COMP 3007: Assignment 1, Q2 and Q3

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Question 1: If the LAST DIGIT of your student number is 7, 8, 9, or 0, then reduce the following expression:

$$(\lambda a.\lambda b.(\lambda c.\lambda d.\lambda e.cde)ab(\lambda f.(\lambda g.f)))(\lambda h.(\lambda i.i))(\lambda j.(\lambda k.j))$$

Solution: Using beta-reduction:

$$(\lambda b.(\lambda c.\lambda d.\lambda e.cde)(\lambda h.(\lambda i.i))b(\lambda f.(\lambda g.f))(\lambda j.(\lambda k.j)) \tag{1}$$

$$(\lambda c.\lambda d.\lambda e.cde)(\lambda h.(\lambda i.i))(\lambda j.(\lambda k.j))(\lambda f.(\lambda g.f)) \tag{2}$$

$$(\lambda d.\lambda e.(\lambda h.(\lambda i.i))de)(\lambda j.(\lambda k.j))(\lambda f.(\lambda g.f)) \tag{3}$$

$$(\lambda e.(\lambda h.(\lambda i.i))(\lambda j.(\lambda k.j))e)(\lambda f.(\lambda g.f)) \tag{4}$$

$$(\lambda h.(\lambda i.i))(\lambda j.(\lambda k.j))(\lambda f.(\lambda g.f)) \tag{5}$$

$$(\lambda i.i))(\lambda f.(\lambda g.f)) \tag{6}$$

$$\lambda f.(\lambda g.f) \tag{7}$$

Question 2: If the 2nd LAST DIGIT of your student number is 4, 5, or 6, then trace the evaluation of: **puzzle (enigma (secret 2 4) 6) 8**

Solution:

$$puzzle(enigma(4-2)\ 6)\ 8$$

$$puzzle(enigma(2\ 6)\ 8$$

$$puzzle(2-6)8$$

$$puzzle\ -4\ \ 8$$

$$-4*8$$

$$-32$$