TH2 - Übung 2

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1 CSP Basis

1.1 Alphabete

$$P = (a \to b \to \mathit{Skip}) \,\Box\, (b \to d \to \mathit{Stop}) \tag{1.1}$$

$$\begin{aligned}
\alpha(P) &= \alpha(a \to b \to \mathit{Skip}) \cup \alpha(b \to d \to \mathit{Stop}) \\
&= \alpha(b \to \mathit{Skip}) \cup \{a\} \cup \alpha(d \to \mathit{Stop}) \cup \{b\} \\
&= \alpha(\mathit{Skip}) \cup \{b\} \cup \{a\} \cup \alpha(\mathit{Stop}) \cup \{d\} \cup \{b\} \\
&= \emptyset \cup \{b, a\} \cup \emptyset \cup \{b, d\} \\
&= \{a, b, d\}
\end{aligned}$$

$$Q = (x \to y \to \mathit{Stop}) \sqcap (u \to \mathit{Stop}) \tag{1.2}$$

$$\begin{aligned}
\alpha(Q) &= \alpha(x \to y \to \mathit{Stop}) \cup \alpha(u \to \mathit{Stop}) \\
&= \alpha(y \to \mathit{Stop}) \cup \{x\} \cup \alpha(\mathit{Stop}) \cup \{u\} \\
&= \alpha(\mathit{Stop}) \cup \{y\} \cup \{x\} \cup \emptyset \cup \{u\} \\
&= \emptyset \cup \{x, y, u\} \\
&= \{u, x, y\}
\end{aligned}$$

$$R = (Q;\ P) \setminus \{x, y\} \tag{1.3}$$

$$\begin{aligned}
\alpha(R) &= \alpha(Q;\ P) \setminus \{x, y\} \\
&= (\alpha(Q) \cup \alpha(P)) \setminus \{x, y\} \\
&= (\{u, x, y\} \cup \{a, b, d\}) \setminus \{x, y\} \\
&= \{a, b, d, u, x, y\} \setminus \{x, y\} \\
&= \{a, b, d, u\}
\end{aligned}$$

$$S = (P \ |[\,\{a, b\}\,|\,\{x, y\}\,]|\ R) \triangle Q \tag{1.4}$$

$$
\begin{array}{rcl}
\alpha(S) & = & \alpha(P \ |[\,\{a,b\} \,|\, \{x,y\}\,]|\ R) \cup \alpha(Q) \\
& = & \{a,b\} \cup \{x,y\} \cup \{u,x,y\} \\
& = & \{a,b,u,x,y\}
\end{array}
$$