

## t51\_osalg\_2

(TMKqF5YBA23MY6q1r52QvL42KKiHy4UC2fS)

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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  $v3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  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  $k6\_lattices : \iota \Rightarrow \iota$  be given. Let  $k16\_osalg\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m2\_osalg\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r8\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k10\_osalg\_2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  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  $r2\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $l1\_orders\_2 : \iota \Rightarrow o$  be given. Let  $m3\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\
 & X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))) \Rightarrow (\forall X1. ((v4\_msualg\_1 \\
 & X1 X0) \wedge ((v12\_osalg\_1 X1 X0) \wedge (l3\_msualg\_1 X1 X0)))) \Rightarrow (\forall X2. \\
 & (m2\_osalg\_2 X2 X0 X1) \Rightarrow ((r8\_pboole (u1\_struct\_0 X0) X2 (u3\_msualg\_1 \\
 & X0 X1)) \Rightarrow (k6\_lattices (k16\_osalg\_2 X0 X1) = k10\_osalg\_2 X0 X1 X2))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
 & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\
 & X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))) \Rightarrow (\forall X1. ((v3\_msualg\_1 \\
 & X1 X0) \wedge ((v12\_osalg\_1 X1 X0) \wedge (l3\_msualg\_1 X1 X0)))) \Rightarrow (\forall X2. \\
 & (m2\_osalg\_2 X2 X0 X1) \Rightarrow ((r8\_pboole (u1\_struct\_0 X0) X2 (u3\_msualg\_1 \\
 & X0 X1)) \Rightarrow (k10\_osalg\_2 X0 X1 X2 = X1))))
 \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\ X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))))) \Rightarrow (\forall X1.(l3\_msualg\_1 \\ X1 X0) \Rightarrow ((v12\_osalg\_1 X1 X0) \Leftrightarrow ((v1\_relat\_1 (u3\_msualg\_1 X0 X1)) \wedge \\ ((v4\_relat\_1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 \\ (u3\_msualg\_1 X0 X1)) \wedge ((v1\_partfun1 (u3\_msualg\_1 X0 X1) (u1\_struct\_0 \\ X0)) \wedge (v11\_osalg\_1 (u3\_msualg\_1 X0 X1) X0))))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.(((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\ X1 X0) \wedge ((v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0)))) \wedge ((v1\_relat\_1 \\ X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 X0)))))) \Rightarrow \\ (r2\_pboole X0 X1 X1) \end{aligned} \quad (4)$$

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.

$$\forall X0.(l3\_osalg\_1 X0) \Rightarrow ((l1\_osalg\_1 X0) \wedge (l2\_osalg\_1 X0)) \quad (7)$$

Assume the following.

$$\forall X0.(l2\_osalg\_1 X0) \Rightarrow ((l1\_msualg\_1 X0) \wedge (l1\_orders\_2 X0)) \quad (8)$$

Assume the following.

$$\forall X0.(l1\_orders\_2 X0) \Rightarrow (l1\_struct\_0 X0) \quad (9)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\ X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))))) \Rightarrow (\forall X1.((v12\_osalg\_1 \\ X1 X0) \wedge (l3\_msualg\_1 X1 X0)) \Rightarrow (\forall X2.(m3\_pboole X2 (u1\_struct\_0 \\ X0) (u3\_msualg\_1 X0 X1)) \Rightarrow ((m2\_osalg\_2 X2 X0 X1) \Leftrightarrow ((v1\_relat\_1 X2) \wedge \\ ((v4\_relat\_1 X2 (u1\_struct\_0 X0)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_partfun1 \\ X2 (u1\_struct\_0 X0)) \wedge (v11\_osalg\_1 X2 X0)))))))))) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 X0) \wedge \\
& (v1\_funct\_1 X1) \wedge (v1\_partfun1 X1 X0))) \Rightarrow (\forall X2. ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 X0) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 X0)))) \Rightarrow \\
& ((m3\_pboole X2 X0 X1) \Leftrightarrow (r2\_pboole X0 X2 X1)))
\end{aligned} \tag{11}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v4\_osalg\_1 \\
& X0) \wedge ((v5\_osalg\_1 X0) \wedge (l3\_osalg\_1 X0)))))) \Rightarrow (\forall X1. ((v3\_msualg\_1 \\
& X1 X0) \wedge ((v4\_msualg\_1 X1 X0) \wedge ((v12\_osalg\_1 X1 X0) \wedge (l3\_msualg\_1 \\
& X1 X0)))))) \Rightarrow (k6\_lattices (k16\_osalg\_2 X0 X1) = X1)
\end{aligned}$$