COMP3610/6361

04/10/2023

$\{7=7 \wedge m>7\}\ l := 7\ \{l=7 \wedge m>7\}$

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correct: $\{P[a/l]\}\ l := a\ \{P\}$

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what if we would have

$\vdash \{P[l/a]\}\ l := a\ \{P\}$

example: $\{l=l\}\ l := 7\ \{l=7\}$

so far so good!?

$\{\cancel{l=7 \wedge} m>l\}\ l := 7\ \{l=7 \wedge m>7\}$

$m := 3;$

$\ell := 1;$

$\{m > \ell\}$

$\ell := 7;$

$\{\ell = 7 \wedge m > 7\}$

~~$\{\ell = 1 \wedge m > \ell\}$~~ $\ell := 7$ $\{\ell = 7 \wedge m > 7\}$

$\{ n \geq 3 \}$ $l := 7$ $\{ l = 7 \wedge n > 3 \}$

$n > 21035$

false

$\{ k_0 = n \wedge n > 0 \}$

Algorithm

$\{ l_0 = n! \}$

$wlp(skip, P) = P$

$wlp(l := a, P) = P[a/l]$

$wlp((c_1 ; c_2), P)$

$wlp(c_1, wlp(c_2, P))$

$wlp(\text{if } b \text{ then } c_1 \text{ else } c_2)$

1. case $b = \text{true}$ then $wlp(c_1, P)$

2. case $b = \text{false}$ then $wlp(c_2, P)$

$wlp(\text{while } b \text{ do } c, P) =$

$\neg b \Rightarrow P$.

$b \Rightarrow wlp(c_1, wlp(\text{while } b \text{ do } c), P)$

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while b do $c \Rightarrow$ if b then c; while b do c
else skip

$\{\ell > 21035\}\ \ell := 7\ \{\ell = 7\}$

$\ell > 21035 \Rightarrow$ true that's $wlp(\ell := 7, \{\ell = 7\})$

$$\frac{\models P \Rightarrow wlp(c, Q) \qquad \vdash \{wlp(c, Q)\}\, c\, \{Q\}}{\vdash \{P\}\, c\, \{Q\}}\ (cons)$$

$\{true\}$

while $(!\ell \neq 0)$ do

$!\ell := !\ell - 1$

$\{\ell = 0\}$

$[\![\ell \geq 0]\!]$

while $(!\ell \neq 0)$ do

$!\ell := !\ell - 1$

$[\![\ell = 0]\!]$

$$sp(skip, P) = P$$

$$sp(c_1; c_2, P) = sp(c_2, sp(c_1, P))$$

$$sp(\text{if } b \text{ then } c_1 \text{ else } c_2) =$$

$$b \Rightarrow sp(c_1, P)$$

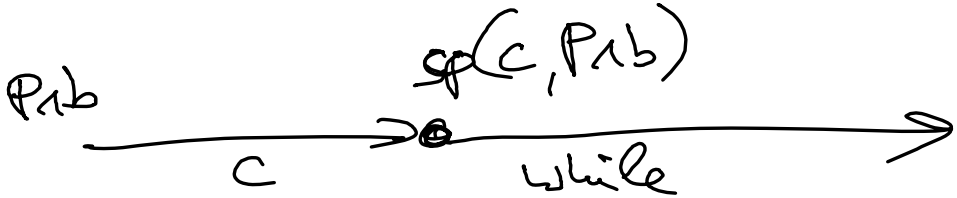
$$\neg b \Rightarrow sp(c_2, P)$$

$\{\ell = 3\}\ \ell := 7\ \{\ell = 7\}$

$\{\ell = 3\}\ \ell := !\ell + 1\ \{\ell = 4\}$

$\{m > 3\}\ \ell := !\ell + 1\ \{m > \ell \wedge \exists v.\ \ell = v + 1\}$

$\{m > \ell\}\ \ell := 7\ \{\exists v.\ m > v \wedge \ell = 7\}$


Prb
c
sp(c, Prb)
while