Dr. Mamdouh Najjar   **ICS 410-01 (071)**   **Sept. 18, 2007**
Programming Languages

Programming Assignment # 1
(20 points)
Starting Scheme Programming
Due Oct. 21, 2007

Write and run Scheme programs to implement the following three problems. Use the PLT Scheme (DrScheme) interpreter available for download at the link:
http://www.plt-scheme.org/

Problem 1:   Eliminate consecutive duplicates of list elements.
If a list contains repeated elements they should be replaced with a single copy of the element. The order of the elements should not be changed.

Example: (compress '(a a a a b c c a a d e e e e))
(A B C A D E)

Problem 2:   Pack consecutive duplicates of list elements into sublists.
If a list contains repeated elements they should be placed in separate sublists.

Example: (pack '(a a a a b c c a a d e e e e))
((A A A A) (B) (C C) (A A) (D) (E E E E))

Problem 3:   Run-length encoding of a list.
Use the result of problem 2 to implement the so-called run-length encoding data compression method. Consecutive duplicates of elements are encoded as lists (N E) where N is the number of duplicates of the element E.

Example: (encode '(a a a a b c c a a d e e e e))
((4 A) (1 B) (2 C) (2 A) (1 D)(4 E))

Hint: the following link is useful.
http://www.ic.unicamp.br/~meidanis/courses/mc336/2006s2/funcional/L-99_Ninety-Nine_Lisp_Problems.html