

Principles of Programming Languages - Homework 1

Abhi Agarwal

1 Problem 1

(a)

The use of pi at line 4 is bound at which line? Line 3

The use of pi at line 7 is bound at which line? Line 1

(b)

The use of x at line 3 is bound at which line? Line 2

The use of x at line 6 is bound at which line? Line 5

The use of x at line 10 is bound at which line? Line 5

The use of x at line 13 is bound at which line? Line 1

2 Problem 2

Is the body of g well-typed? Yup!

If so, give the return type of g and explain how you determined this type.

The return type of g would be (Int, Int).

For this explanation, first, give the types for the names a and b.

Type of a is an Int. The reasoning stands from:

val (a, b) = (1, (x, 3))

a: Int

1: Int

val a = 1

val _ = 1 => Int

One portion of the return could either be:

a + 2 : Int because

a : Int

2 : Int

- + - : (Int, Int) => Int

Or

1 : Int

Type of b is a Tuple of (Int, Int). The reasoning stands from:

```
val (a, b) = (1, (x, 3))
```

```
  b: (Int, Int)
```

```
  x: Int
```

```
  3: Int
```

```
  (x, 3): (Int, Int)
```

```
  val b = (x, 3) => (Int, Int)
```

3 Problem 3

(d) ii.

No mutable variables? Yup!

Is your implementation tail-recursive? Yes it is!