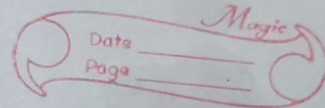


2019CSB1071



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 pre condition is $b > \frac{1-a}{2}$

Ans-2

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

Q: $\sum_{i=1}^n i = 1 + 2 + \dots + n$

1) for 0th iteration : $\{ \text{sum} = 0 \}$
 $\{ \text{count} = 1 \}$

ii) for 1st iteration: $\begin{cases} \text{sum} = 0 + n = n \\ \text{count} = n - 1 \end{cases}$

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

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

eg for 4th iteration : $\begin{cases} \text{sum} = n + n-1 + n-2 + n-3 \\ \text{cont } n-4 \end{cases}$

The relationship between ΔH & ΔG can be written as

Sum = $n + (n-1) + \dots + (\text{count} + 2) + (\text{count} + 1)$
after each iteration

So,

$$I = \{ \text{sum} = n + (n-1) + \dots + (\text{count} + 2) + \text{count} + 1 \}$$

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

we need to show that

$$P \Rightarrow I$$

In other words, we need to prove,
 $n + (n-1) + \dots + (\text{count} + 1) + (\text{count} + 2) = 0$
 when $\text{count} = n$

$$\Rightarrow n + (n-1) + \dots + (\text{count} + 1) + (\text{count} + 2)$$

$$\Rightarrow n + (n-1) + \dots + (\text{count} + 1) + (\text{count} + 2) +$$

$$(\text{count} + (\text{count} - 1) + \dots + 1) -$$

$$(\text{count} + (\text{count} - 1) + \dots + 1)$$

↓ Adding & subtracting $\text{count} + (\text{count} - 1) + \dots + 1$

$$\Rightarrow \sum_{x=1}^n x - (\text{count} + (\text{count} - 1) + \dots + 1)$$

when $\text{count} = n$,

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

$$\Rightarrow 0$$

Hence $P \Rightarrow I$

$$\textcircled{*} B = \text{count} \neq 0$$

$$\Rightarrow \{I \neq B\} = \{\text{sum} = n + (n-1) + \dots + (\text{count}+1) + (\text{count}+2) \neq \text{count} \neq 0\}$$

$$I: \{\text{sum} = n + (n-1) + \dots + (\text{count}+1) + \text{count} + 2\}$$

Hence, we observe that

$$\{I \neq B\} \subseteq \{I\}$$

Also

$$\{I \neq B\} = \{ \text{sum} = n + (n-1) + \dots + (\text{count}+1) + (\text{count}+2) \}$$

$$\neq (\text{count} = 0)$$

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

Hence, we proved that

$$\{I \neq B\} \Rightarrow \emptyset$$

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

Hence, at the end of loop

$$\text{sum} = n + (n-1) + \dots + (\text{count}+1) + (\text{count}+2)$$

$$\neq \text{count} = 0, \text{ so}$$

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