

# Solutions

## 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

$$(\bar{A}\bar{B}\bar{C}) \vee (\bar{A}B\bar{C}) \vee (\bar{A}B\bar{C}) \vee (A\bar{B}\bar{C}) \vee (A\bar{B}C)$$

with the + for  $\vee$  and  $\cdot$  for  $\wedge$  its easier to deal

$$\bar{A}\bar{B}C + \bar{A}B\bar{C} + \bar{A}BC + A\bar{B}\bar{C} + A\bar{B}C$$

$$\bar{A}\bar{B}C + \bar{A}B(\bar{C} + C) + A\bar{B}(\bar{C} + C)$$

$$\bar{A}\bar{B}C + \bar{A}B(1) + A\bar{B}(1)$$

$$\bar{A}\bar{B}C + \bar{A}B + AB$$

$$\bar{A}\bar{B}C + (\bar{A} + A)B$$

$$\bar{A}\bar{B}C + (1)B$$

$$\bar{A}\bar{B}C + B$$

$$(\bar{A}C + B)(\bar{B} + B)$$

$$(\bar{A}C + B)1$$

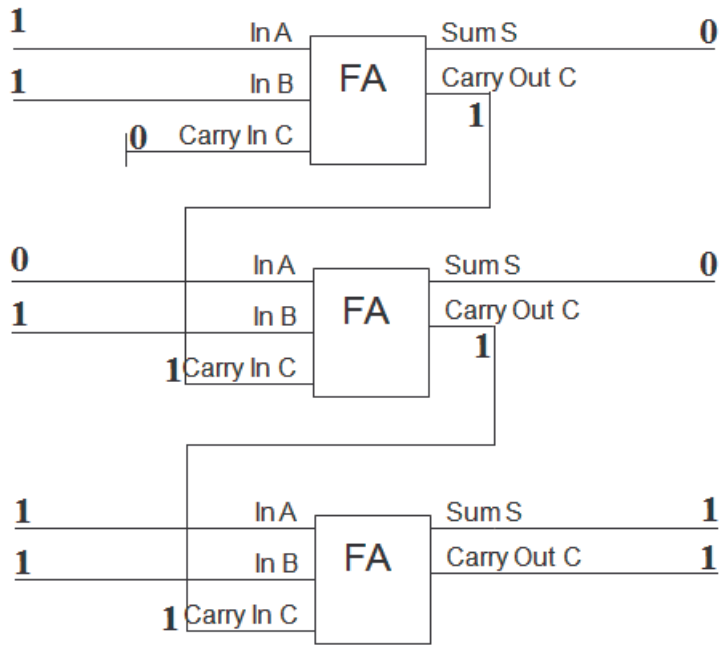
$$\bar{A}C + B$$

	$\bar{B}$	B
$\bar{A}$	0	1
A	0	1
	$\bar{C}$	$C$

$$B \vee (\bar{A} \wedge C)$$



8) Draw the gate-combination to add 101 and 111 with full-adder and give the states at each input/output?



=> 1100

9) Give the value table for XOR with two inputs?

A	B	OUT
0	0	0
0	1	1
1	0	1
1	1	0