Homework6

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Problem1:

Trigger : ∀x.{f(g(x))}

(∀x)(f(g(x)) = x) ∧ g(a) = c ∧ g(b) = c ∧ a != b

∀x.{f(g(x))}(f(g(x)) = x) g(a) = c g(b) = c a != b

So f(g(a)) = a = f(c) and f(g(b)) = b = f(c)

So a = b;

unsat

Problem2:

1. {a = 1}a := a + 1{a = 2}
2. {a+1= 2}a := a + 1{a = 2} AS
3. a=1→a+1=2 predicate logic
4. {a = 1}a := a + 1{a = 2} SP(1)(2)

2. {a = 1}a := a + 1{a = 3}

(1) {a = 1}a := a + 1{(∃x)((a=v+1)∧(v=1))}

(2) (∃x)((a=v+1)∧(v=1))→ a=2

(3) not valid

1. {a − b > 3}a := a − b{a > 2}
2. {a-b>2}a := a − b{a > 2}
3. a-b > 3 →a-b>2
4. {a-b > 3}a := a − b{a > 2}
5. {a = 1} while(1) skip {a = 3}
6. {a=3}skip {a = 3}
7. {(a=3)∧1}→ {a = 3}
8. {(a=3)∧1}skip {a = 3}
9. {a=3} while(1) skip {a=3}

Not valid

1. {a ≤ 10} while(a! = 10) a := a + 1 {a = 10}
2. {a+1≤10}a := a + 1 {a ≤10}
3. (a ≤ 10)∧a! = 10 → a+1≤10
4. {(a ≤ 10)∧a! = 10}a := a + 1 {a ≤10}
5. {a ≤ 10} while(a! = 10) a := a + 1 {(a ≤ 10)∧a= 10}
6. (a ≤ 10)∧a= 10→ a=10
7. {a ≤ 10} while(a! = 10) a := a + 1 {a = 10}