Låt Move vara programmet

$y = 0;$

while $(x \overset{>}{!}= 0)$ {

$y = y + 1;$

$x = x - 1;$

}

Visa att $\vdash_{par} (\!| x = x_0 |\!)$ Move $(\!| y = x_0 |\!)$

Presentera beviset som en tablå. Identifiera alla bevis-förpliktelser.

(Notera att precis innan while-slingan gäller $x = x_0 \wedge y = 0$)

Vi måste hitta en slingvariant (loop invariant) η sådan att:

1. $x = x_0 \wedge y = 0 \rightarrow \eta$
2. $\eta \wedge \neg(x \mathrel{!=} 0) \rightarrow y = x_0$
3. $\eta \rightarrow (x \mathrel{!=} 0) \vee (y = x_0)$

Ingen av de uppenbara kandidaterna $(x = x_0) \wedge (y = 0)$ eller $(x \mathrel{!=} 0) \vee (y = x_0)$ duger.

Rätt svar: $\underline{y + x = x_0}$ $\wedge\ x \geq 0$

$(\!|\ x = x_0\ |\!)$ Pre

$(\!|\ 0 + x = x_0\ |\!)$ Implied

$y = 0;$

$(\!|\ y + x = x_0\ |\!)$ Loop-invariant

while $(x\ != 0)$ {

$(\!|\ y + x = x_0 \wedge x\ != 0\ |\!)$ While

$(\!|\ y + 1 + x - 1 = x_0\ |\!)$ Implied

$y = y + 1;$

$(\!|\ y + x - 1 = x_0\ |\!)$ Assignment

$x = x - 1;$

$(\!|\ y + x = x_0\ |\!)$ While, Assignment

}

$(\!|\ y + x = x_0 \wedge \neg (x\ != 0)\ |\!)$ While

$(\!|\ y = x_0\ |\!)$ Post

Bevisförpliktelser :

1. $x = x_0 \rightarrow 0 + x = x_0$ ok

2. $y + x = x_0 \wedge x \neq 0 \rightarrow y + 1 + x - 1 = x_0$ ok

3. $y + x = x_0 \wedge \neg(x \neq 0) \rightarrow y = x_0$ ok