

CS 3723: Programming Languages

Feb 20, 2012

You Name:

1. which of the following correctly describes the situation where a variable needs to be renamed when evaluating a function call $((\lambda x. M) N)$ in lambda calculus.
 - (a) If N contains a free variable y which is bound in M , then the bound variable in M needs to be renamed.
 - (b) If N contains a free variable y which is bound in M , then the free variable in N needs to be renamed.
 - (c) If N contains x as a free variable, then the bound variable x in $(\lambda x. M)$ needs to be renamed.
2. Which of the following are correct reductions of the lambda calculus expression $(\lambda x. (\lambda y. y x) (\lambda z. x z)) y$
 - (a) $(\lambda y. y y) (\lambda z. y z)$
 - (b) $(\lambda z. z y) (\lambda z. y z)$
 - (c) $(\lambda x. (\lambda z. x z) x) y$
 - (d) $(\lambda x. \lambda y (\lambda z. x z) x) y$