Homework 17 Solutions
CS 336

The important issue is the logic you used to arrive at your answer.

1. Prove that the program segment

   \[
   \begin{align*}
   &\text{y := 1} \\
   &\text{z := x+y}
   \end{align*}
   \]

is correct with respect to precondition "x = 0" and postcondition "z = 1".

   \[
   \begin{align*}
   &\text{y := 1} \\
   &\text{z := x+y}
   \end{align*}
   \]

2. Prove that the program segment

   \[
   \text{if } x < 0 \text{ then } x := 0 \text{ endif}
   \]

is correct with respect to precondition "true" and postcondition "x ≥ 0".

   \[
   \begin{align*}
   &\text{if } x < 0 \text{ then } x := 0 \text{ endif}
   \end{align*}
   \]
3. Prove that the program segment

```plaintext
x := 0
z := x+y
if x < 0 then
    z := z+1
else
    z := 0
```

is correct with respect to precondition "y = 3" and postcondition "z = 7".

```plaintext
x := 0  y = 3
z := x+y  y = 3 ∧ x = 0
z := x+y  y = 3 ∧ x = 0 ∧ z = x + y
if x < 0 then  x = 0 ∧ z = 3
false
z := z+1  z = 7 (any postcondition holds)
else
z := 7  x = 0 ∧ z = 3 ∧ x ≥ 0
z := 7  z = 7
end if
```