Introduction to Computational Logic, SS 2006: Hints for Assignment 6

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Exercise 6.5 a)

$$
\begin{aligned}
xx &= xx + 0 && \text{Id} \\
&= xx + x\bar{x} && \text{Compl} \\
&= x(x + \bar{x}) && \text{Distr} \\
&= x1 && \text{Compl} \\
&= x && \text{Id}
\end{aligned}
$$

Exercise 6.8 a) UoC yields for $\{b := x, a := \bar{x}\}$

$$
\{\bar{x}x = 0, \bar{x} + x = 1\} \overset{\text{BA}}{\vdash\dashv} \{x = \bar{\bar{x}}\}
$$

Since the equations on the left are deducible from BA, we have

$$
\emptyset \overset{\text{BA}}{\vdash\dashv} \{x = \bar{\bar{x}}\}
$$

and therefore $\text{BA} \vdash x = \bar{\bar{x}}$

Exercise 6.9

a) $\overset{\text{BL}}{\vdash}$:

$$
\begin{aligned}
ab &= 1b && a = 1 \\
&= 11 && b = 1 \\
&= 1 && \text{Id}
\end{aligned}
$$

$\overset{\text{BL}}{\dashv}$:

$$
\begin{aligned}
a &= a(a + b) && \text{Abs} \\
&= aa + ab && \text{Distr} \\
&= aa + 1 && ab = 1 \\
&= 1 && \text{Dom}
\end{aligned}
$$

b analogously