BU CAS CS 520 (Fall Semester, 2009)
Principles of Programming Languages

Assignment 6

Out: Monday, 16 November 2009
Due: Tuesday, 24 November 2009

Total: 70 points + 50 extra points

Exercise 1 *(20 pts) Assume $t \equiv_\alpha t'$, that is, $nf_\alpha(t) \equiv nf_\alpha(t')$. Then we have the following.*

1. *$FV(t) = FV(t')$.*
2. *If $y \notin vars(t) \cup vars(t')$, then $t[y/x] \equiv_\alpha t'[y/x]$ for any variable x.*

Exercise 2 *(20 pts) Given a λ-abstraction $\lambda x.t$ and a variable $y \notin FV(t)$, please prove that $\lambda x.t$ and $\lambda y.t[x \mapsto y]$ are α-equivalent, that is, $nf_\alpha(\lambda x.t)$ and $nf_\alpha(\lambda y.t[x \mapsto y])$ are syntactically the same.*

Exercise 3 *(30 pts) Please see the file* `assignment6_3.dats`

Exercise 4 *(50 extra pts) Please see the file* `assignment6_4.dats`