Exercise 1

1.) The first function looks at the following table for input evaluation:

x \ y	O^-	A^-	O^+	B^-	A^+	AB^-	B^+	AB^+
O^-	1	0	0	0	0	0	0	0
A^-	1	1	0	0	0	0	0	0
O^+	1	0	1	0	0	0	0	0
B^-	1	0	0	1	0	0	0	0
A^+	1	1	1	0	1	0	0	0
AB^-	1	1	0	1	0	1	0	0
B^+	1	0	1	1	0	0	1	0
AB^+	1	1	1	1	1	1	1	1

The diagram shows if bloodtype x can receive blood from bloodtype y.

Exercise 1

2.) Let $f : \{0,1\}^3 \times \{0,1\}^3 \rightarrow \{0,1\}^3$

be defined as $f(x,y) = x \cup \neg y$.

The bit-descriptions of the different blood types are as follows.

$O^- := 000$

$O^+ := 010$

$A^- := 001$

$A^+ := 101$

$B^- := 100$

$B^+ := 110$

$AB^- := 011$

$AB^+ := 111$

If $x \cup \neg y = 111$, bloodtype x can receive blood from bloodtype y, and f outputs 1.

If f outputs otherwise, the bloodtypes are not compatible and f outputs 0.