

t19\_msafree (TMK-  
WxM3En2s5y6PvK1TNZdkJwwTg7xXSucU)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  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  $l3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_msafree : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r2\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k6\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $g3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $u4\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $v2\_msualg\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1.((v4\_msualg\_1 X1 X0) \wedge (l3\_msualg\_1 X1 X0)) \Rightarrow \\ & (\forall X2.((v4\_msualg\_1 X2 X0) \wedge (l3\_msualg\_1 X2 X0)) \Rightarrow (\forall X3. \\ & (m2\_pboole X3 (u1\_struct\_0 X0) (u3\_msualg\_1 X0 X1) (u3\_msualg\_1 \\ & X0 X2)) \Rightarrow ((r1\_msualg\_3 X0 X1 X2 X3) \Rightarrow ((r2\_msualg\_3 X0 X1 X2 X3) \Leftrightarrow (k6\_msualg\_3 \\ & X0 X1 X2 X3 = g3\_msualg\_1 X0 (u3\_msualg\_1 X0 X2) (u4\_msualg\_1 X0 X2))))))))) \end{aligned} \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1.((v4\_msualg\_1 X1 X0) \wedge (l3\_msualg\_1 X1 X0)) \Rightarrow \\ & (\exists X2.((v3\_msualg\_1 X2 X0) \wedge ((v4\_msualg\_1 X2 X0) \wedge ((v2\_msafree \\ & X2 X0) \wedge (l3\_msualg\_1 X2 X0)))) \wedge (\exists X3.(m2\_pboole X3 (u1\_struct\_0 \\ & X0) (u3\_msualg\_1 X0 X2) (u3\_msualg\_1 X0 X1)) \wedge (r2\_msualg\_3 X0 X2 \\ & X1 X3)))))) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1.(l3\_msualg\_1 X1 X0) \Rightarrow (\forall X2.(l3\_msualg\_1 \\ & X2 X0) \Rightarrow (\forall X3.(m2\_pboole X3 (u1\_struct\_0 X0) (u3\_msualg\_1 \\ & X0 X1) (u3\_msualg\_1 X0 X2)) \Rightarrow ((r2\_msualg\_3 X0 X1 X2 X3) \Leftrightarrow ((r1\_msualg\_3 \\ & X0 X1 X2 X3) \wedge (v2\_msualg\_3 X3 (u1\_struct\_0 X0) (u3\_msualg\_1 X0 X1) \\ & (u3\_msualg\_1 X0 X2))))))))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. (((\neg v2\_struct\_0 X0) \wedge (l1\_msualg\_1 X0)) \wedge \\ & (l3\_msualg\_1 X1 X0)) \Rightarrow ((v3\_msualg\_1 X1 X0) \Rightarrow (X1 = g3\_msualg\_1 X0 \\ & (u3\_msualg\_1 X0 X1) (u4\_msualg\_1 X0 X1))) \end{aligned} \quad (4)$$

**Theorem 1**

$$\begin{aligned} & \forall X0. ((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\ & X0))) \Rightarrow (\forall X1. ((v3\_msualg\_1 X1 X0) \wedge (v4\_msualg\_1 X1 X0) \wedge \\ & (l3\_msualg\_1 X1 X0))) \Rightarrow (\exists X2. ((v3\_msualg\_1 X2 X0) \wedge (v4\_msualg\_1 \\ & X2 X0) \wedge (v2\_msafree X2 X0) \wedge (l3\_msualg\_1 X2 X0))) \wedge (\exists X3. \\ & (m2\_pboole X3 (u1\_struct\_0 X0) (u3\_msualg\_1 X0 X2) (u3\_msualg\_1 \\ & X0 X1)) \wedge ((r2\_msualg\_3 X0 X2 X1 X3) \wedge (k6\_msualg\_3 X0 X2 X1 X3 = X1)))) \end{aligned}$$