

## t61\_cat\_3

(TMXyV5yBG7z31d3V8gQEGtAT2QHUw9uFXnC)

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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  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $u4\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $r2\_cat\_3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v10\_cat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k4\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $r1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k3\_graph\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_cat\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
 & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
 & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\
 & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u4\_struct\_0 X0)) \Rightarrow (\forall X3. \\
 & (m1\_subset\_1 X3 (u4\_struct\_0 X0)) \Rightarrow (((r2\_cat\_3 X0 X1 X2 X3) \wedge (v10\_cat\_1 \\
 & (k4\_graph\_1 X0 X3) X0)) \Rightarrow (r1\_cat\_1 X0 X1 (k4\_graph\_1 X0 X2))))))
 \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
 & \forall X0.((\neg v2\_struct\_0 X0) \wedge ((\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\
 & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\
 & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\
 & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u4\_struct\_0 X0)) \Rightarrow (\forall X3. \\
 & (m1\_subset\_1 X3 (u4\_struct\_0 X0)) \Rightarrow ((r2\_cat\_3 X0 X1 X2 X3) \Leftrightarrow ((k3\_graph\_1 \\
 & X0 X2 = X1) \wedge ((k3\_graph\_1 X0 X3 = X1) \wedge (\forall X4.(m1\_subset\_1 X4 \\
 & (u1\_struct\_0 X0)) \Rightarrow (\forall X5.(m1\_subset\_1 X5 (u4\_struct\_0 X0)) \Rightarrow \\
 & (\forall X6.(m1\_subset\_1 X6 (u4\_struct\_0 X0)) \Rightarrow (\neg (X5 \in k2\_cat\_1 \\
 & X0 X4 (k4\_graph\_1 X0 X2)) \wedge ((X6 \in k2\_cat\_1 X0 X4 (k4\_graph\_1 X0 X3)) \wedge \\
 & (\forall X7.(m1\_subset\_1 X7 (u4\_struct\_0 X0)) \Rightarrow (\neg (X7 \in k2\_cat\_1 \\
 & X0 X4 X1) \wedge (\forall X8.(m1\_subset\_1 X8 (u4\_struct\_0 X0)) \Rightarrow ((X8 \in \\
 & k2\_cat\_1 X0 X4 X1) \Rightarrow (((k1\_cat\_1 X0 X8 X2 = X5) \wedge (k1\_cat\_1 X0 X8 X3 = X6)) \Leftrightarrow \\
 & (X7 = X8))))))))))))))
 \end{aligned} \tag{2}$$

**Theorem 1**

$$\begin{aligned} & \forall X0.((\neg v2\_struct\_0 X0) \wedge (\neg v11\_struct\_0 X0) \wedge ((v2\_cat\_1 \\ & X0) \wedge ((v3\_cat\_1 X0) \wedge ((v4\_cat\_1 X0) \wedge ((v5\_cat\_1 X0) \wedge ((v6\_cat\_1 \\ & X0) \wedge (l1\_cat\_1 X0))))))) \Rightarrow (\forall X1.(m1\_subset\_1 X1 (u1\_struct\_0 \\ & X0)) \Rightarrow (\forall X2.(m1\_subset\_1 X2 (u4\_struct\_0 X0)) \Rightarrow (\forall X3. \\ & (m1\_subset\_1 X3 (u4\_struct\_0 X0)) \Rightarrow (((r2\_cat\_3 X0 X1 X2 X3) \wedge (v10\_cat\_1 \\ & (k4\_graph\_1 X0 X2) X0)) \Rightarrow (r1\_cat\_1 X0 X1 (k4\_graph\_1 X0 X3)))))) \end{aligned}$$