

# t54\_circrm1 (TMTDbCn- QQYYV3F4gRzjA2UfZRZAR87hpQBr)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_msafree2 : \iota \Rightarrow o$  be given. Let  $l1\_msualg\_1 : \iota \Rightarrow o$  be given. Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  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  $r5\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  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  $k3\_relat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_circuit2 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r3\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r4\_circrm1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_funct\_1 : \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_msafree2 \\
 & \quad X0) \wedge (l1\_msualg\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
 & \quad v11\_struct\_0 X1) \wedge ((v2\_msafree2 X1) \wedge (l1\_msualg\_1 X1)))) \Rightarrow (\forall X2. \\
 & \quad ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3.((v1\_relat\_1 \\
 & \quad X3) \wedge (v1\_funct\_1 X3)) \Rightarrow (\forall X4.((v4\_msualg\_1 X4 X0) \wedge ((v4\_msafree2 \\
 & \quad X4 X0) \wedge (l3\_msualg\_1 X4 X0)))) \Rightarrow (\forall X5.((v4\_msualg\_1 X5 X1) \wedge \\
 & \quad ((v4\_msafree2 X5 X1) \wedge (l3\_msualg\_1 X5 X1)))) \Rightarrow ((r5\_circrm1 X0 X1 \\
 & \quad X2 X3 X4 X5) \Rightarrow (r3\_circrm1 X0 X1 X2))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_msafree2 \\
 & \quad X0) \wedge (l1\_msualg\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
 & \quad v11\_struct\_0 X1) \wedge ((v2\_msafree2 X1) \wedge (l1\_msualg\_1 X1)))) \Rightarrow (\forall X2. \\
 & \quad ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3.((v1\_relat\_1 \\
 & \quad X3) \wedge (v1\_funct\_1 X3)) \Rightarrow (\forall X4.((v4\_msualg\_1 X4 X0) \wedge ((v4\_msafree2 \\
 & \quad X4 X0) \wedge (l3\_msualg\_1 X4 X0)))) \Rightarrow (\forall X5.((v4\_msualg\_1 X5 X1) \wedge \\
 & \quad ((v4\_msafree2 X5 X1) \wedge (l3\_msualg\_1 X5 X1)))) \Rightarrow (((r4\_circrm1 X0 \\
 & \quad X1 X2 X3 X4 X5) \wedge (r3\_circrm1 X0 X1 X2)) \Rightarrow (\forall X6.(m1\_subset\_1 \\
 & \quad X6 (k4\_card\_3 (u3\_msualg\_1 X1 X5))) \Rightarrow (\forall X7.(m1\_subset\_1 \\
 & \quad X7 (k4\_card\_3 (u3\_msualg\_1 X0 X4))) \Rightarrow ((X7 = k3\_relat\_1 X2 X6) \Rightarrow (k6\_circuit2 \\
 & \quad X0 X4 X7 = k3\_relat\_1 X2 (k6\_circuit2 X1 X5 X6))))))))))
 \end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge (l1\_msualg\_1 X0)) \Rightarrow (\forall X1. \\
& ((\neg v2\_struct\_0 X1) \wedge (l1\_msualg\_1 X1)) \Rightarrow (\forall X2.((v1\_relat\_1 \\
& X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3.((v1\_relat\_1 X3) \wedge (v1\_funct\_1 \\
& X3)) \Rightarrow (\forall X4.((v4\_msualg\_1 X4 X0) \wedge (l3\_msualg\_1 X4 X0)) \Rightarrow ( \\
& \forall X5.((v4\_msualg\_1 X5 X1) \wedge (l3\_msualg\_1 X5 X1)) \Rightarrow ((r5\_circuit1 \\
& X0 X1 X2 X3 X4 X5) \Leftrightarrow ((r4\_circuit1 X0 X1 X2 X3 X4 X5) \wedge (r4\_circuit1 X1 \\
& X0 (k2\_funct\_1 X2) (k2\_funct\_1 X3) X5 X4))))))))) \\
& \tag{3}
\end{aligned}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_msafree2 \\
& X0) \wedge (l1\_msualg\_1 X0)))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge ((\neg \\
& v11\_struct\_0 X1) \wedge ((v2\_msafree2 X1) \wedge (l1\_msualg\_1 X1)))) \Rightarrow (\forall X2. \\
& ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow (\forall X3.((v1\_relat\_1 \\
& X3) \wedge (v1\_funct\_1 X3)) \Rightarrow (\forall X4.((v4\_msualg\_1 X4 X0) \wedge ((v4\_msafree2 \\
& X4 X0) \wedge (l3\_msualg\_1 X4 X0))) \Rightarrow (\forall X5.((v4\_msualg\_1 X5 X1) \wedge \\
& ((v4\_msafree2 X5 X1) \wedge (l3\_msualg\_1 X5 X1))) \Rightarrow ((r5\_circuit1 X0 X1 \\
& X2 X3 X4 X5) \Rightarrow (\forall X6.(m1\_subset\_1 X6 (k4\_card\_3 (u3\_msualg\_1 \\
& X0 X4))) \Rightarrow (\forall X7.(m1\_subset\_1 X7 (k4\_card\_3 (u3\_msualg\_1 \\
& X1 X5))) \Rightarrow ((X6 = k3\_relat\_1 X2 X7) \Rightarrow (k6\_circuit2 X0 X4 X6 = k3\_relat\_1 \\
& X2 (k6\_circuit2 X1 X5 X7)))))))))))))
\end{aligned}$$