csc324 SOLUTION for Quiz #1 Monday 27 September 1999

Duration: 15 minutes

Aids allowed: None

Family Name: ______________________ **Lecturer:** Diane Horton

First Name: ______________________ **Tutor:** ______________________

Student #: ______________________

Grade: ____________

csc324 Quiz #1 Monday 27 September 1999

1. For each of the following expressions, circle "E" if it would cause an error in Lisp, or "N" if it would not. If it would not cause an error, show the value that Lisp would return.

Expression	Causes an error?	Value (if not an error)
`(list '(P Q) '(S T))`	E $\boxed{\text{N}}$	`((P Q) (S T))`
`(car '(((A)) B C))`	E $\boxed{\text{N}}$	`((A))`
`(car (A B C))`	$\boxed{\text{E}}$ N	
`(cons '(P Q) (cdr '(A B C)))`	E $\boxed{\text{N}}$	`((P Q) B C)`
`(append '(car (X Y)) '(A B C))`	E $\boxed{\text{N}}$	`(CAR (X Y) A B C)`

2. What does the following function return, and what preconditions does it require? (Hint: I could have used `eq` instead of `equal`. I am *not* testing you on the difference between them.)

```
(defun mystery (a b)
   (cond ( (null a) 0 )
         ( (equal b (car a))
               (+ 1 (mystery (cdr a) b))
         )
         ( t   (mystery (cdr a) b) )
   )
)
```

Returns: `The number of times b occurs in list a.`

Preconditions: `a is a list.`

3. Complete the following Lisp function, whose job is to return the last element of a list. Examples:
`(lastelement '(A B C)) = C`   `(lastelement '(A (B C))) = (B C)`
You may not use Lisp's `last` function.

```
; Precondition: 'list' is a list of one or more elements.
(defun lastelement (list)


    (cond ( (eq (length list) 1) (car list) )
          ( t  (lastelement (cdr list)) )
    )
)
```