

t47\_isocat\_1 (TM-  
SyTC18G2LpCgXRduyEyD3aD5dY5DrLx9G)

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Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v11\_struct\_0 : \iota \Rightarrow o$  be given. Let  $v2\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v3\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v5\_cat\_1 : \iota \Rightarrow o$  be given. Let  $v6\_cat\_1 : \iota \Rightarrow o$  be given. Let  $l1\_cat\_1 : \iota \Rightarrow o$  be given. Let  $m1\_isocat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k10\_cat\_1 : \iota \Rightarrow \iota$  be given. Let  $m2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r3\_nattra\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k9\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r2\_isocat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1)))))))) \Rightarrow (\forall X2. \\
& (m2\_cat\_1 X2 X0 X1) \Rightarrow (\forall X3.(m2\_cat\_1 X3 X1 X0) \Rightarrow (\forall X4. \\
& (m2\_cat\_1 X4 X0 X0) \Rightarrow ((r3\_nattra\_1 X0 X0 X4 (k10\_cat\_1 X0)) \Rightarrow ((r3\_nattra\_1 \\
& X0 X1 (k9\_cat\_1 X0 X0 X1 X4 X2) X2) \wedge (r3\_nattra\_1 X1 X0 (k9\_cat\_1 X1 \\
& X0 X0 X3 X4) X3))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. \forall X3. (((\neg v2\_struct\_0 \\
& X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 \\
& X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 X0) \wedge (l1\_cat\_1 X0)))))))) \wedge ((( \\
& \neg v2\_struct\_0 X1) \wedge ((\neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 \\
& X1) \wedge ((v4\_cat\_1 X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 \\
& X1)))))))) \wedge ((m2\_cat\_1 X2 X0 X1) \wedge (m2\_cat\_1 X3 X0 X1))) \Rightarrow (r3\_nattra\_1 \\
& X0 X1 X2 X2)
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0)))))))) \Rightarrow (m2\_cat\_1 (k10\_cat\_1 X0) X0 X0)
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow ((r2\_isocat\_1 \\
& X0 X1) \Rightarrow (\forall X2.(m2\_cat\_1 X2 X0 X1) \Rightarrow ((m1\_isocat\_1 X2 X0 X1) \Leftrightarrow \\
& (\exists X3.(m2\_cat\_1 X3 X1 X0) \wedge ((r3\_nattr\_1 X0 X0 (k9\_cat\_1 X0 \\
& X1 X0 X2 X3) (k10\_cat\_1 X0)) \wedge (r3\_nattr\_1 X1 X1 (k9\_cat\_1 X1 X0 X1 \\
& X3 X2) (k10\_cat\_1 X1)))))))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.((\neg v2\_struct\_0 X1) \wedge (( \\
& \neg v11\_struct\_0 X1) \wedge ((v2\_cat\_1 X1) \wedge ((v3\_cat\_1 X1) \wedge ((v4\_cat\_1 \\
& X1) \wedge ((v5\_cat\_1 X1) \wedge ((v6\_cat\_1 X1) \wedge (l1\_cat\_1 X1))))))) \Rightarrow ((r2\_isocat\_1 \\
& X0 X1) \Leftrightarrow (\exists X2.(m2\_cat\_1 X2 X0 X1) \wedge (\exists X3.(m2\_cat\_1 X3 \\
& X1 X0) \wedge ((r3\_nattr\_1 X0 X0 (k9\_cat\_1 X0 X1 X0 X2 X3) (k10\_cat\_1 X0)) \wedge \\
& (r3\_nattr\_1 X1 X1 (k9\_cat\_1 X1 X0 X1 X3 X2) (k10\_cat\_1 X1))))))
\end{aligned} \tag{5}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
& X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
& X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (m1\_isocat\_1 (k10\_cat\_1 X0) X0 X0)
\end{aligned}$$