CSE 3302/5307 Programming Language Concepts

Homework10 - Fall 2023

Due Date: Nev.4, 2023, 11:59p.m. Central Time

Problem1 - 30%

Prove the Lemma: If $(S, q) \rightarrow (S', q')$ then:

- T is complete for (S, q) iff T is complete for (S', q')
- T is principal for (S, q) iff T is principal for (S', q')

Problem2 - 40%

(a) Give the detailed derivation of the following expressions and obtain the set of equations, then solve these equations by unification algorithm to get the principle solution and give the universal polymorphic types:

```
let x = inr (5::4::3) in
case x of inl y => y.1 + y.2 |
          inr y => (case y of nil => 0 | h::l => h)
```

Problem3 - 30%

Show why type checking let expression using [t-LetPoly] is exponential in time and give an amortised linear implementation of let polymorphism instead.