

Computer Science 431

First Hour Exam

Name _____

Friday, Oct. 1
100 pts.

I. Lisp stuff

a. (10 pts.)

Write as dotted pairs

(a b)

(a (b))

Write as lists

(a . (b . (c . nil)))

((a . nil) (b . nil))

b. Write as a lisp expression (5 pts.)

$3 * (7 - 2)$

- c. (5 pts.) Without using **first**, **second**, or **third**, write lisp expressions to return

The **first** item in the list **lst**

The **second** item in the list **lst**

The **third** item in the list **lst**

- d. (5 pts.) What will be returned by

(car '(a . b))

(cdr '(a . b))

- e. (10 pts.) Write a lisp function called **rot** which will **rotate** the first three items in a list. For example, (rot '(a b c d)) should return (b c a d). You may use any lisp functions (including first, second, etc.) you wish (except for a built-in rotate function).
- f. (10 pts.) Write a lisp function mimicing the built in nth function, which will return the nth item in a list. For example, (nth '(a b c d e) 4) should return d (the fourth item in the list). Consider recursion.

- g. (10 pts.) Write a pattern for the match function which will do the following: for a successful match,

The first and last items in the list should be the atom 'a'
The second item in the list can be anything at all, but
whatever it is should be placed in the variable *X*.
The third item in the list must be a number, and whatever
number it is should be placed in the variable *Y*

2. Search (20 pts.)

Consider the following successor function:

(A (B C))
(B (D E))
(C (G))
(D (F))
(E nil)
(G (F))
(F nil)

A is the initial (start) state, and F is the final state.

- a. Sketch the graph

- b. Briefly describe both depth first and breadth first search, illustrating your answer to each by listing some nodes in the graph (previous page) in the order they might be visited.

3. Philosophy:
 - a. (10 pts) With the help of a diagram (if you would like), give an explanation of the Turing test. What is the criterion for success?

b. (10 pts.) What is the physical symbol system hypothesis (PSSH)? As a part of your answer, explain what 'necessary' and 'sufficient' means in the context of the PSSH.

c. (5 pts) What is a **percept sequence**?