Q1.

Write the meaning of these sentences in first order logic. You may ignore temporal and aspectual semantics for the moment.

(1) a. Every student who is tired is happy.
b. Every tired student is happy.
c. Every successful student is tired.
d. John ate only two apples. (Hint: you can use the two place predicate *notid*, meaning 'not identical' or 'not the same individual as'.)

Let the operator $\circ$ be left associative. (For associativity you can consult the lambda calculus notes Section 3, item B, or the Wikipedia article on 'operator associativity'.

Eliminate all the eliminable parenthesis in the following:

Q2.

(2) a. $((a \circ b) \circ c)$
b. $(a \circ (b \circ (c \circ d)))$
c. $(a \circ ((b \circ c) \circ d))$

Restore the following to fully parenthesized form.

(3) a. $a \circ b \circ c \circ d$
b. $a \circ b \circ (c \circ d)$
c. $a \circ (b \circ c) \circ d$