

Exercises 1: Computer architecture

- 1) Write the disjunctive normal form for the following value table. Simplify it by using the mathematical and the Karnaugh-Veitch-Methode.

A	B	C	Q
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

- 2) Draw the logic gate for above table.

- 3) Simplify the following term

$$x_1x_2\bar{x}_3\bar{x}_4 + \bar{x}_1x_2\bar{x}_3x_4 + \bar{x}_1\bar{x}_2\bar{x}_3x_4 + \bar{x}_1\bar{x}_2x_3x_4 + \bar{x}_1x_2x_3\bar{x}_4 + x_1x_2x_3\bar{x}_4$$

- 4) The standard Boolean algebra uses the element set of 0 and 1 and the operations AND, OR and NOT on it. Show that at least the operations AND and NOT or OR and NOT are enough to construct the algebra.
- 5) Calculate the binary representation of 2303?
- 6) How many Bytes do you need to represent 1023?
- 7) Which decimal number is coded with 10101010
- 8) Draw the gate-combination to add 101 and 111 with full-adder and give the states at each input/output?
- 9) Give the value table for XOR with two inputs?