

# t58\_scm\_halt (TMQQzLWG- mxb1dRdzFfrEvBLJtg9X6RnNwui)

October 27, 2020

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  $k1\_scmfsa\_2 : \iota$  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  $r1\_xreal\_0 : \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k8\_extpro\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_4 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_scmfsa\_m : \iota \Rightarrow \iota$  be given. Let  $k3\_extpro\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k5\_extpro\_1 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k1\_scmfsa8c : \iota \Rightarrow \iota$  be given. Let  $k1\_funct\_1 : \iota \Rightarrow \iota \Rightarrow \iota$  be given. Let  $k4\_scmfsa\_2 : \iota \Rightarrow \iota$  be given. Let  $k6\_numbers : \iota$  be given. Let  $np\_1 : \iota$  be given. Let  $r5\_scmfsa7b : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $r6\_scmfsa7b : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow o$  be given. Let  $k8\_memstr\_0 : \iota \Rightarrow \iota \Rightarrow \iota \Rightarrow \iota$  be given. Assume the following.

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

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_3 k1\_scmfsa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmfsa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\
& k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\
& X2)))))) \Rightarrow (((r5\_scmfsa7b X2 X1 X0) \wedge (r6\_scmfsa7b X2 X1 X0)) \Rightarrow (\forall X3. \\
& (m2\_subset\_1 X3 k1\_numbers k5\_numbers) \Rightarrow ((\neg r1\_xreal\_0 (k8\_extpro\_1 \\
& np\_3 k1\_scmfsa\_2 (k1\_funct\_4 X0 X2) (k8\_memstr\_0 np\_3 k1\_scmfsa\_2 \\
& X1)) X3) \Rightarrow (k3\_extpro\_1 np\_3 k1\_scmfsa\_2 (k1\_funct\_4 X0 X2) (k5\_extpro\_1 \\
& np\_3 k1\_scmfsa\_2 (k1\_funct\_4 X0 X2) (k8\_memstr\_0 np\_3 k1\_scmfsa\_2 \\
& X1) X3) = k3\_extpro\_1 np\_3 k1\_scmfsa\_2 (k1\_funct\_4 X0 (k1\_scmfsa8c \\
& X2)) (k5\_extpro\_1 np\_3 k1\_scmfsa\_2 (k1\_funct\_4 X0 (k1\_scmfsa8c \\
& X2)) (k8\_memstr\_0 np\_3 k1\_scmfsa\_2 X1) X3))))))
\end{aligned} \tag{2}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_3 k1\_scmfsa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmfsa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\
& k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\
& X2)))))) \Rightarrow ((r2\_scm\_halt X2 X1 X0) \Leftrightarrow (r6\_scmfsa7b X2 (k1\_scmfsa\_m \\
& X1) X0)))
\end{aligned} \tag{3}$$

Assume the following.

$$\begin{aligned}
& \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\
& X0 (u1\_compos\_1 k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\
& X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\
& X1 (u1\_struct\_0 k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\
& X1 (k2\_memstr\_0 np\_3 k1\_scmfsa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\
& k1\_scmfsa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\
& X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\
& k1\_scmfsa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\
& X2)))))) \Rightarrow ((r1\_scm\_halt X2 X1 X0) \Leftrightarrow (r5\_scmfsa7b X2 (k1\_scmfsa\_m \\
& X1) X0)))
\end{aligned} \tag{4}$$

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

$$\begin{aligned} & \forall X0.((v1\_relat\_1 X0) \wedge ((v4\_relat\_1 X0 k5\_numbers) \wedge ((v5\_relat\_1 \\ & X0 (u1\_compos\_1 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X0) \wedge (v1\_partfun1 \\ & X0 k5\_numbers)))))) \Rightarrow (\forall X1.((v1\_relat\_1 X1) \wedge ((v4\_relat\_1 \\ & X1 (u1\_struct\_0 k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X1) \wedge ((v5\_funct\_1 \\ & X1 (k2\_memstr\_0 np\_3 k1\_scmf\_sa\_2)) \wedge (v1\_partfun1 X1 (u1\_struct\_0 \\ & k1\_scmf\_sa\_2)))))) \Rightarrow (\forall X2.((\neg v1\_xboole\_0 X2) \wedge ((v1\_relat\_1 \\ & X2) \wedge ((v4\_relat\_1 X2 k5\_numbers) \wedge ((v5\_relat\_1 X2 (u1\_compos\_1 \\ & k1\_scmf\_sa\_2)) \wedge ((v1\_funct\_1 X2) \wedge ((v1\_finset\_1 X2) \wedge (v1\_afinsq\_1 \\ & X2)))))) \Rightarrow (((r1\_scm\_halt X2 X1 X0) \wedge (r2\_scm\_halt X2 X1 X0)) \Rightarrow (\forall X3. \\ & (m2\_subset\_1 X3 k1\_numbers k5\_numbers) \Rightarrow ((\neg r1\_xcreal\_0 (k8\_extpro\_1 \\ & np\_3 k1\_scmf\_sa\_2 (k1\_funct\_4 X0 X2) (k1\_scmf\_sa\_m X1)) X3) \Rightarrow (k3\_extpro\_1 \\ & np\_3 k1\_scmf\_sa\_2 (k1\_funct\_4 X0 X2) (k5\_extpro\_1 np\_3 k1\_scmf\_sa\_2 \\ & (k1\_funct\_4 X0 X2) (k1\_scmf\_sa\_m X1) X3) = k3\_extpro\_1 np\_3 k1\_scmf\_sa\_2 \\ & (k1\_funct\_4 X0 (k1\_scmf\_sa8c X2)) (k5\_extpro\_1 np\_3 k1\_scmf\_sa\_2 \\ & (k1\_funct\_4 X0 (k1\_scmf\_sa8c X2)) (k1\_scmf\_sa\_m X1) X3)))))) \end{aligned}$$