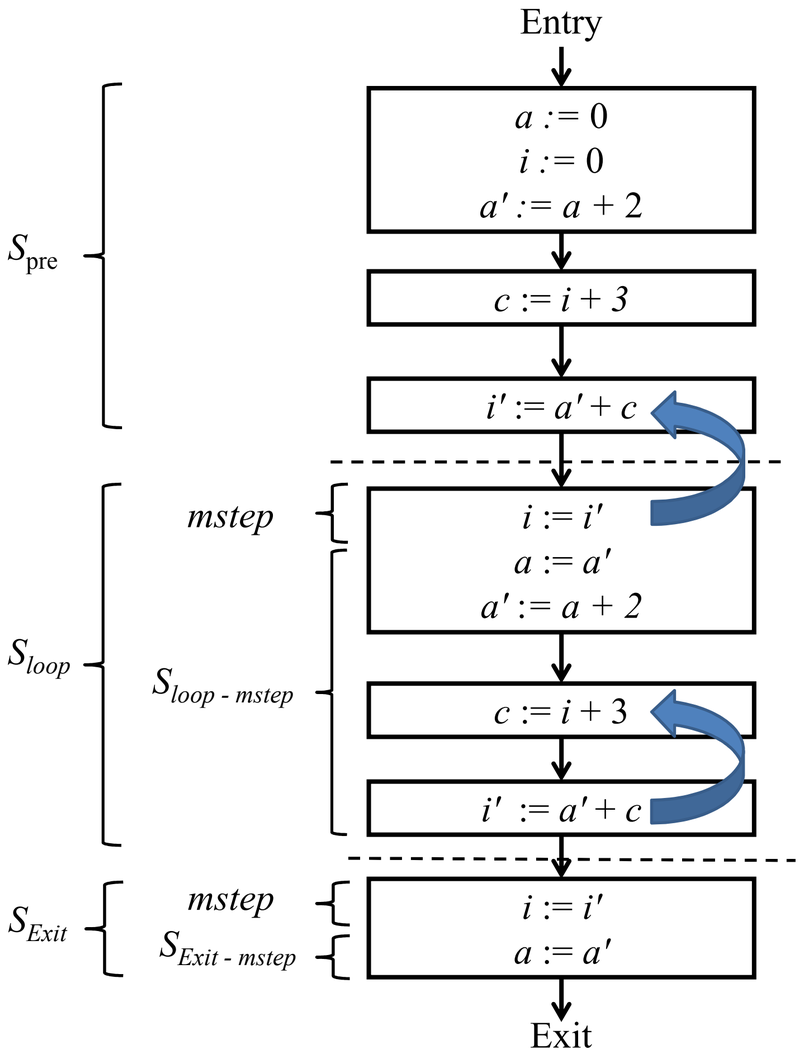

➢ *Requires complex induction*

LHS:

$S_{pre} + S_{loop} \cdot k + S_{Exit}$

$= S_{pre} + (mstep + S_{loop\text{-}mstep}) \cdot k + (mstep + S_{Exit\text{-}mstep})$

RHS:

$(S_{pre} + mstep) + (S_{loop\text{-}mstep} + mstep) \cdot k + S_{exit\text{-}mstep}$

$= (S_{pre} + mstep) + (S_{loop\text{-}mstep} + mstep) \cdot (k - 1) + (S_{loop\text{-}mstep} + mstep) + S_{Exit\text{-}mstep}$

$= S_{pre} + [mstep + (S_{loop\text{-}mstep} + mstep) \cdot (k - 1) + S_{loop\text{-}mstep}] + (mstep + S_{Exit\text{-}mstep})$

LHS = RHS iff

$(mstep + S_{loop\text{-}mstep}) \cdot k = [mstep + (S_{loop\text{-}mstep} + mstep) \cdot (k - 1) + S_{loop\text{-}mstep}]$

[Proved by Induction]