# CS424/524-01: Programming Languages Extra Credit

### Due: See Canvas for Due Dates (up to 5 points added to a test grade)

## These problems cover material from Chapter 15 of the textbook.

## Chapter 15: Work the following problems. Point values are provided.

1. (1) What is the result of each of the following statements [In the event a list is an answer, just write the list form not the annotated version - Example: (a b c) **NOT** (list a b c)

(+ (car '(1 2 3)) (caar '((1) 10 30)))

* Add
* Car takes first element of list: 1
* Caar takes first element of first element: 1
* **Result is 2**

1. (1) What is wrong with the following expression. Do not just give me an error message. Explain it.

(caar '(a (b c d)))

* Caar takes first element of first element but the first element is ‘a’ which is a symbol. Therefor it’s an atomic value

1. (1) Write a Scheme/Lisp expression to pull the value *pear* out of the following list use only car and cdr, no other combinations.

'(orange (apple grape ((pear) raisin)) lemon)

* Cdr ‘(orange (apple grape ((pear) raisin)) lemon ) – return everything but 1st element
  + ((apple grape ((pear) raisin)) lemon)
* Car ((apple grape ((pear) raisin)) lemon) – return first element
  + (Apple grape ((pear) raisin))
* Cdr (Apple grape ((pear) raisin))
  + (Grape ((pear) raisin))
* Cdr (grape ((pear) raisin))
  + ((pear) raisin)
* Car ((pear) raisin)
  + (Pear)
* Car (pear)
  + Pear
* Answer: (car (car (cdr (cdr (car (cdr '(orange (apple grape ((pear) raisin)) lemon)))))))

1. (1) Write a single lisp/scheme expression to insert the new value 'z into the beginning of the list **'(a b)** to produce **'(z a b)**

* (Cons ‘z ‘(a b))

1. (1) Explain what the following Scheme/LISP function (named EXF1) does. In other words, tell me what it accomplishes, not just describe the step-by-step logic:

(define (EXF1 S L)

(cond ((null? L) '())

((equal? S (car L)) L)

( else (EXF1 S (cdr L)))

)

)

* Takes two arguments of S and L and checks if L is empty. If empty it returns an empty list. Checks if first element of L is equal to S, if not it calls the function again with the rest of the list
* EXF1 uses recursion to search in some list L for a target S