Here is a procedure applied to an argument.
\[ \langle x : \text{int} \rightarrow a := x. \ b := x \rangle (a+1) \]
Suppose, by mistake, we replace both occurrences of \( x \) in the body with the argument. What do we get? What should we get? (This mistake is known as “call-by-name”.)

§
\[ \langle x : \text{int} \rightarrow a := x. \ b := x \rangle (a+1) \]
as directed, replace both occurrences of \( x \)
\[ = a := a+1. \ b := a+1 \]
\[ = a' = a+1 \land b' = a+2 \]
On page 39, Exercise 110(k) says that it is a mistake to replace the \( x \) after the composition. Here’s what we should get.
\[ \langle x : \text{int} \rightarrow a := x. \ b := x \rangle (a+1) \]
expand the two assignments
\[ = \langle x : \text{int} \rightarrow a' := x \land b' := b. \ a' := a \land b' := x \rangle (a+1) \]
definition of sequential composition
\[ = \langle x : \text{int} \rightarrow \exists a'', b'' \cdot a'' := x \land b'' := b \land a' = a'' \land b' = x \rangle (a+1) \]
apply
\[ = \langle x : \text{int} \rightarrow a' = b' = x \rangle (a+1) \]
\[ = a' = b' = a+1 \]
OR
\[ \langle x : \text{int} \rightarrow a := x. \ b := x \rangle (a+1) \]
expand the last assignment
\[ = \langle x : \text{int} \rightarrow a' := a \land b' := x \rangle (a+1) \]
substitution law
\[ = \langle x : \text{int} \rightarrow a' = x \land b' = x \rangle (a+1) \]
\[ = \langle x : \text{int} \rightarrow a' = b' = x \rangle (a+1) \]
apply
\[ = a' = b' = a+1 \]