

t61\_circrm1  
(TMUWb8m3AWyBevLwrDdGw7aFhAKRHV4eLYa)

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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  $v4\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v4\_msafree2 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m4\_msaterm : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m3\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_msafree2 : \iota \Rightarrow o$  be given. Let  $r8\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_card\_3 : \iota \Rightarrow \iota$  be given. Let  $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_dtconstr : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $k5\_msafree : \iota \Rightarrow \iota$  be given. Let  $k5\_trees\_3 : \iota \Rightarrow \iota$  be given. Let  $k1\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k9\_trees\_9 : \iota \Rightarrow \iota$  be given. Let  $r1\_facirc\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_facirc\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_nat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $np\_1 : \iota$  be given. Let  $k6\_trees\_1 : \iota \Rightarrow \iota$  be given. Let  $k9\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_relat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $m1\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k7\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$

be given. Let  $r7\_circtrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\
& X0))) \Rightarrow (\forall X1.((v4\_msualg\_1 X1 X0) \wedge ((v4\_msafree2 X1 X0) \wedge \\
& (l3\_msualg\_1 X1 X0))) \Rightarrow (\forall X2.(m4\_msaterm X2 X0 X1) \Rightarrow (\forall X3. \\
& (m3\_msaterm X3 X0 X2) \Rightarrow (\forall X4.((\neg v2\_struct\_0 X4) \wedge ((\neg v11\_struct\_0 \\
& X4) \wedge ((v2\_msafree2 X4) \wedge (l1\_msualg\_1 X4)))) \Rightarrow (\forall X5.((v4\_msualg\_1 \\
& X5 X4) \wedge ((v4\_msafree2 X5 X4) \wedge (l3\_msualg\_1 X5 X4))) \Rightarrow ((r7\_circtrm1 \\
& X0 X1 X2 X3 X4 X5) \Rightarrow (\forall X6.(m2\_circtrm1 X6 X0 X2 X1 X3 X4 X5) \Rightarrow (\forall X7. \\
& (m1\_dtconstr X7 (u1\_struct\_0 (k5\_msafree X0 X2)) (k5\_trees\_3 ( \\
& u1\_struct\_0 (k5\_msafree X0 X2))) (k1\_msaterm X0 X2)) \Rightarrow ((X7 \in k9\_trees\_9 \\
& X3) \Rightarrow (\forall X8.(m1\_subset\_1 X8 (k4\_card\_3 (u3\_msualg\_1 X4 X5))) \Rightarrow \\
& ((r1\_facirc\_1 X4 X5 (k5\_facirc\_1 X4 X5 X8 (k2\_nat\_1 np\_1 (k6\_trees\_1 \\
& (k9\_xtuple\_0 X7)))) (k1\_funct\_1 X6 X7)) \wedge (\forall X9.(m1\_subset\_1 \\
& X9 (k4\_card\_3 (u3\_msualg\_1 (k1\_circtrm1 X0 X2 X3) (k6\_circtrm1 \\
& X0 X2 X3 X1)))) \Rightarrow ((X9 = k3\_relat\_1 X6 X8) \Rightarrow (\forall X10.(m1\_circtrm1 \\
& X10 X0 X2 X3 X1 X9) \Rightarrow (k1\_funct\_1 (k5\_facirc\_1 X4 X5 X8 (k2\_nat\_1 np\_1 \\
& (k6\_trees\_1 (k9\_xtuple\_0 X7)))) (k1\_funct\_1 X6 X7) = k7\_circtrm1 \\
& X0 X1 X2 X7 X10)))))))))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\
& X0))) \Rightarrow (\forall X1.((v4\_msualg\_1 X1 X0) \wedge ((v4\_msafree2 X1 X0) \wedge \\
& (l3\_msualg\_1 X1 X0))) \Rightarrow (\forall X2.(m4\_msaterm X2 X0 X1) \Rightarrow (\forall X3. \\
& (m3\_msaterm X3 X0 X2) \Rightarrow (\forall X4.((\neg v2\_struct\_0 X4) \wedge ((\neg v11\_struct\_0 \\
& X4) \wedge ((v2\_msafree2 X4) \wedge (l1\_msualg\_1 X4)))) \Rightarrow (\forall X5.((v4\_msualg\_1 \\
& X5 X4) \wedge ((v4\_msafree2 X5 X4) \wedge (l3\_msualg\_1 X5 X4))) \Rightarrow ((r8\_circtrm1 \\
& X0 X1 X2 X3 X4 X5) \Rightarrow (r7\_circtrm1 X0 X1 X2 X3 X4 X5))))))
\end{aligned} \tag{2}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge (l1\_msualg\_1 \\
& X0)) \Rightarrow (\forall X1.((v4\_msualg\_1 X1 X0) \wedge (v4\_msafree2 X1 X0) \wedge \\
& (l3\_msualg\_1 X1 X0)) \Rightarrow (\forall X2.(m4\_msaterm X2 X0 X1) \Rightarrow (\forall X3. \\
& (m3\_msaterm X3 X0 X2) \Rightarrow (\forall X4.((\neg v2\_struct\_0 X4) \wedge (\neg v11\_struct\_0 \\
& X4) \wedge (v2\_msafree2 X4) \wedge (l1\_msualg\_1 X4))) \Rightarrow (\forall X5.((v4\_msualg\_1 \\
& X5 X4) \wedge (v4\_msafree2 X5 X4) \wedge (l3\_msualg\_1 X5 X4)) \Rightarrow ((r8\_circtrm1 \\
& X0 X1 X2 X3 X4 X5) \Rightarrow (\forall X6.(m2\_circtrm1 X6 X0 X2 X1 X3 X4 X5) \Rightarrow (\forall X7. \\
& (m1\_subset\_1 X7 (k4\_card\_3 (u3\_msualg\_1 X4 X5))) \Rightarrow (\forall X8. \\
& (m1\_dtconstr X8 (u1\_struct\_0 (k5\_msafree X0 X2)) (k5\_trees\_3 ( \\
& u1\_struct\_0 (k5\_msafree X0 X2))) (k1\_msaterm X0 X2)) \Rightarrow ((X8 \in k9\_trees\_9 \\
& X3) \Rightarrow ((r1\_facirc\_1 X4 X5 (k5\_facirc\_1 X4 X5 X7 (k2\_nat\_1 np\_1 (k6\_trees\_1 \\
& (k9\_xtuple\_0 X8)))) (k1\_funct\_1 X6 X8)) \wedge (\forall X9.(m1\_subset\_1 \\
& X9 (k4\_card\_3 (u3\_msualg\_1 (k1\_circtrm1 X0 X2 X3) (k6\_circtrm1 \\
& X0 X2 X3 X1)))) \Rightarrow ((X9 = k3\_relat\_1 X6 X7) \Rightarrow (\forall X10.(m1\_circtrm1 \\
& X10 X0 X2 X3 X1 X9) \Rightarrow (k1\_funct\_1 (k5\_facirc\_1 X4 X5 X7 (k2\_nat\_1 np\_1 \\
& (k6\_trees\_1 (k9\_xtuple\_0 X8)))) (k1\_funct\_1 X6 X8) = k7\_circtrm1 \\
& X0 X1 X2 X8 X10)))))))))))))
\end{aligned}$$