307 Suppose variable declaration is defined as

**new** $x$: $T\cdot P \quad = \quad \exists x$: *undefined*$\cdot\ \exists x'$: $T\cdot P$

What are the characteristics of this sort of declaration? Look at the example

**new** $x$: *int*$\cdot$ *ok*

After trying the question, scroll down to the solution.

§ According to this definition of local variable declaration, the variable initially has the value *undefined* , and has a final value of type $T$ . In the example, suppose there is one nonlocal variable $y$ . Then

$$
\begin{array}{ll}
 & \textbf{new}\ x\colon \mathit{int}\cdot\ \mathit{ok} \\
= & \exists x\colon \mathit{undefined}\cdot\ \exists x'\colon \mathit{int}\cdot\ \mathit{ok} \\
= & \exists x\colon \mathit{undefined}\cdot\ \exists x'\colon \mathit{int}\cdot\ x'{=}x \wedge y'{=}y \\
= & \exists x\colon \mathit{undefined}\cdot\ x\colon \mathit{int} \wedge y'{=}y \\
= & \mathit{undefined}\colon \mathit{int} \wedge y'{=}y
\end{array}
$$

We cannot evaluate *undefined*: *int* . If it's $\perp$ , then **new** *x*: *int*· *ok* is unimplementable.