

Homework 7

November 1, 2019



Deadline

Due: November 8, 2019, 23:59. Good luck!

Problem 1

Write preconditions and postconditions of the following incomplete Hoare triples to make them valid.

1. $\{a > 2\} a := a + 1 \{ \quad \}$
2. $\{ \quad \} \text{ if } (a == 0) \text{ then } a := 1 \text{ else } a := 3 \{ a = 3 \}$
3. $\{ \quad \} a := b - c \{ a = 5 \}$
4. $\{ a = 3 \} \text{ while } (a < 10) a := a + 1 \{ \quad \}$

Solution.

Your solution here.

Problem 2

Prove $\{a = v0 \wedge b = v1\} c := a; a := b; b := c \{a = v1 \wedge b = v0\}$.

Solution.

Your solution here.

Problem 3

Prove $\{T\} \text{ if}(a == 1) \text{ then } b := 3 \text{ else } b := 1 \{b = 1 \vee b = 3\}$.

Solution.

Your solution here.

Problem 4

Prove $\{a = 3\} \text{ while}(a! = 10) a := a + 1 \{a = 10\}$. The loop invariant is $a \leq 10$.

Solution.

Your solution here.

Problem 5

Write a weaker precondition and a stronger postcondition for $\{b = 7\} a := b + 3 \{a > 5\}$.

Solution.

Your solution here.

Problem 6

Compute $wlp(a := b - 1; \text{ if}(a == 10) \text{ then } c := a + 1 \text{ else } c := a + 2, c > 4)$

Solution.

Your solution here.