Homework 17 Solutions
CS 336

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

1. Prove that the program segment

```
y := 1
z := x+y
```

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

$x = 0$
y := 1 $x = 0 \wedge y = 1$
z := x+y $x = 0 \wedge y = 1 \wedge z = 1$
$z = 1$

2. Prove that the program segment

if x < 0 **then** x := 0

is correct with respect to precondition "*true*" and postcondition " $x \geq 0$ ".

true
if x < 0 **then** $x < 0$
x := 0 $x = 0$
endif $(x = 0) \vee (true \wedge x \geq 0)$
$x \geq 0$

3. Prove that the program segment

```
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 "$z = 7$".

$y = 3$

x := 0 $y = 3 \wedge x = 0$

z := x+y $y = 3 \wedge x = 0 \wedge z = x + y$

$x = 0 \wedge z = 3$

if x < 0 **then** $x = 0 \wedge z = 3 \wedge x < 0$

false

z := z+1 $z = 7$ (any postcondition holds)

else $x = 0 \wedge z = 3 \wedge x \geq 0$

z := 7 $z = 7$

end if $z = 7 \vee z = 7$

$z = 7$