Informatics 41 • Fall 2004 • David G. Kay • UC Irvine  Your name _____

# SEVENTH QUIZ

Your student ID _____

You have 15 minutes from the start of class to complete this quiz. Read the questions with care; work with deliberate speed. Don't give us more than we ask for. The usual instructions apply. Good luck!

Problem 1 (7 points)

Complete the definition of this function, which uses dish structures as usual:

```
(define-struct dish (name price))

;; menu-add-dish: dish (listof dish) -> (listof dish)
;; Add the dish (the first argument) to the menu (the second argument), as follows:
;; If the dish's name matches the name of a dish on the menu, substitute the dish's
;; price for the one already on the menu.  Otherwise, add the dish to the menu.
(define menu-add-dish
  (lambda (dish menu)
    (cond


      ((empty? menu) (list _____________))


      ((string=? (dish-name _____________)


                 (dish-name (_____________ _____________)))


       (_____________ _____________ (rest menu)))


      (else (cons (first menu) (_____________ dish (rest menu)))))))
```

Problem 2 (4 points)

Here is a definition of `collection-search` from the restaurant collection program:

```
;; collection-search: collection (rrant->boolean) -> collection
;; Return a collection made up of all the restaurants in C that pass test?
(define collection-search
  (lambda (C test?)
    (cond
      ((collection-empty? C) (make-collection 'x))
      ((test? (first C))
       (cons (first C) (collection-search (rest C) test?)))
      (else (collection-search (rest C) test?)))))
```

*[continued on the other side]*

Complete the definition below:

```
;; search-by-cuisine: collection -> collection
;; Return a collection of those restaurants in the input collection
;; that serve the cuisine specified by the user.
(define search-by-cuisine
  (lambda (RC)
    (local ((define cuisine (begin
                              (display "Please enter cuisine to search for:  ")
                              (read))))
      (collection-search
        RC
```

```
))))
```

Problem 3 (9 points)

A Deus X reference sheet is attached. You may tear it off; you don't have to turn it back in.

(a) (3 points) Which of the following operations would you expect to find as a single machine-language operation in the instruction set of a typical computer (like the Deus X)? (Choose *one or more* of the following.)

A. Display to the user a menu of choices on the screen.
B. Highlight an icon on the desktop when a user clicks on it.
C. Multiply two numbers together
D. Compare two machine words of memory to see if they hold the same value.
E. Play a sound when the user selects an invalid command.

(b) (3 points) Suppose that location 1000 of the Deus X machine's memory holds the number 15 and that location 2000 holds the number 20. What is in location 2000 after executing these three instructions? (The first number on each line indicates the instruction's address in memory.)

```
0.   10  1000  (lda 1000)
1.    1  2000  (add 2000)
2.   20  2000  (sta 2000)
```

(c) (3 points) Suppose that location 1000 of the Deus X machine's memory holds the number 55 and that location 2000 holds the number 44. What does the Deus X machine print after executing these instructions?

```
0.   10  1000  (lda 1000)
1.   50  2000  (cmpa 2000)
2.   60  2000  (je 5)
3.    6  1000  (out 1000)
4.    7  6     (jmp 6)
5.    6  2000  (out 2000)
6.   …
```