

Exercise 7

1. Consider the variable example in the lecture notes. Write a reader agent $\mathbf{Read}(a)$ which is a correct implementation of

$$\bar{\mathbf{T}} = \oplus\{\mathbf{read}:?[\mathbf{nat}]; \mathbf{end}, \mathbf{write}:![\mathbf{nat}]; \mathbf{end}\}$$

but is not of a correct implementation of

$$\mathbf{T}' = \oplus\{\mathbf{read}:?[\mathbf{nat}]; \mathbf{end}\}$$

2. Show that $\mathbf{Read}(a)$ is a correct implementation of $\bar{\mathbf{T}}$ using the typing rules.

Note: As we did not see the rules for session initialization in the lectures, just verify $\mathbf{Read}(a)$ from the point in which the session has been initiated on channel s . The respective typing environment is $\Delta = s : \bar{\mathbf{T}}$. (Same for point 3 and point 8).

3. Show that $\mathbf{Read}(a)$ is not a correct implementation of \mathbf{T}' using the typing rules.
4. Show the reductions of $\mathbf{Read}\langle a \rangle \mid \mathbf{Var}\langle a, 5 \rangle$ with

$$\mathbf{Var}\langle a, x \rangle = a(z).z \triangleright [\mathbf{read} : \bar{z}\langle x \rangle. \mathbf{Var}\langle a, x \rangle \parallel \mathbf{write} : z\langle y \rangle. \mathbf{Var}\langle a, y \rangle]$$

5. Write the dual types of $\bar{\mathbf{T}}$ and \mathbf{T}' .
6. Write one non-recursive process $\mathbf{OneTimeVar}\langle a, x \rangle$ that correctly implements $\bar{\mathbf{T}}'$.
7. Show the reductions of $\mathbf{Read}\langle a \rangle \mid \mathbf{OneTimeVar}\langle a, 5 \rangle$.
8. Check if $\mathbf{OneTimeVariable}\langle a, 5 \rangle \mid \mathbf{Read}\langle a \rangle$ is well typed against $\Delta = s : \bar{\mathbf{T}}' \circ s : \mathbf{T}'$ with $\Gamma = \Theta = \emptyset$.