CS3723 Pgm2 Lisp (10 points)

Code the functions listed below and use the specified test cases.

Notes:

* You can only use the functions we discussed in the LISP notes including ones we developed as exercises or used in these functions.
* Your functions must be executed on a **fox** server using the specified test cases. Use (load "p2*abc123*.lisp" :echo T :print T). Replace *abc123* with your abc123 ID.
* Turn in your log from the terminal window.
* Your code must follow my LISP programming standards.

1. Code the function, SETDIFF, which is passed two sets which are all top-level items. It returns the difference of set1 and set2 (i.e., it returns items in set1 which are not in set2).

Examples:

(setdiff '(x y z) '(w x z)) is (Y)

(setdiff '(w x y z) '(x y)) is (W Z)

(setdiff '(x y z) '(x y z)) is ()

2. Code the function, MAKESET, which is passed a top-level list of atoms. It should return a list of unique atoms (i.e., each of the elements will occur only once).

Example:

(makeset '()) is (D A B) -- note that the order is insignificant

3. Code the function, ATOMICLIST, which is passed a list of atoms. It should return a list of atoms that occur anywhere in the list regardless of nesting.

Hint: APPEND can be useful.

Examples:

(atomiclist '(A (B F (H) G) J)) is (A B F H G J)

(atomiclist '(L () (I () S) (((P ()))) )) is (L () I () S P ()) it can show NIL instead of ()

4. Code the function, countUniqNonNIL, which is passed a list containing any level of nesting and returns a count of all **unique** non-NIL atoms that occur anywhere in the list.

Hint: other functions in this assignment may be useful.

Examples:

(countUniqNonNIL ' (H (A) ()) P (P Y D) (A (Y S))) is 6

Test cases:

(setdiff '(x y z) '(w x z))

(setdiff '(w x y z) '(x y))

(setdiff '(x y z) '(x y z))

(setdiff '(w r y i g x h t z) '(w x y z))

(makeset '(a b b a d a b b a))

(makeset '(e a t s e t))

(atomiclist '(A (B F (H) G) J))

(atomiclist '(L () (I () S) (((P ()))) ))

(countUniqNonNIL '((H (A) ()) P (P Y D) (A (Y S))))

(countUniqNonNIL '( (T (H A T)) (I S) I (T) ))