

## t57\_scm\_halt

(TMbMo5tEXG1M41bBmw7KiB3HvcuyYFrCR5G)

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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  $k1\_scmf\_sa\_2 : \iota$  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  $np\_3 : \iota$  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  $r1\_scm\_halt : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r2\_scm\_halt : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $m2\_subset\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k1\_numbers : \iota$  be given. Let  $r1\_xxreal\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k8\_extpro\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_4 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_scmf\_sa\_m : \iota \Rightarrow \iota$  be given. Let  $r8\_pboole : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k5\_extpro\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_scmf\_sa8c : \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_scmf\_sa\_2 : \iota \Rightarrow \iota$  be given. Let  $k6\_numbers : \iota$  be given. Let  $np\_1 : \iota$  be given. Let  $r5\_scmf\_sa7b : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r6\_scmf\_sa7b : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k8\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

$$\begin{aligned} & \forall X0. ((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge \\ & ((v1\_funct\_1 X0) \wedge (v5\_funct\_1 X0 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)))))) \Rightarrow \\ & (k1\_funct\_1 (k1\_scmf\_sa\_m X0) (k4\_scmf\_sa\_2 k6\_numbers) = np\_1) \end{aligned} \tag{1}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmf\_sa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\
& k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\
& X2)))))) \Rightarrow (((r5\_scmf\_sa7b X2 X1 X0) \wedge (r6\_scmf\_sa7b X2 X1 X0)) \Rightarrow (\forall X3. \\
& (m2\_subset\_1 X3 k1\_numbers k5\_numbers) \Rightarrow ((r1\_xxreal\_0 X3 (k8\_extpro\_1 \\
& np\_3 k1\_scmf\_sa\_2 (k1\_funct\_4 X0 X2) (k8\_memstr\_0 np\_3 k1\_scmf\_sa\_2 \\
& X1))) \Rightarrow (r8\_pboole (u1\_struct\_0 k1\_scmf\_sa\_2) (k5\_extpro\_1 np\_3 \\
& k1\_scmf\_sa\_2 (k1\_funct\_4 X0 X2) (k8\_memstr\_0 np\_3 k1\_scmf\_sa\_2 \\
& X1) X3) (k5\_extpro\_1 np\_3 k1\_scmf\_sa\_2 (k1\_funct\_4 X0 (k1\_scmf\_sa8c \\
& X2)) (k8\_memstr\_0 np\_3 k1\_scmf\_sa\_2 X1) X3))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmf\_sa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\
& k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\
& X2)))))) \Rightarrow ((r2\_scm\_halt X2 X1 X0) \Leftrightarrow (r6\_scmf\_sa7b X2 (k1\_scmf\_sa\_m \\
& X1) X0)))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmf\_sa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\
& k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\
& X2)))))) \Rightarrow ((r1\_scm\_halt X2 X1 X0) \Leftrightarrow (r5\_scmf\_sa7b X2 (k1\_scmf\_sa\_m \\
& X1) X0)))
\end{aligned} \tag{4}$$

Assume the following.

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge \\ & ((v1\_funct\_1 X0) \wedge ((v5\_funct\_1 X0 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge \\ & (v1\_partfun1 X0 (u1\_struct\_0 k1\_scmf\_sa\_2)))))) \Rightarrow ((k1\_funct\_1 \\ & X0 (k4\_scmf\_sa\_2 k6\_numbers) = np\_1) \Rightarrow (k8\_memstr\_0 np\_3 k1\_scmf\_sa\_2 \\ & X0 = k1\_scmf\_sa\_m X0)) \end{aligned} \quad (5)$$

Assume the following.

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge \\ & ((v1\_funct\_1 X0) \wedge (v5\_funct\_1 X0 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)))) \Rightarrow \\ & (k1\_scmf\_sa\_m (k1\_scmf\_sa\_m X0) = k1\_scmf\_sa\_m X0) \end{aligned} \quad (6)$$

Assume the following.

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge \\ & ((v1\_funct\_1 X0) \wedge ((v5\_funct\_1 X0 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge \\ & (v1\_partfun1 X0 (u1\_struct\_0 k1\_scmf\_sa\_2)))))) \Rightarrow ((v1\_relat\_1 \\ & (k1\_scmf\_sa\_m X0)) \wedge ((v4\_relat\_1 (k1\_scmf\_sa\_m X0) (u1\_struct\_0 \\ & k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 (k1\_scmf\_sa\_m X0)) \wedge ((v5\_funct\_1 \\ & (k1\_scmf\_sa\_m X0) (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge (v1\_partfun1 \\ & (k1\_scmf\_sa\_m X0) (u1\_struct\_0 k1\_scmf\_sa\_2)))))) \end{aligned} \quad (7)$$

Assume the following.

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge \\ & ((v1\_funct\_1 X0) \wedge (v5\_funct\_1 X0 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)))) \Rightarrow \\ & ((v1\_relat\_1 (k1\_scmf\_sa\_m X0)) \wedge ((v4\_relat\_1 (k1\_scmf\_sa\_m X0) \\ & (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 (k1\_scmf\_sa\_m X0)) \wedge \\ & (v5\_funct\_1 (k1\_scmf\_sa\_m X0) (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)))))) \end{aligned} \quad (8)$$

### Theorem 1

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\ & X0 (u1\_compos\_1 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\ & X0 k5\_numbers)))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\ & X1 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\ & X1 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\ & k1\_scmf\_sa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\ & X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\ & k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\ & X2)))))) \Rightarrow (((r1\_scm\_halt X2 X1 X0) \wedge (r2\_scm\_halt X2 X1 X0)) \Rightarrow (\forall X3. \\ & (m2\_subset\_1 X3 k1\_numbers k5\_numbers) \Rightarrow ((r1\_xreal\_0 X3 (k8\_extpro\_1 \\ & np\_3 k1\_scmf\_sa\_2 (k1\_funct\_4 X0 X2) (k1\_scmf\_sa\_m X1))) \Rightarrow (r8\_pboole \\ & (u1\_struct\_0 k1\_scmf\_sa\_2) (k5\_extpro\_1 np\_3 k1\_scmf\_sa\_2 (k1\_funct\_4 \\ & X0 X2) (k1\_scmf\_sa\_m X1) X3) (k5\_extpro\_1 np\_3 k1\_scmf\_sa\_2 (k1\_funct\_4 \\ & X0 (k1\_scmf\_sa8c X2) (k1\_scmf\_sa\_m X1) X3)))))) \end{aligned}$$