X5.7 In ProTem, a **value** expression has the form

value x: T ⟦P⟧

where x is a variable of type T, local to program P. The value of this expression is the final value of variable x. Formalize this **value** expression, generalizing P to a specification.

After trying the question, scroll down to the solution.

§ This **value** expression is equivalent to the expression P **value** x in Subsection 5.5.0. But we don't need to introduce variable v because we are given variable x. Suppose the other variables are y and z. Then this value expression is the value of x' satisfying

$\exists x, y', z' \cdot P$

For example, **value** x: *int*$\cdot$ $[\![x := y+1]\!]$ is the value of x' satisfying

$\exists x, y', z' \cdot x := y+1$

$= \quad \exists x, y', z' \cdot x' = y+1 \wedge y'=y \wedge z'=z$

$= \quad x' = y+1$

For another example, **value** x: *int*$\cdot$ $[\![x'>3]\!]$ is the value of x' satisfying

$\exists x, y', z' \cdot x'>3$

$= \quad x'>3$