t17_msafree3 (TM-Nxj5DMTxHdoLm9LYCeiyHcCRX7L1t2vZh)

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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 $m1\_dtconstr : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ 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 $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k5\_msafree3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k7\_msaterm : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $r2\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $k4\_msafree3 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $m3\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$ be given. Let $u3\_msualg\_1 : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Let $k11\_msafree : \iota \Rightarrow \iota \Rightarrow \iota$ be given. Assume the following.

$$\forall X0.\forall X1.\forall X2.(((\neg v11\_struct\_0\ X0) \wedge ((v1\_instalg1\ X0) \wedge (l1\_msualg\_1\ X0))) \wedge (((v1\_relat\_1\ X1) \wedge ((v2\_relat\_1\ X1) \wedge ((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0)) \wedge ((v1\_funct\_1\ X1) \wedge (v1\_partfun1\ X1\ (u1\_struct\_0\ X0)))))) \wedge ((v1\_relat\_1\ X2) \wedge ((v4\_relat\_1\ X2\ (u1\_struct\_0\ X0)) \wedge ((v1\_funct\_1\ X2) \wedge (v1\_partfun1\ X2\ (u1\_struct\_0\ X0)))))) \Rightarrow (m3\_pboole\ (k5\_msafree3\ X0\ X1\ X2)\ (u1\_struct\_0\ X0)\ (u3\_msualg\_1\ X0\ (k11\_msafree\ X0\ X1)))) \tag{1}$$

Assume the following.

$$\forall X0.((\neg v11\_struct\_0\ X0)\wedge((v1\_instalg1\ X0)\wedge(l1\_msualg\_1\ X0)))\Rightarrow(\forall X1.((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0))))))\Rightarrow(\forall X2.((v1\_relat\_1\ X2)\wedge((v4\_relat\_1\ X2\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X2)\wedge(v1\_partfun1\ X2\ (u1\_struct\_0\ X0)))))\Rightarrow(\forall X3.(m3\_pboole\ X3\ (u1\_struct\_0\ X0)\ (u3\_msualg\_1\ X0\ (k11\_msafree\ X0\ X1)))\Rightarrow((X3 = k5\_msafree3\ X0\ X1\ X2)\Leftrightarrow(\forall X4.(m1\_subset\_1\ X4\ (u1\_struct\_0\ X0))\Rightarrow(k1\_funct\_1\ X3\ X4 = ReplSep\ (toset\ (\lambda X5 : \iota.m1\_dtconstr\ X5\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1))\ (k5\_trees\_3\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1)))\ (k1\_msaterm\ X0\ X1)))\ (\lambda X5 : \iota.(k7\_msaterm\ X0\ X1\ X5 = X4)\wedge(r2\_pboole\ (u1\_struct\_0\ X0)\ (k4\_msafree3\ X0\ X1\ X5)\ X2))\ (\lambda X5 : \iota.X5)))))) \tag{2}$$

Theorem 1

$$\forall X0.((\neg v11\_struct\_0\ X0)\wedge((v1\_instalg1\ X0)\wedge(l1\_msualg\_1\ X0)))\Rightarrow(\forall X1.((v1\_relat\_1\ X1)\wedge((v2\_relat\_1\ X1)\wedge((v4\_relat\_1\ X1\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X1)\wedge(v1\_partfun1\ X1\ (u1\_struct\_0\ X0))))))\Rightarrow(\forall X2.((v1\_relat\_1\ X2)\wedge((v4\_relat\_1\ X2\ (u1\_struct\_0\ X0))\wedge((v1\_funct\_1\ X2)\wedge(v1\_partfun1\ X2\ (u1\_struct\_0\ X0)))))\Rightarrow(\forall X3.(m1\_dtconstr\ X3\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1))\ (k5\_trees\_3\ (u1\_struct\_0\ (k5\_msafree\ X0\ X1)))\ (k1\_msaterm\ X0\ X1))\Rightarrow(\forall X4.(m1\_subset\_1\ X4\ (u1\_struct\_0\ X0))\Rightarrow((X3 \in k1\_funct\_1\ (k5\_msafree3\ X0\ X1\ X2)\ X4)\Rightarrow((k7\_msaterm\ X0\ X1\ X3 = X4)\wedge(r2\_pboole\ (u1\_struct\_0\ X0)\ (k4\_msafree3\ X0\ X1\ X3)\ X2)))))))$$