1 5F-1 Bookkeeping

- **0 pts** Correct

SF-2

$inv \wedge VC(c, inv2 \wedge (\forall x_i \text{ s.t. } inv2 \Rightarrow (b \Rightarrow VC(c, inv2) \wedge \neg b \Rightarrow P)))$

where $i \in [1, n]$

SF-3. select stark & targaryen

stark

$A = \{y \leq 10\}$

$B = \{y = 10\}$

$\sigma = \{y = 0\}$

$\sigma' = \{y = 10\}$

c: while $y < 10$ do $y := 2$

easy to show $\begin{cases} \langle c, \sigma \rangle \Downarrow \sigma' \\ \sigma \models A \\ \sigma' \models B \end{cases}$

Then it is not possible to prove $\vdash \{A\} c \{B\}$.

Because it should be

$$\frac{\vdash \{x \wedge b\} c \{x\}}{\vdash \{x\} \text{while } b \text{ do } c \{x \wedge \neg b\}} \text{ stark}$$

since only we have

$\{ y \leq 10 \wedge \neg (y < 10) \}$

$= \{ y \leq 10 \wedge y \geq 10 \} = \{y = 10\}$

if we don't have that, then information we have can not prove $\vdash \{A\} c \{B\}$.

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2 5F-2 VCGen Do-While

- **0 pts** Correct

SF-2

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where $i \in [1, n]$

SF-3. select stark & targaryen

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easy to show $\begin{cases} \langle c, \sigma \rangle \Downarrow \sigma' \\ \sigma \models A \\ \sigma' \models B \end{cases}$

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if we don't have that, then information we have can not prove $\vdash \{A\} c \{B\}$.

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targaryen

$A = \{y \le 10\}$

$B = \{y = 10\}$

$\sigma = \{y = 0\}$

$\sigma' = \{y = 10\}$

c: while $y < 10$ do (if $y < 10$ then $y := 2$ else $y := 11$)

easy to show $\begin{cases} \langle c, \sigma \rangle \Downarrow \sigma' \\ \sigma \models A \\ \sigma' \models B \end{cases}$

Then let's show it is impossible to show $\vdash \{A\}\, c\, \{B\}$

since it should be

$$\frac{\vdash \{X \wedge b\}\, c\, \{X\}}{\vdash \{X\}\ \text{while } b \text{ do } c\ \{X \wedge \neg b\}}\ \text{targaryen}$$

since if we not include $\wedge b$,

then by the c, we may directly get

$y = 11$, then it will breaks the while loop

and we will not get to $y = 10\}$ (σ')

so, that is why it is impossible to

show $\vdash \{A\}\, c\, \{B\}$

3 5F-3 VCGen Mistakes

- **0 pts** Correct