

5.5 Program Correctness

5.5 pg. 377 # 1

Prove that the program segment

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

is correct with respect to the initial assertion $x = 0$ and the final assertion $z = 1$.

5.5 pg. 377 # 3

Verify that the program segment

```
x := 2
z := x + y
if y > 0 then
  z := z + 1
else
  z := 0
```

is correct with respect to the initial assertion $y = 3$ and the final assertion $z = 6$.

5.5 pg. 377 # 7

Use a loop invariant to prove that the following program segment for computing the n th power, n is a positive integer, of a real number x is correct.

```
power := 1
i := 1
while i ≤ n
  power := power · x
  i := i + 1
```

5.5 pg. 377 # 11

Suppose that both the program assertion $p\{S\}q_0$ and the conditional statement $q_0 \rightarrow q_1$ are true. Show that $p\{S\}q_1$ also must be true.