

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 | |
| First name | |
| Student ID number | |
| CalCentral email (_@berkeley.edu) | |
| Discussion Section | ____ _ |
| <i>All the work on this exam is my own.</i> (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.