3rd	start	start	0

state	signals
start	00
1st	01
2nd	10
3rd	11

signales

transitions

Q	x = 0	x = 1	z
00	00	01	1
01	00	10	1
10	01	11	0
11	00	00	0

Q^+

q	q^+	T
0	0	0
0	1	1
1	0	1
1	1	0

excitation-table

	x = 0	x = 1	z
00	00	01	1
01	01	11	1
10	11	01	0
11	11	11	0

d_0

x \ q_1q_0	00	01	11	10
0	0	1	1	1
1	1	1	1	1

$d_0 = x + q_0 + q_1$

d_1

x \ q_1q_0	00	01	11	10
0	0	0	1	1
1	0	1	1	0

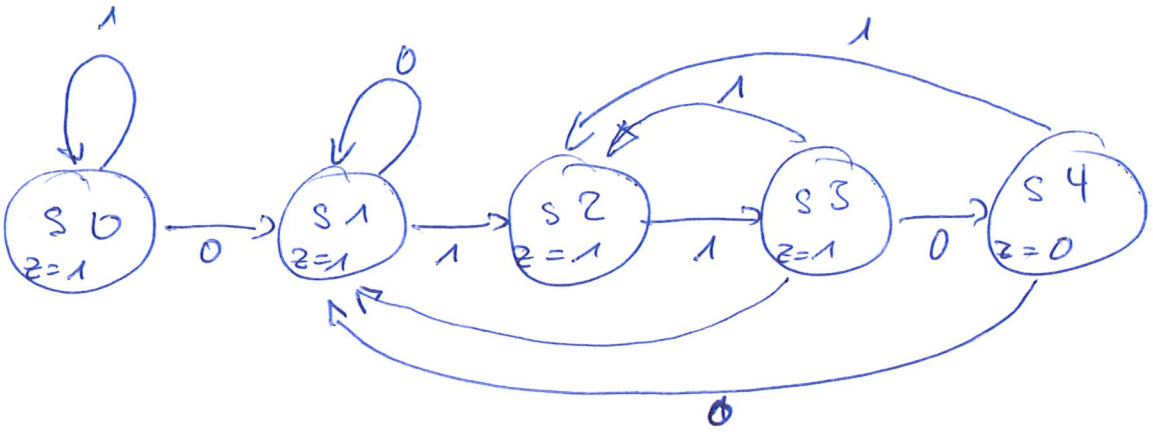
$d_1 = \bar{x} q_1 + x q_0$

$z = \bar{q_1}$

rita

5 | Moore machine

=> process (present_state) sets output!



Sequenzräume: 0 -> 1 -> 1 -> 0