

t31_osafree (TMN-
mkrvBXo2bhSwzv7N9QAuJGzuCiwAeWen)

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Let $v2_struct_0 : \iota \Rightarrow o$ be given. Let $v11_struct_0 : \iota \Rightarrow o$ be given. Let $v4_osalg_1 : \iota \Rightarrow o$ be given. Let $v5_osalg_1 : \iota \Rightarrow o$ be given. Let $v2_osalg_4 : \iota \Rightarrow o$ be given. Let $l3_osalg_1 : \iota \Rightarrow o$ be given. Let $v1_relat_1 : \iota \Rightarrow o$ be given. Let $v2_relat_1 : \iota \Rightarrow o$ be given. Let $v4_relat_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u1_struct_0 : \iota \Rightarrow \iota$ be given. Let $v1_funct_1 : \iota \Rightarrow o$ be given. Let $v1_partfun1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k24_osafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m1_subset_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v1_xboole_0 : \iota \Rightarrow o$ be given. Let $k23_osafree : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $l1_struct_0 : \iota \Rightarrow o$ be given. Let $l2_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u3_msualg_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m3_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $v12_osalg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l3_msualg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m1_osafree : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $l1_osalg_1 : \iota \Rightarrow o$ be given. Let $l2_osalg_1 : \iota \Rightarrow o$ be given. Let $l1_msualg_1 : \iota \Rightarrow o$ be given. Let $l1_orders_2 : \iota \Rightarrow o$ be given. Let $k16_osafree : \iota \Rightarrow \iota \Rightarrow \iota$ 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 $v13_osalg_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1_funct_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0. \forall X1. (X0 \in X1) \Rightarrow (m1_subset_1 X0 X1) \quad (1)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. \forall X2. (((\neg v2_struct_0 X0) \wedge (\neg v11_struct_0 \\ & X0) \wedge ((v4_osalg_1 X0) \wedge (v5_osalg_1 X0) \wedge (v2_osalg_4 X0) \wedge (l3_osalg_1 \\ & X0)))) \wedge (((v1_relat_1 X1) \wedge (v2_relat_1 X1) \wedge (v4_relat_1 X1 \\ & (u1_struct_0 X0)) \wedge (v1_funct_1 X1) \wedge (v1_partfun1 X1 (u1_struct_0 \\ & X0)))) \wedge (m1_subset_1 X2 (u1_struct_0 X0))) \Rightarrow (\neg v1_xboole_0 \\ & (k23_osafree X0 X1 X2)) \end{aligned} \quad (2)$$

Assume the following.

$$\begin{aligned} & \forall X0. \forall X1. ((l1_struct_0 X0) \wedge (l2_msualg_1 X1 X0)) \Rightarrow \\ & ((v1_relat_1 (u3_msualg_1 X0 X1)) \wedge (v4_relat_1 (u3_msualg_1 \\ & X0 X1) (u1_struct_0 X0)) \wedge (v1_funct_1 (u3_msualg_1 X0 X1)) \wedge (v1_partfun1 \\ & (u3_msualg_1 X0 X1) (u1_struct_0 X0)))) \end{aligned} \quad (3)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.((v1_relat_1 X1)\wedge((v4_relat_1 X1 X0)\wedge \\ (v1_funct_1 X1)\wedge(v1_partfun1 X1 X0)))\Rightarrow(\forall X2.(m3_pboole \\ X2 X0 X1)\Rightarrow((v1_relat_1 X2)\wedge((v4_relat_1 X2 X0)\wedge((v1_funct_1 X2)\wedge \\ (v1_partfun1 X2 X0)))))) \end{aligned} \quad (4)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.(((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge \\ ((v4_osalg_1 X0)\wedge((v5_osalg_1 X0)\wedge(l3_osalg_1 X0))))))\wedge((v12_osalg_1 \\ X1 X0)\wedge(l3_msualg_1 X1 X0))\Rightarrow(\forall X2.(m1_osafree X2 X0 X1)\Rightarrow \\ (m3_pboole X2 (u1_struct_0 X0) (u3_msualg_1 X0 X1))) \end{aligned} \quad (5)$$

Assume the following.

$$\forall X0.(l3_osalg_1 X0)\Rightarrow((l1_osalg_1 X0)\wedge(l2_osalg_1 X0)) \quad (6)$$

Assume the following.

$$\begin{aligned} \forall X0.((\neg v2_struct_0 X0)\wedge(l1_msualg_1 X0))\Rightarrow(\forall X1. \\ (l3_msualg_1 X1 X0)\Rightarrow(l2_msualg_1 X1 X0)) \end{aligned} \quad (7)$$

Assume the following.

$$\forall X0.(l2_osalg_1 X0)\Rightarrow((l1_msualg_1 X0)\wedge(l1_orders_2 X0)) \quad (8)$$

Assume the following.

$$\forall X0.(l1_orders_2 X0)\Rightarrow(l1_struct_0 X0) \quad (9)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.(((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge \\ ((v4_osalg_1 X0)\wedge((v5_osalg_1 X0)\wedge((v2_osalg_4 X0)\wedge(l3_osalg_1 \\ X0))))))\wedge((v1_relat_1 X1)\wedge((v2_relat_1 X1)\wedge((v4_relat_1 X1 \\ (u1_struct_0 X0))\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 (u1_struct_0 \\ X0))))))\Rightarrow(m1_osafree (k24_osafree X0 X1) X0 (k16_osafree X0 X1)) \end{aligned} \quad (10)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.(((\neg v2_struct_0 X0)\wedge((\neg v11_struct_0 X0)\wedge \\ ((v4_osalg_1 X0)\wedge((v5_osalg_1 X0)\wedge((v2_osalg_4 X0)\wedge(l3_osalg_1 \\ X0))))))\wedge((v1_relat_1 X1)\wedge((v2_relat_1 X1)\wedge((v4_relat_1 X1 \\ (u1_struct_0 X0))\wedge((v1_funct_1 X1)\wedge(v1_partfun1 X1 (u1_struct_0 \\ X0))))))\Rightarrow((v3_msualg_1 (k16_osafree X0 X1) X0)\wedge((v4_msualg_1 \\ (k16_osafree X0 X1) X0)\wedge((v12_osalg_1 (k16_osafree X0 X1) X0)\wedge \\ ((v13_osalg_1 (k16_osafree X0 X1) X0)\wedge(l3_msualg_1 (k16_osafree \\ X0 X1) X0)))))) \end{aligned} \quad (11)$$

Assume the following.

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v4_osalg_1 \\
& X0) \wedge ((v5_osalg_1 X0) \wedge ((v2_osalg_4 X0) \wedge (l3_osalg_1 X0)))))) \Rightarrow \\
& (\forall X1.((v1_relat_1 X1) \wedge ((v2_relat_1 X1) \wedge ((v4_relat_1 \\
& X1 (u1_struct_0 X0)) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 (u1_struct_0 \\
& X0)))))) \Rightarrow (\forall X2.(m1_osafree X2 X0 (k16_osafree X0 X1)) \Rightarrow (\\
& (X2 = k24_osafree X0 X1) \Leftrightarrow (\forall X3.(m1_subset_1 X3 (u1_struct_0 \\
& X0)) \Rightarrow (k1_funct_1 X2 X3 = k23_osafree X0 X1 X3))))))
\end{aligned} \tag{12}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. ((v1_relat_1 X1) \wedge ((v4_relat_1 X1 X0) \wedge (\\
& (v1_funct_1 X1) \wedge (v1_partfun1 X1 X0)))) \Rightarrow ((v2_relat_1 X1) \Leftrightarrow (\forall X2. \\
& \neg (X2 \in X0) \wedge (v1_xboole_0 (k1_funct_1 X1 X2))))
\end{aligned} \tag{13}$$

Theorem 1

$$\begin{aligned}
& \forall X0.((\neg v2_struct_0 X0) \wedge ((\neg v11_struct_0 X0) \wedge ((v4_osalg_1 \\
& X0) \wedge ((v5_osalg_1 X0) \wedge ((v2_osalg_4 X0) \wedge (l3_osalg_1 X0)))))) \Rightarrow \\
& (\forall X1.((v1_relat_1 X1) \wedge ((v2_relat_1 X1) \wedge ((v4_relat_1 \\
& X1 (u1_struct_0 X0)) \wedge ((v1_funct_1 X1) \wedge (v1_partfun1 X1 (u1_struct_0 \\
& X0)))))) \Rightarrow (v2_relat_1 (k24_osafree X0 X1)))
\end{aligned}$$