INSTRUCTIONS

• You have 10 minutes to complete this quiz.
• The exam is closed book, closed notes, closed computer, closed calculator.
• The final score for this quiz will be assigned based on effort rather than correctness.
• Mark your answers on the exam itself. We will not grade answers written on scratch paper.
• For multiple choice questions,
  – ☐ means mark all options that apply
  – ☐ means mark a single choice

Last name

First name

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Name of the person to your left

Name of the person to your right

All the work on this exam is my own. (please sign)
1. (5 points) **Interpretive Dance**

(a) (2 pt) Assume the following definition has been loaded into the Scheme interpreter.

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

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

i. ```(+ 5 (* 3 7 3))```  
  
<table>
<thead>
<tr>
<th><code>scheme_eval</code></th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>scheme_apply</code></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

ii. ```(sum-of-squares 3 4 5)```  
  
<table>
<thead>
<tr>
<th><code>scheme_eval</code></th>
<th>4</th>
<th>5</th>
<th>8</th>
<th>10</th>
<th>14</th>
<th>19</th>
<th>24</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>scheme_apply</code></td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
<td>6</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(b) (3 pt) For each of the following Scheme expressions, mark the choice corresponding to the correct Pair representation that `scheme_read` would create.

i. ```(func (4 5) 3)```  
  - O Pair('func', Pair(4, Pair(5, Pair(3)))))
  - O Pair('func', Pair(4, Pair(5, Pair(3, nil)))))
  - O Pair('func', Pair(Pair(4, 5), Pair(3, nil)))
  - O Pair('func', Pair(Pair(4, Pair(5, nil)), Pair(3, nil)))
  - O Attempting to `scheme_read` the above expression would result in a syntax error.

ii. ```'(1 2 (3))```  
  - O Pair(1, Pair(2, Pair(3, nil))))
  - O Pair(1, Pair(2, Pair(Pair(3, nil), nil)))]
  - O Pair('quote', Pair(1, Pair(2, Pair(Pair(3, nil), nil))))
  - O Pair('quote', Pair(Pair(1, Pair(2, Pair(Pair(3, nil), nil)))))
  - O Attempting to `scheme_read` the above expression would result in a syntax error.

iii. ```(cdr () 'cdr)```  
  - O Pair('cdr', Pair(nil, Pair('cdr', nil)))
  - O Pair('cdr', Pair(Pair(nil, Pair('cdr', nil))))
  - O Pair('cdr', Pair(Pair('cdr', Pair('quote', Pair('cdr', nil))), nil)))
  - O Pair('cdr', Pair(Pair('cdr', Pair('quote', Pair('cdr', nil)))))))
  - O Attempting to `scheme_read` the above expression would result in a syntax error.