CMSC 330 Spring 2017 Quiz #4

Name _____

Discussion Time (circle one) 10am 11am 12noon 1pm 2pm 3pm

Discussion TA (circle one) Aaron Alex Austin Ayman Daniel Eric Greg Jake JT Sam Tal Tim Vitung

Instructions

- Do not start this quiz until you are told to do so.
- You have 20 minutes for this quiz.
- This is a closed book quiz. No notes or other aids are allowed.
- For partial credit, show all of your work and clearly indicate your answers.

1. (4 points) Circle ALL expressions that are equivalent to the following lambda expression

(λx.x z) λy.w λw.w y x z

i. (λx.x z) (λy.w) (λw.w y x z)

ii. (λx.(x z)) λy.w λw.w y x z

iii. (λx.x z) λy.(w (λw.(w y x z)))

iv. (λx.x z) λy.w λw.(w (y (x z)))

2. (2 points) Are the following two terms alpha equivalent? (Circle One) YES **NO**

(λx.x (λy.x y) y) z (λx.x (λa.x a) a) z

3. (4 points) Reduce the following lambda expression:

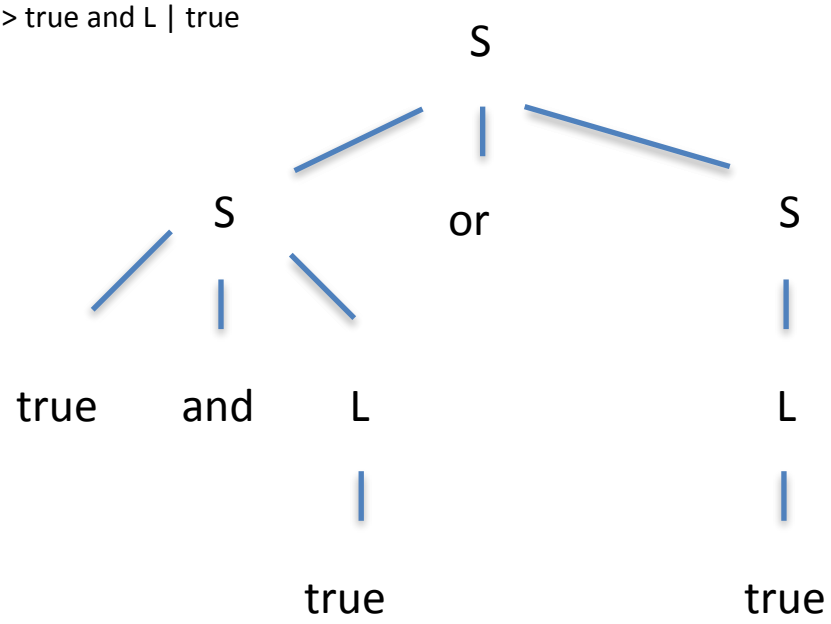
(λa.λc.c b a) c (λd.λe.e)

(λa.λc.c b a) c (λd.λe.e) // Alpha Conversion λc.c becomes λf.f
(λf.f b c) (λd.λe.e)
(λd.λe.e) b c
(λe.e) c
c

4. (5 points) Given the following language, provide a parse tree for “true and true or true”

   S —> S or S | L

   L —> true and L | true



5. (5 points) Make the following grammar left associative with “()” having higher precedence than “and”. You can introduce new non-terminals if necessary.

   S —> (S) | S and S | true | false

   S —> S and E | E

   E —> (S) | true | false