2019CSB1071

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Written Assignment - IV

Ans-1

$\Rightarrow b > 5$

$\Rightarrow 2*a - 1 > 5$

$\Rightarrow a > 3$

Given that, $a = 3*(2*b + a)$

$\Rightarrow a > 3$

$\Rightarrow 3*(2*b + a) > 3$

$\Rightarrow 2*b + a > 1$

$\Rightarrow b > \frac{1-a}{2}$

weakest precondition is $b > \left(\frac{1-a}{2}\right)$

Ans-2

So, P : $\{n > 0$ & $count = n$ & $sum = 0\}$

Q : $\{sum = 1 + 2 + \cdots n\}$

i) for 0th iteration : $\{sum = 0\}$

$\{count = n\}$

ii) for 1st iteration : $\{sum = 0 + n = n\}$

$\{count = n - 1\}$

iii) for 2nd iteration : $\{sum = n + n - 1\}$

$\{count = n - 2\}$

iv) for 3rd iteration : $\{sum = n + n - 1 + n - 2\}$

$\{count = n - 3\}$

v) for 4th iteration : $\{sum = n + n - 1 + n - 2 + n - 3$

$\{cont\ n - 4\}$

The relationship between sum & count can be written as

$sum = n + (n-1) + \cdots + (count + 2) + (count + 1)$

after each iteration

when count = n,

$$\Rightarrow \sum_{x=1}^{n} x - \sum_{x=1}^{n} x$$

$$\Rightarrow 0$$

Hence $P \Rightarrow I$

B = count != 0

$\Rightarrow \{I \,\&\, B\} = \{sum = n + (n-1) + \dots (count+1) + (count+2)\}$

& { count != 0

I: { sum = n + (n-1) + ... (count + 1) + count + 2 }

Hence, we observe that

{I & B} S {I}

Also,

$\{I \,\&\, !B\} = \{sum = n + (n-1) + \dots (count+1) + (count+2)\}$
$\&\& \; (count == 0)$

$\Rightarrow \{sum = n + (n-1) \dots + 2 + 1\} = Q$

Hence, we proved that
$\{I \,\&\, !B\} \Rightarrow Q$

In each iteration of while loop count decreases by 1, & $n > 0$ & count $> 0$ before start of loop. So, loop will always terminate & become equal to 0 in n steps.

Hence, at the end of loop
sum = $n + (n-1) + \dots + (count+1) + (count+2)$
& count $= 0$, so

sum = $n + (n-1) + \dots + 2 + 1$