t7_msafree3 (TMWjwo4v5j35yYYmTKbccqRPkXWi1rovitE)

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Let $v11\_struct\_0 : \iota \Rightarrow o$ be given. Let $v1\_instalg1 : \iota \Rightarrow o$ be given. Let $l1\_msualg\_1 : \iota \Rightarrow o$ 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 $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $m1\_dtconstr : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k5\_msafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5\_trees\_3 : \iota \Rightarrow \iota$ be given. Let $k1\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k11\_msafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k7\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $v2\_struct\_0 : \iota \Rightarrow o$ be given. Let $m2\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u4\_struct\_0 : \iota \Rightarrow \iota$ be given. Let $k3\_relat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u1\_msualg\_1 : \iota \Rightarrow \iota$ be given. Let $k6\_finseq\_2 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u2\_msualg\_1 : \iota \Rightarrow \iota$ be given. Let $g3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ 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 $k8\_msafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $l3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k10\_msafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k7\_msafree : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $u4\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0.\forall X1.\forall X2.(((\neg v2\_struct\_0\ X0) \wedge (l1\_msualg\_1\ X0)) \wedge (((v1\_relat\_1\ X1) \wedge ((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0)) \wedge ((v1\_funct\_1\ X1) \wedge (v1\_partfun1\ X1\ (u1\_struct\_0\ X0))))) \wedge (m2\_pboole\ X2\ (u4\_struct\_0\ X0)\ (k3\_relat\_1\ (u1\_msualg\_1\ X0)\ (k6\_finseq\_2\ (u1\_struct\_0\ X0)\ X1))\ (k3\_relat\_1\ (u2\_msualg\_1\ X0)\ X1)))) \Rightarrow (\forall X3.\forall X4.\forall X5.(g3\_msualg\_1\ X0\ X1\ X2 = g3\_msualg\_1\ X3\ X4\ X5) \Rightarrow ((X0 = X3) \wedge ((X1 = X4) \wedge (X2 = X5)))) \tag{1}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0) \wedge ((\neg v11\_struct\_0\ X0) \wedge (l1\_msualg\_1\ X0))) \wedge ((v1\_relat\_1\ X1) \wedge ((v2\_relat\_1\ X1) \wedge ((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0)) \wedge ((v1\_funct\_1\ X1) \wedge (v1\_partfun1\ X1\ (u1\_struct\_0\ X0)))))))) \Rightarrow ((v3\_msualg\_1\ (k11\_msafree\ X0\ X1)\ X0) \wedge (v4\_msualg\_1\ (k11\_msafree\ X0\ X1)\ X0)) \tag{2}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge (l1\_msualg\_1\ X0)))\wedge((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0)))))))\Rightarrow((v1\_relat\_1\ (k8\_msafree\ X0\ X1))\wedge((v4\_relat\_1\ (k8\_msafree\ X0\ X1)\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ (k8\_msafree\ X0\ X1))\wedge(v1\_partfun1\ (k8\_msafree\ X0\ X1)\ (u1\_struct\_0\ X0)))))) \tag{3}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge (l1\_msualg\_1\ X0)))\wedge((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0)))))))\Rightarrow(l3\_msualg\_1\ (k11\_msafree\ X0\ X1)\ X0) \tag{4}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge (l1\_msualg\_1\ X0)))\wedge((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0)))))))\Rightarrow(m2\_pboole\ (k10\_msafree\ X0\ X1)\ (u4\_struct\_0\ X0)\ (k3\_relat\_1\ (u1\_msualg\_1\ X0)\ (k6\_finseq\_2\ (u1\_struct\_0\ X0)\ (k8\_msafree\ X0\ X1)))\ (k3\_relat\_1\ (u2\_msualg\_1\ X0)\ (k8\_msafree\ X0\ X1))) \tag{5}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge(l1\_msualg\_1\ X0)))\Rightarrow(\forall X1.((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0)))))))\Rightarrow(\forall X2.(m1\_dtconstr\ X2\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1))\ (k5\_trees\_3\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1)))\ (k1\_msaterm\ X0\ X1))\Rightarrow(\forall X3.(m1\_subset\_1\ X3\ (u1\_struct\_0\ X0))\Rightarrow((X3 = k7\_msaterm\ X0\ X1\ X2)\Leftrightarrow(X2 \in k7\_msafree\ X0\ X1\ X3))))) \tag{6}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge(l1\_msualg\_1\ X0)))\Rightarrow(\forall X1.((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0)))))))\Rightarrow(k11\_msafree\ X0\ X1 = g3\_msualg\_1\ X0\ (k8\_msafree\ X0\ X1)\ (k10\_msafree\ X0\ X1))) \tag{7}$$

Assume the following.

$$\forall X0.((\neg v2\_struct\_0\ X0)\wedge((\neg v11\_struct\_0\ X0)\wedge(l1\_msualg\_1\ X0)))\Rightarrow(\forall X1.((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0))))))\Rightarrow(\forall X2.((v1\_relat\_1\ X2)\wedge((v4\_relat\_1\ X2\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X2)\wedge(v1\_partfun1\ X2\ (u1\_struct\_0\ X0)))))\Rightarrow((X2 = k8\_msafree\ X0\ X1)\Leftrightarrow(\forall X3.(m1\_subset\_1\ X3\ (u1\_struct\_0\ X0))\Rightarrow(k1\_funct\_1\ X2\ X3 = k7\_msafree\ X0\ X1\ X3)))) \tag{8}$$

Assume the following.

$$\forall X0.(l1\_msualg\_1\ X0)\Rightarrow(((v2\_struct\_0\ X0)\wedge(v1\_instalg1\ X0))\Rightarrow(v11\_struct\_0\ X0)) \tag{9}$$

Assume the following.

$$\forall X0.\forall X1.(((\neg v2\_struct\_0\ X0)\wedge(l1\_msualg\_1\ X0))\wedge(l3\_msualg\_1\ X1\ X0))\Rightarrow((v3\_msualg\_1\ X1\ X0)\Rightarrow(X1 = g3\_msualg\_1\ X0\ (u3\_msualg\_1\ X0\ X1)\ (u4\_msualg\_1\ X0\ X1))) \tag{10}$$

Theorem 1

$$\forall X0.((\neg v11\_struct\_0\ X0)\wedge((v1\_instalg1\ X0)\wedge(l1\_msualg\_1\ X0)))\Rightarrow(\forall X1.((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0))))))\Rightarrow(\forall X2.(m1\_subset\_1\ X2\ (u1\_struct\_0\ X0))\Rightarrow(\forall X3.(m1\_dtconstr\ X3\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1))\ (k5\_trees\_3\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1)))\ (k1\_msaterm\ X0\ X1))\Rightarrow((X3 \in k1\_funct\_1\ (u3\_msualg\_1\ X0\ (k11\_msafree\ X0\ X1))\ X2)\Leftrightarrow(k7\_msaterm\ X0\ X1\ X3 = X2)))))$$