CS 61A
Fall 2017

Structure and Interpretation of Computer Programs

QUIZ 9

INSTRUCTIONS

- You have 10 minutes to complete this quiz.

- The exam is closed book, closed notes, closed computer, closed calculator.

- Mark your answers **on the exam itself**. We will *not* grade answers written on scratch paper.

- For multiple choice questions, fill in each option or choice completely.

  - ☐ means mark **all options** that apply
  - ◯ means mark a **single choice**

Last name	
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Discussion Section	___ ___ ___
All the work on this exam is my own. **(please sign)**	

0. **Your thoughts?** Are you more of a Python-ista, or a Scheme-er?

1. **Interpretive Dance**

   Assume the following definition has been loaded into the Scheme interpreter.

   ```
   (define (sum-of-squares x y z)
     (+ (* x x) (* y y) (* z z)))
   ```

   For each of the following Scheme expressions, mark the number of calls made to `scheme_eval` and `scheme_apply`:

   (a) `(+ 5 (* 3 7 3))`

       `scheme_eval`   ○ 3 ○ 4 ○ 5 ○ 6 ○ 7 ○ 8 ○ 9

       `scheme_apply`   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6

   (b) `(sum-of-squares 3 4 5)`

       `scheme_eval`   ○ 4 ○ 5 ○ 8 ○ 10 ○ 14 ○ 19 ○ 24 ○ 25

       `scheme_apply`   ○ 1 ○ 2 ○ 3 ○ 4 ○ 5 ○ 6

2. **Scheming**

   For each of the following Scheme expressions, mark the choice corresponding to the correct `Pair` representation that `scheme_read` would return.

   (a) `(func (4 5) 3)`

   ○ `Pair('func', Pair(4, Pair(5, Pair(3))))`

   ○ `Pair('func', Pair(4, Pair(5, Pair(3, nil))))`

   ○ `Pair('func', Pair(Pair(4, 5), Pair(3, nil)))`

   ○ `Pair('func', Pair(Pair(4, Pair(5, nil)), Pair(3, nil)))`

   ○ Attempting to `scheme_read` the above expression would result in a syntax error.

   (b) `'(1 2 (3))`

   ○ `Pair(1, Pair(2, Pair(3, nil)))`

   ○ `Pair(1, Pair(2, Pair(Pair(3, nil), nil)))`

   ○ `Pair('quote', Pair(1, Pair(2, Pair(Pair(3, nil), nil))))`

   ○ `Pair('quote', Pair(Pair(1, Pair(2, Pair(Pair(3, nil), nil))), nil))`

   ○ Attempting to `scheme_read` the above expression would result in a syntax error.

   (c) `(cdr () 'cdr)`

   ○ `Pair('cdr', Pair(nil, Pair('cdr', nil)))`

   ○ `Pair('cdr', Pair(Pair(nil, Pair('cdr', nil))))`

   ○ `Pair('cdr', Pair(nil, Pair(Pair('quote', Pair('cdr', nil)), nil)))`

   ○ `Pair('cdr', Pair(Pair(nil, Pair(Pair('quote', Pair('cdr', nil))))))`

   ○ Attempting to `scheme_read` the above expression would result in a syntax error.