

# t9\_osalg\_3 (TMbGTVuvNabCn- cySo3ezDj5dRiGVXRT1e4C)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v4\_osalg\_1 : \iota \Rightarrow o$  be given. Let  $v5\_osalg\_1 : \iota \Rightarrow o$  be given. Let  $l3\_osalg\_1 : \iota \Rightarrow o$  be given. Let  $v4\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v12\_osalg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_osalg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v3\_orders\_2 : \iota \Rightarrow o$  be given. Let  $v4\_orders\_2 : \iota \Rightarrow o$  be given. Let  $v5\_orders\_2 : \iota \Rightarrow o$  be given. Let  $l1\_orders\_2 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v11\_osalg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_msualg\_3 : \iota \Rightarrow o$  be given. Let  $v2\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_osalg\_3 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $r4\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r8\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $l1\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_osalg\_1 : \iota \Rightarrow o$  be given. Let  $l2\_osalg\_1 : \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((v3\_orders\_2 X0) \wedge ((v4\_orders\_2 \\
& X0) \wedge ((v5\_orders\_2 X0) \wedge (l1\_orders\_2 X0)))))) \Rightarrow (\forall X1. ((v1\_relat\_1 \\
& X1) \wedge ((v4\_relat\_1 X1 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X1) \wedge ((v1\_partfun1 \\
& X1 (u1\_struct\_0 X0)) \wedge (v11\_osalg\_1 X1 X0)))))) \Rightarrow (\forall X2. ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_partfun1 \\
& X2 (u1\_struct\_0 X0)) \wedge (v11\_osalg\_1 X2 X0)))))) \Rightarrow (\forall X3. (m2\_pboole \\
& X3 (u1\_struct\_0 X0) X1 X2) \Rightarrow (((v1\_msualg\_3 X3) \wedge ((v2\_msualg\_3 X3 \\
& (u1\_struct\_0 X0) X1 X2) \wedge (v1\_osalg\_3 X3 X0))) \Rightarrow (v1\_osalg\_3 (k4\_msualg\_3 \\
& (u1\_struct\_0 X0) X1 X2 X3) X0))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\ X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))))) \Rightarrow (\forall X1.(l3\_msualg\_1 \\ X1 X0) \Rightarrow ((v12\_osalg\_1 X1 X0) \Leftrightarrow ((v1\_relat\_1 (u3\_msualg\_1 X0 X1)) \wedge \\ ((v4\_relat\_1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 \\ (u3\_msualg\_1 X0 X1)) \wedge ((v1\_partfun1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 \\ X0)) \wedge (v11\_osalg\_1 (u3\_msualg\_1 X0 X1) X0))))))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ X0))) \Rightarrow (\forall X1.((v4\_msualg\_1 X1 X0) \wedge (l3\_msualg\_1 X1 X0)) \Rightarrow \\ (\forall X2.((v4\_msualg\_1 X2 X0) \wedge (l3\_msualg\_1 X2 X0)) \Rightarrow (\forall X3. \\ (m2\_pboole X3 (u1\_struct\_0 X0) (u3\_msualg\_1 X0 X1) (u3\_msualg\_1 \\ X0 X2)) \Rightarrow (\forall X4.(m2\_pboole X4 (u1\_struct\_0 X0) (u3\_msualg\_1 \\ X0 X2) (u3\_msualg\_1 X0 X1)) \Rightarrow (((r4\_msualg\_3 X0 X1 X2 X3) \wedge (r8\_pboole \\ (u1\_struct\_0 X0) X4 (k4\_msualg\_3 (u1\_struct\_0 X0) (u3\_msualg\_1 \\ X0 X1) (u3\_msualg\_1 X0 X2) X3))) \Rightarrow (r4\_msualg\_3 X0 X2 X1 X4)))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ X0))) \Rightarrow (\forall X1.(l3\_msualg\_1 X1 X0) \Rightarrow (\forall X2.(l3\_msualg\_1 \\ X2 X0) \Rightarrow (\forall X3.(m2\_pboole X3 (u1\_struct\_0 X0) (u3\_msualg\_1 \\ X0 X1) (u3\_msualg\_1 X0 X2)) \Rightarrow ((r4\_msualg\_3 X0 X1 X2 X3) \Leftrightarrow ((r1\_msualg\_3 \\ X0 X1 X2 X3) \wedge ((v2\_msualg\_3 X3 (u1\_struct\_0 X0) (u3\_msualg\_1 X0 X1) \\ (u3\_msualg\_1 X0 X2)) \wedge (v1\_msualg\_3 X3)))))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. \forall X2. ((\neg v1\_xboole\_0 X0) \wedge ((v1\_relat\_1 \\ X1) \wedge ((v4\_relat\_1 X1 X0) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0)))) \wedge \\ ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 \\ X2 X0)))))) \Rightarrow ((r8\_pboole X0 X1 X2) \Leftrightarrow (X1 = X2)) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_struct\_0 X0)) \Rightarrow (\neg v1\_xboole\_0 \\ (u1\_struct\_0 X0)) \quad (6)$$

Assume the following.

$$\begin{aligned} \forall X0. \forall X1. \forall X2. (((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\ X1 X0) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0)))) \wedge ((v1\_relat\_1 \\ X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 X0)))))) \Rightarrow \\ (\forall X3.(m2\_pboole X3 X0 X1 X2) \Rightarrow ((v1\_relat\_1 X3) \wedge ((v4\_relat\_1 \\ X3 X0) \wedge ((v1\_funct\_1 X3) \wedge (v1\_partfun1 X3 X0)))) \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0.(l3\_osalg\_1 X0) \Rightarrow ((l1\_osalg\_1 X0) \wedge (l2\_osalg\_1 X0)) \quad (8)$$

Assume the following.

$$\forall X0.(l2\_osalg\_1 X0) \Rightarrow ((l1\_msualg\_1 X0) \wedge (l1\_orders\_2 X0)) \quad (9)$$

Assume the following.

$$\forall X0.(l1\_orders\_2 X0) \Rightarrow (l1\_struct\_0 X0) \quad (10)$$

Assume the following.

$$\begin{aligned} & \forall X0.\forall X1.\forall X2.\forall X3.(((v1\_relat\_1 X1) \wedge \\ & ((v4\_relat\_1 X1 X0) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0)))) \wedge \\ & (((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 \\ & X2 X0)))) \wedge (m2\_pboole X3 X0 X1 X2))) \Rightarrow (m2\_pboole (k4\_msualg\_3 X0 \\ & X1 X2 X3) X0 X2 X1) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\ & X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))))) \Rightarrow (\forall X1.((v12\_osalg\_1 \\ & X1 X0) \wedge (l3\_msualg\_1 X1 X0)) \Rightarrow (\forall X2.((v12\_osalg\_1 X2 X0) \wedge \\ & (l3\_msualg\_1 X2 X0)) \Rightarrow ((r1\_osalg\_3 X0 X1 X2) \Leftrightarrow (\exists X3.(m2\_pboole \\ & X3 (u1\_struct\_0 X0) (u3\_msualg\_1 X0 X1) (u3\_msualg\_1 X0 X2)) \wedge (( \\ & r4\_msualg\_3 X0 X1 X2 X3) \wedge (v1\_osalg\_3 X3 X0)))))) \end{aligned} \quad (12)$$

Assume the following.

$$\forall X0.(l3\_osalg\_1 X0) \Rightarrow ((v4\_osalg\_1 X0) \Rightarrow ((v3\_orders\_2 X0) \wedge ((v4\_orders\_2 X0) \wedge (v5\_orders\_2 X0)))) \quad (13)$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\ & X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))))) \Rightarrow (\forall X1.((v4\_msualg\_1 \\ & X1 X0) \wedge ((v12\_osalg\_1 X1 X0) \wedge (l3\_msualg\_1 X1 X0)) \Rightarrow (\forall X2. \\ & ((v4\_msualg\_1 X2 X0) \wedge ((v12\_osalg\_1 X2 X0) \wedge (l3\_msualg\_1 X2 X0)) \Rightarrow \\ & ((r1\_osalg\_3 X0 X1 X2) \Rightarrow (r1\_osalg\_3 X0 X2 X1)))) \end{aligned}$$