Let $a$ and $b$ be binary interactive variables. Define

\[ \text{loop} = \begin{cases} \text{if } b \text{ then loop else ok fi} \end{cases} \]

Add a time variable according to any reasonable measure, and then express

\[ b := \bot \parallel \text{loop} \]

as an equivalent program but without using $\parallel$.

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The left process owns $b$. Variable $a$ could belong to either process; let's give it to the right process. Let assignment take time 1. Then the left process is

\[ \neg b(t+1) \land t' = t+1 \]

Add recursive time to \text{loop}, and the right process is

\[ \text{loop} \]

\[ = \begin{cases} \text{if } b \text{ then } t := t+1. \text{ loop else ok fi} \end{cases} \quad \text{unroll} \]

\[ = \begin{cases} \text{if } b \text{ then } t := t+1. \text{ if } b \text{ then } t := t+1. \text{ loop else ok fi else ok fi} \end{cases} \quad \text{Substitution Law} \]

\[ = \begin{cases} \text{if } b \text{ then if } b(t+1) \text{ then } t := t+2. \text{ loop else } t := t+1 \text{ fi else ok fi} \end{cases} \]

The left process gives us $\neg b(t+1)$

\[ = \begin{cases} \text{if } b \text{ then if } \bot \text{ then } t := t+2. \text{ loop else } t := t+1 \text{ fi else ok fi} \end{cases} \]

\[ = \begin{cases} \text{if } b \text{ then } t := t+1 \text{ else ok fi} \end{cases} \]

\[ = \begin{cases} \text{if } b \text{ then } a' = a \land t' = t+1 \text{ else } t' = t \text{ fi} \end{cases} \quad \text{if } t' = t \text{ implies } a' = a \text{ t} \]

\[ = a' = a \land \text{ if } b \text{ then } t' = t+1 \text{ else } t' = t \text{ fi} \]

The independent composition is

\[ \exists t_L, t_R: \neg b(t+1) \land t_L = t+1 \land a t_R = a t \land \text{ if } b \text{ then } t_R = t+1 \text{ else } t_R = t \text{ fi} \]

\[ \land t' = t_L \uparrow t_R \]

The left process takes time 1 and the right process takes time 0 or 1, so the maximum is 1

\[ = \neg b(t+1) \land a(t+1) = a t \land t' = t+1 \]

We no longer have a concurrent composition, so $a$ and $b$ are both variables

\[ = b := \bot \]