

# t1\_scpqsort (TMPyUKiiRUcgSziXNLe- qYRKcd8fhPEqdYEX)

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Let  $v1\_relat\_1 : \iota \Rightarrow o$  be given. Let  $v4\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_numbers : \iota$  be given. Let  $v5\_relat\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_compos\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_scmpds\_2 : \iota$  be given. Let  $v1\_funct\_1 : \iota \Rightarrow o$  be given. Let  $v1\_partfun1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $u1\_struct\_0 : \iota \Rightarrow \iota$  be given. Let  $v5\_funct\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k2\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $np\_2 : \iota$  be given. Let  $v5\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k6\_numbers : \iota$  be given. Let  $v1\_xboole\_0 : \iota \Rightarrow o$  be given. Let  $v1\_finset\_1 : \iota \Rightarrow o$  be given. Let  $v1\_afinsq\_1 : \iota \Rightarrow o$  be given. Let  $v2\_compos\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v3\_scmpds\_4 : \iota \Rightarrow o$  be given. Let  $v1\_ami\_2 : \iota \Rightarrow o$  be given. Let  $m1\_subset\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_int\_1 : \iota \Rightarrow o$  be given. Let  $r1\_scmpds\_6 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r2\_scmpds\_6 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r1\_xxreal\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_scmpds\_2 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k6\_scmpds\_4 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k3\_scmpds\_6 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_4 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k7\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k2\_nat\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_card\_1 : \iota \Rightarrow \iota$  be given. Let  $k1\_zfmisc\_1 : \iota \Rightarrow \iota$  be given. Let  $k9\_xtuple\_0 : \iota \Rightarrow \iota$  be given. Let  $v2\_xxreal\_0 : \iota \Rightarrow o$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_numbers : \iota$  be given. Let  $k4\_ordinal1 : \iota$  be given. Let  $v3\_ordinal1 : \iota \Rightarrow o$  be given. Let  $v2\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v3\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v1\_extpro\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $v2\_struct\_0 : \iota \Rightarrow o$  be given. Let  $l1\_extpro\_1 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $l1\_compos\_1 : \iota \Rightarrow o$  be given. Let  $v1\_setfam\_1 : \iota \Rightarrow o$  be given. Let  $v7\_ordinal1 : \iota \Rightarrow o$  be given.

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_2 k1\_scmpds\_2)) \wedge ((v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmpds\_2)) \wedge (v5\_memstr\_0 X1 np\_2 k1\_scmpds\_2 k6\_numbers)))))) \Rightarrow \\
& (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 \\
& X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 k1\_scmpds\_2)) \wedge ( \\
& (v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge ((v1\_afinsq\_1 X2) \wedge ((v2\_compos\_1 \\
& X2 k1\_scmpds\_2) \wedge (v3\_scmpds\_4 X2)))))))))) \Rightarrow (\forall X3.((\neg v1\_xboole\_0 \\
& X3) \wedge ((v1\_relat\_1 X3) \wedge ((v4\_relat\_1 X3 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X3 (u1\_compos\_1 k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X3) \wedge ((v1\_finset\_1 \\
& X3) \wedge ((v1\_afinsq\_1 X3) \wedge (v3\_scmpds\_4 X3)))))))))) \Rightarrow (\forall X4. \\
& ((v1\_ami\_2 X4) \wedge (m1\_subset\_1 X4 (u1\_struct\_0 k1\_scmpds\_2))) \Rightarrow \\
& (\forall X5.(v1\_int\_1 X5) \Rightarrow (((r1\_scmpds\_6 X2 X1 X0) \wedge (r2\_scmpds\_6 \\
& X2 X1 X0)) \Rightarrow ((r1\_xxreal\_0 (k1\_funct\_1 X1 (k2\_scmpds\_2 (k1\_funct\_1 \\
& X1 X4) X5)) k6\_numbers) \vee (k6\_scmpds\_4 (k3\_scmpds\_6 X4 X5 X2 X3) X1 \\
& X0 = k1\_funct\_4 (k6\_scmpds\_4 X2 X1 X0) (k7\_memstr\_0 np\_2 k1\_scmpds\_2 \\
& (k2\_nat\_1 (k2\_nat\_1 (k5\_card\_1 X2) (k5\_card\_1 X3)) np\_2))))))))))
\end{aligned} \tag{1}$$

Assume the following.

$$\forall X0. \forall X1. \forall X2. \neg (X0 \in X1) \wedge ((m1\_subset\_1 X1 (k1\_zfmisc\_1 X2)) \wedge (v1\_xboole\_0 X2)) \tag{2}$$

Assume the following.

$$\forall X0. \forall X1. (m1\_subset\_1 X0 X1) \Rightarrow ((v1\_xboole\_0 X1) \vee (X0 \in X1)) \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_ami\_2 X0) \wedge (m1\_subset\_1 X0 (u1\_struct\_0 k1\_scmpds\_2))) \Rightarrow \\
& (\forall X1.(m1\_subset\_1 X1 k5\_numbers) \Rightarrow (\neg X0 \in k9\_xtuple\_0 (k7\_memstr\_0 \\
& np\_2 k1\_scmpds\_2 X1)))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. ((v1\_relat\_1 X1) \wedge (v1\_funct\_1 X1)) \Rightarrow (\forall X2. \\
& ((v1\_relat\_1 X2) \wedge (v1\_funct\_1 X2)) \Rightarrow ((\neg X0 \in k9\_xtuple\_0 X1) \Rightarrow (k1\_funct\_1 \\
& (k1\_funct\_4 X2 X1) X0 = k1\_funct\_1 X2 X0)))
\end{aligned} \tag{5}$$

Assume the following.

$$\begin{aligned}
& ((v2\_xxreal\_0 np\_2) \wedge (m2\_subset\_1 np\_2 k1\_numbers k5\_numbers)) \wedge \\
& ((m1\_subset\_1 np\_2 k5\_numbers) \wedge (m1\_subset\_1 np\_2 k1\_numbers))
\end{aligned} \tag{6}$$

Assume the following.

$$\neg v1\_xboole\_0 \ np\_2 \quad (7)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.((\neg v1\_xboole\_0 \ X0)\wedge((\neg v1\_xboole\_0 \ X1)\wedge \\ (m1\_subset\_1 \ X1 \ (k1\_zfmisc\_1 \ X0))))\Rightarrow(\forall X2.(m2\_subset\_1 \\ X2 \ X0 \ X1)\Leftrightarrow(m1\_subset\_1 \ X2 \ X1)) \end{aligned} \quad (8)$$

Assume the following.

$$k5\_numbers = k4\_ordinal1 \quad (9)$$

Assume the following.

$$(\neg v1\_xboole\_0 \ k4\_ordinal1)\wedge(v3\_ordinal1 \ k4\_ordinal1) \quad (10)$$

Assume the following.

$$\begin{aligned} (v2\_memstr\_0 \ k1\_scmpds\_2 \ np\_2)\wedge((v3\_memstr\_0 \ k1\_scmpds\_2 \ np\_2)\wedge \\ (v1\_extpro\_1 \ k1\_scmpds\_2 \ np\_2)) \end{aligned} \quad (11)$$

Assume the following.

$$(\neg v2\_struct\_0 \ k1\_scmpds\_2)\wedge(v1\_extpro\_1 \ k1\_scmpds\_2 \ np\_2) \quad (12)$$

Assume the following.

$$\forall X0.\forall X1.(l1\_extpro\_1 \ X1 \ X0)\Rightarrow((l1\_memstr\_0 \ X1 \ X0)\wedge \\ (l1\_compos\_1 \ X1)) \quad (13)$$

Assume the following.

$$\begin{aligned} \forall X0.\forall X1.\forall X2.((\neg v1\_setfam\_1 \ X0)\wedge(((\neg v2\_struct\_0 \\ X1)\wedge((v2\_memstr\_0 \ X1 \ X0)\wedge((v3\_memstr\_0 \ X1 \ X0)\wedge(l1\_memstr\_0 \ X1 \\ X0))))\wedge(v7\_ordinal1 \ X2)))\Rightarrow((v1\_relat\_1 \ (k7\_memstr\_0 \ X0 \ X1 \ X2))\wedge \\ ((v4\_relat\_1 \ (k7\_memstr\_0 \ X0 \ X1 \ X2) \ (u1\_struct\_0 \ X1))\wedge((v1\_funct\_1 \\ (k7\_memstr\_0 \ X0 \ X1 \ X2))\wedge(v5\_funct\_1 \ (k7\_memstr\_0 \ X0 \ X1 \ X2) \ (k2\_memstr\_0 \\ X0 \ X1)))))) \end{aligned} \quad (14)$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. \forall X2. (((\neg v1\_xboole\_0 X0) \wedge ((v1\_relat\_1 \\
& X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 X0 (u1\_compos\_1 \\
& k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X0) \wedge ((v1\_finset\_1 X0) \wedge (v1\_afinsq\_1 \\
& X0)))))) \wedge (((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 X1 (u1\_struct\_0 k1\_scmpds\_2)) \wedge \\
& ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 X1 (k2\_memstr\_0 np\_2 k1\_scmpds\_2)) \wedge \\
& (v1\_partfun1 X1 (u1\_struct\_0 k1\_scmpds\_2)))))) \wedge ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\
& k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X2) \wedge (v1\_partfun1 X2 k5\_numbers)))))) \Rightarrow \\
& ((v1\_relat\_1 (k6\_scmpds\_4 X0 X1 X2)) \wedge ((v4\_relat\_1 (k6\_scmpds\_4 \\
& X0 X1 X2) (u1\_struct\_0 k1\_scmpds\_2)) \wedge ((v1\_funct\_1 (k6\_scmpds\_4 \\
& X0 X1 X2)) \wedge ((v5\_funct\_1 (k6\_scmpds\_4 X0 X1 X2) (k2\_memstr\_0 np\_2 \\
& k1\_scmpds\_2)) \wedge (v1\_partfun1 (k6\_scmpds\_4 X0 X1 X2) (u1\_struct\_0 \\
& k1\_scmpds\_2))))))
\end{aligned} \tag{15}$$

Assume the following.

$$m1\_subset\_1 k5\_numbers (k1\_zfmisc\_1 k1\_numbers) \tag{16}$$

Assume the following.

$$\forall X0. (v1\_finset\_1 X0) \Rightarrow (m1\_subset\_1 (k5\_card\_1 X0) k4\_ordinal1) \tag{17}$$

Assume the following.

$$\begin{aligned}
& \forall X0. \forall X1. ((m1\_subset\_1 X0 k5\_numbers) \wedge (v7\_ordinal1 \\
& X1)) \Rightarrow (m2\_subset\_1 (k2\_nat\_1 X0 X1) k1\_numbers k5\_numbers)
\end{aligned} \tag{18}$$

Assume the following.

$$(v1\_extpro\_1 k1\_scmpds\_2 np\_2) \wedge (l1\_extpro\_1 k1\_scmpds\_2 np\_2) \tag{19}$$

Assume the following.

$$\forall X0. (m1\_subset\_1 X0 k4\_ordinal1) \Rightarrow (v7\_ordinal1 X0) \tag{20}$$

Assume the following.

$$\begin{aligned}
& \forall X0. ((\neg v1\_xboole\_0 X0) \wedge (v7\_ordinal1 X0)) \Rightarrow ((\neg v1\_xboole\_0 \\
& X0) \wedge ((v7\_ordinal1 X0) \wedge (\neg v1\_setfam\_1 X0)))
\end{aligned} \tag{21}$$

**Theorem 1**

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_2 k1\_scmpds\_2)) \wedge ((v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmpds\_2)) \wedge (v5\_memstr\_0 X1 np\_2 k1\_scmpds\_2 k6\_numbers)))))) \Rightarrow \\
& (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 X2) \wedge ((v4\_relat\_1 \\
& X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 k1\_scmpds\_2)) \wedge \\
& (v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge ((v1\_afinsq\_1 X2) \wedge ((v2\_compos\_1 \\
& X2 k1\_scmpds\_2) \wedge (v3\_scmpds\_4 X2)))))))))) \Rightarrow (\forall X3.((\neg v1\_xboole\_0 \\
& X3) \wedge ((v1\_relat\_1 X3) \wedge ((v4\_relat\_1 X3 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X3 (u1\_compos\_1 k1\_scmpds\_2)) \wedge ((v1\_funct\_1 X3) \wedge ((v1\_finset\_1 \\
& X3) \wedge ((v1\_afinsq\_1 X3) \wedge (v3\_scmpds\_4 X3)))))))))) \Rightarrow (\forall X4. \\
& ((v1\_ami\_2 X4) \wedge (m1\_subset\_1 X4 (u1\_struct\_0 k1\_scmpds\_2))) \Rightarrow \\
& (\forall X5.((v1\_ami\_2 X5) \wedge (m1\_subset\_1 X5 (u1\_struct\_0 k1\_scmpds\_2))) \Rightarrow \\
& (\forall X6.(v1\_int\_1 X6) \Rightarrow (((r1\_scmpds\_6 X2 X1 X0) \wedge (r2\_scmpds\_6 \\
& X2 X1 X0)) \Rightarrow ((r1\_xxreal\_0 (k1\_funct\_1 X1 (k2\_scmpds\_2 (k1\_funct\_1 \\
& X1 X4) X6)) k6\_numbers) \vee (k1\_funct\_1 (k6\_scmpds\_4 (k3\_scmpds\_6 \\
& X4 X6 X2 X3) X1 X0) X5 = k1\_funct\_1 (k6\_scmpds\_4 X2 X1 X0) X5))))))))))
\end{aligned}$$