

## Phase 17 Demo : Semicolon - Separated Bindings

### Example 1 : Two bindings

Simple case with two binding groups:

$$\forall x:\mathbb{N} \bullet \forall y:\mathbb{N} \bullet x + y > 0$$

### Example 2 : Three bindings

Three levels of nesting:

$$\forall x: T \bullet \forall y: U \bullet \forall z: V \bullet x = y$$

### Example 3 : Mixed comma and semicolon

First quantifier has multiple variables with shared domain:

$$\forall x, y: \mathbb{N} \bullet \forall z: \mathbb{N} \bullet x + y = z$$

### Example 4 : Real - world example from Solution 41

$$\forall r: \text{ran } records \bullet \forall i1, i2: \text{dom } r \bullet i1 \neq i2 \Rightarrow true$$

### Example 5 : Conditional with semicolon bindings

Combining Phase 16 and Phase 17:

$$\forall x: \mathbb{N} \bullet \forall y: \mathbb{N} \bullet (\text{if } x > y \text{ then } x \text{ else } y)$$

### Example 6 : Nested mu operator

Definite description with multiple bindings:

$$(\mu p: \text{ran } hd \bullet \mu q: \text{ran } hd \bullet p \neq q \mid p.2 > q.2)$$

### Example 7 : With exists quantifier

Multiple bindings with exists:

$$\exists x: \mathbb{N} \bullet \exists y: \mathbb{N} \bullet x > y \wedge y > 0$$